

20 DEC 1927 193

FIFTEENTH ANNUAL REPORT  
OF THE (3)  
SUPERINTENDING ENGINEER  
OF  
PUBLIC HEALTH DEPARTMENT  
(ENGINEERING BRANCH)

BIHAR AND ORISSA

FOR THE YEAR ENDED

31st MARCH 1927.



PATNA

SUPERINTENDENT, GOVERNMENT PRINTING,  
BIHAR AND ORISSA

1927,

[Price—Re. 1.]

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## GOVERNMENT OF BIHAR AND ORISSA.

## MINISTRY OF LOCAL SELF-GOVERNMENT.

## RESOLUTION.

*Dated the 24th September 1927.*

## READ—

The annual report of the Public Health Engineering Department for 1926-27.

1. MR. S. E. PLATT held charge of the Department throughout the year till 23rd March 1927 when he went on leave and Mr. T. S. Soorma, Executive Engineer, began to officiate as Superintending Engineer.

2. The following comparison between the values of the work done by the Department in the last two years shows steady expansion :—

*Works under construction.*

	1925-26.	1926-27.
	Rs.	Rs.
Government ... ..	3,32,380	3,37,278
Deposit ... ..	1,25,672	2,42,666

*Works executed by or under the supervision of the Department*

1925-26.	1926-27.
Rs.	Rs.
7,82,232	9,11,744

*Schemes prepared.*

Detailed ... ..	10,44,918	8,57,000
Preliminary ... ..	4,88,900	27,70,000

The cost of the Department in the latter year was Rs. 1,88,778.

3. Advantage has been taken of the appointment of a second Executive Engineer to reorganise the Department into two divisions between which the province has been territorially divided with strict regard to ease and economy of travelling

The bulk of the actual constructional work of the Department has been done for Government. The number of pumping plants in charge of different Government departments has so increased that a proposal is under consideration to appoint another engineer with special qualifications to supervise their working as experience both with them and with municipal and other plants shows that considerable economies can be effected with expert supervision.

4. A feature of the present report is the increasing reliance on tube wells as a source of water-supply and it is satisfactory to note that all the wells sunk on behalf of Government have been entirely successful except at Darbhanga where the very fine sand encountered caused trouble with the pumping plant adopted. Increased experience has led to elaborate rules for the testing of tube wells, which are all sunk by private enterprise before they are taken over from the contractors. The existence, which these wells prove, of large supplies of sub-soil water offers great opportunities for the development of local water-supply systems as the tubes are not expensive in themselves and the water which they yield is so pure as to render all filtration unnecessary. A supply of absolutely pure water is a great preventive of disease. But experience has yet to prove the durability of these wells in the conditions encountered in this province.

5. Progress with the major deposit works has not been so satisfactory. The cost of substituting tube wells for the river Ganges as a source of supply in Bhagalpur was originally underestimated, but after discussion with the municipality a revised scheme designed to supply half as much again as the old head works at their best, linked to a distribution system capable of supplying twice as much has now been sanctioned at an estimated cost of Rs. 8 lakhs. This will admit of future expansion as funds permit and the needs of the town require. As considerable time has been occupied by a discussion of the plans it is hoped that the work will now proceed expeditiously: the state of the old plant threatens a cessation of the supply.

The progress made with the new tube wells at Gaya was not satisfactory, because hard rock was struck at a depth of 100 feet and this necessitated a modification of the design. It is hoped that the new wells which are now being tested will provide the augmented supply required. Analytical tests carried out after the year under review in consequence of a typhoid epidemic in the town proved the impurity of the present supply, though it

was also proved that the epidemic was not due to the water. The municipality were induced by mistaken notions of economy to refuse to adopt chlorination to render the water-supplies safe though the waterworks yielded a profit on the year's working. In any industrial undertaking the efficiency of the plant must be a first charge on income. When the undertaking is the supply of drinking water consideration of the public health makes the observance of this principle a duty.

At Puri the search for a suitable source of water continues. The fresh experiments sanctioned by Government were delayed by the strike on the Bengal-Nagpur Railway and have in consequence been deferred till after the monsoon.

Much has been done to restore the water-supply at Muzaffarpur which had suffered through the exhaustion and drainage of certain shallow wells.

At Patna rapid progress has been made with the extension and improvement of the Patna-Bankipur waterworks and the yield of the new wells is satisfactory.

6. Government are pleased to observe the fact that large economies have been made in the running charges of municipal waterworks, particularly in the matter of fuel consumption, and they hope that increased attention will be paid to the very important matter of maintaining engines and other parts of such plant in good running order to the neglect of which the great variations in the cost of pumping are at present largely due.

7. Of drainage, besides the Government work at Patna, Darbhanga and Cuttack, no large schemes are being carried out except at Muzaffarpur where the detailed survey has been completed. The most important scheme under construction is at Jharia where satisfactory progress has been made. One of the most important schemes under consideration is perhaps the Arrah drain-flushing scheme, which is a proposal designed to solve one of the greatest difficulties of sanitary engineering in this province. The proposal is to pump water through the drainage system to wash out the foul matter which collects in them for want of flow. Hitherto no method of overcoming this difficulty has been devised and for this reason an item of Rs. 40,000 originally provided in the Monghyr drainage scheme which was sanctioned in 1911 was abandoned.

With the extension of water-supply system in the province more attention will necessarily have to be given to drainage.

8. Government in the Ministry of Local Self-Government desire to thank Mr. Platt who held the post of Superintending Engineer, Public Health Department, almost throughout the year, for the efficient manner in which he has carried out his duties. The names of the officers commended by him have been noted.

By order of the Government of Bihar and Orissa,  
(Ministry of Local Self-Government,)

H. E. HORSFIELD,  
*Secretary.*

**FIFTEENTH ANNUAL REPORT**  
**OF THE**  
**SUPERINTENDING ENGINEER,**  
**Public Health Department (Engineering Branch),**  
**Bihar and Orissa, for the year ended**  
**31st March 1927.**

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*Staff.*—The post of Superintending Engineer was held by Mr. S. E. Platt until the 23rd March 1927 when he proceeded on seven months and 20 days' leave on relief by Mr. T. S. Soorma, Executive Engineer.

Mr. P. F. Plomer, Executive Engineer, held charge of the 1st Division, Public Health Department, until the 1st March 1927 when he handed over to Mr. T. S. Soorma, who held charge of the 1st Division until the 23rd March 1927 when he handed over to Babu A. N. Banerjee, Assistant Engineer.

Mr. T. S. Soorma assumed charge of the 2nd Division, Public Health Department, on the 1st June 1926, the date of its formation, until 1st March when he was relieved by Mr. Md. Sadique, Assistant Engineer. The designation of the original Sanitary Works Division was changed to 1st Division, Public Health Department, on the formation of the 2nd Division.

Babu S. R. Banerjee continued to work as Personal Assistant to the Superintending Engineer.

Babu B. D. Dhawan, Assistant Mechanical Engineer, was confirmed in his appointment on the 17th December 1926.

In addition to the above there are employed in the department four permanent and two temporary super-<sup>new</sup> seven permanent and eleven tempora<sup>new</sup> electrically-lower subordinates, three Bihari Improv<sup>new</sup> elevated service sary drawing office, accounts and clerical<sup>new</sup> the new University the additional area

The following places were visited by the Superintending Engineer during the year :—

Arrah, Bhagalpur, Chapra, Dumka, Gaya, Jharia, Hazaribagh, Monghyr, Muzaffarpur, Laheria-saraj, Giridih, Rancho, Puri, Chaibassa, Sambalpur, Bargarh, Bhabua, Sonepur and Madhupur.

*Expenditure.*—The sum of Rs. 5,79,944 was spent on construction and maintenance including Rs. 2,42,666 on deposit works on behalf of local authorities. The expenditure on open waterworks amounted to Rs. 2,61,000 and also Rs. 70,800 was spent on sanitary works carried out by municipal boards. The total value of work carried out under the supervision of the Public Health Department (Engineering Branch) was Rs. 9,11,744.

Detailed schemes amounting to Rs. 8,57,000 and preliminary schemes amounting to Rs. 27,70,000 have been prepared and submitted.

Work is in hand on projects to a total value of about 23 lakhs.

The cost of the establishment of the Public Health Department (Engineering Branch) amounts to Rs. 1,88,778 (including Rs. 26,578 for travelling allowance and contingencies).

#### APPENDICES.

The following statements are appended to this report :—

1. Statement giving details of the various waterworks in Bihar and Orissa.

2. Statement of annual cost of maintenance of waterworks in Bihar and Orissa.

3. Statement of the capital expenditure incurred on waterworks.

4. Statement of analysis of water supplied by open waterworks.

5. Statement of consumption of fuel, other working costs of open waterworks.

6. Statement of expenditure incurred on sewerage and



## 7. Statements under the following heads :—

- (a) Outline schemes prepared.
- (b) Detailed schemes prepared.
- (c) Works under construction by the Public Health Department.
- (d) Works under construction by local authorities
- (e) Schemes submitted by local authorities for scrutiny by the Public Health Department.
- (f) Schemes under preparation.
- (g) Schemes to be prepared.

8. Comparative statement of fuel consumption per-million foot gallons in 1925-26 and 1926-27.

## ORIGINAL WORKS.

*Patna-Bankipur Water-supply.*—The original scheme was estimated to cost Rs. 10,56,789 and with the exception of the construction of one tube-well and the installation of permanent pumping plant, was completed some years ago. During the past few years the water available has proved insufficient to meet the demand during the hot weather. The feasibility of completing the scheme as originally designed was carefully investigated in connection with the installation of the permanent pumping plant and the proposal to extend the supply to include the area of the new Patna University.

It was decided in order to insure the purity of the supply to arrange for the new pumps to draw water direct from the tube-wells although this involved abandoning the two existing wells which are not suitable for this type of pumping plant. The yield of one of the two existing wells is now so small that it is not worth while installing new plant in it.

A scheme for the necessary alteration and extension, estimated to cost Rs. 3,41,000, has been prepared and sanctioned and with the original scheme will provide five new 9" diameter tube-wells with the necessary-electrically-driven pumping plant. In addition an elevated service reservoir to hold 120,000 gallons near the new University and the necessary distribution-system for the additional area of supply are provided.

The work is in hand and it is hoped to complete it before the end of the year.

Two 9" tube-wells have been sunk at the University site and proved satisfactory. A third tube-well 9" diameter was sunk at Digba before the end of the financial year and two more a few weeks after. The third tube was taken down to 340 feet and 48 feet of Ashford strainer placed in two pieces of 24 feet respectively between the depth of 274'-8" to 298'-8" and 310' to 334'. Test pumping with an air lift gave a yield of 13,312 gallons per hour with a depression of 2'-7½". The sinking of a sixth tube at Amlatola has been approved by Government and proposals to sink the tube before the rains have been submitted to Government for sanction.

The pumping plant has been ordered and an agreement entered into with the Patna Electric Supply Company, Limited, for the supply of the necessary energy.

*Patna Medical College and General Hospital.*—An independent water-supply from two 5" tube-wells has been completed. It has been designed to supply 150,000 gallons per day and has been satisfactory so far. Vertical spindle centrifugal pumps direct driven by motors have been installed by Messrs. Mather and Platt, Limited, and have proved capable of the designed duty. The plant has, however, proved rather noisy and the firm are investigating the possibility of reducing this.

The sanitary installation in the Hospital has been completed with the exception of that of the Female Hospital. This is now in hand.

A proposal to provide an additional supply of water for the irrigation of the Hospital compound having been sanctioned, a 5" tube-well has been sunk to a depth of 314 feet. Test pumping has given a yield of 6,300 gallons per hour with a depression head of about 3'-6". A detailed estimate amounting to Rs. 30,000 for the distribution system required for the irrigation of the compound and covering the cost of the tube-well already sunk for the purpose has been submitted for sanction.

*Patna University Water-supply and Sanitary Installation.*—A scheme estimated to cost Rs. 2,79,708 was sanctioned and work started, but owing to changes in the layout

of the buildings, etc., the progress has not been satisfactory. Revised proposals for various sections are under consideration.

The water required in the University will be obtained from the mains of the Patna-Bankipur water-supply distribution system.

*Water-supply.*—The laying of the distribution system has made good progress and arrangements are being made for supplying the Physics and Chemical Laboratories with water by the end of June 1927. The tank and staging for the High Level Reservoir have been received and the erection started. The design of the Low Level Reservoir is being revised in view of the great depth of made ground found at the site now selected therefor.

*Sewerage and Sanitary Installation.*—After the construction of this had been taken in hand the sewerage portion had to be revised on account of the inclusion of the Arts College which was decided upon subsequent to the sanction of the scheme. Certain portions of the scheme were revised and the construction started. Meanwhile public agitation against the discharge of filter effluent near the Koila and Shivalaya Ghat was started. Proposals to meet these objections were made and accepted by some of the principal objectors and revised plans for the outfalls were drawn up. By that time, however, the agitation had gathered strength and the very idea of the discharge of effluent into any part of the Ganges within the limits of the City became repugnant to the Hindu Community and very drastic changes in the scheme were called for. But as this development took place after the end of the year under report mention thereof will be made in the next year's report. The net result as far as the working of the year under report is concerned is that beyond a short length of sewer and the western liquifying tank all work on the sewerage has been held up. The sanitary installation inside the buildings and the construction of water-flushed latrines has well advanced.

*Tikiatoli Drainage Scheme.*—The ground has been levelled and the roads constructed. The drainage work is in hand.

*Gulzarbagh Press Water-supply.*—A 2½" diameter tube-well has been completed and duplicate sets of electrically-

driven centrifugal pump installed and set to work. Test pumping of this tube was carried out and the yield found to be 1,200 gallons per hour. This yield will just meet the demand of the Press.

*Darbhanga Medical School.*—The sanitary installation has been completed and is working satisfactorily. The first tube-well sunk has given trouble due to fine sand so a second has been sunk to a greater depth. Owing to the very fine sand in which the strainers have to be placed it has been decided to change the type of pump.

One set of Triplex pumps has been installed on the new tube but no water is being pumped from this tube pending alteration in the plant by the suppliers. The duplicate set has also still to be installed. Meanwhile the old tube is giving the required supply with the old pumping plant. One of these sets has already been replaced by Triplex pumps by the firm and the other which is now working will be replaced shortly

A preliminary estimate for the sanitary installation and drainage has been sanctioned. Detailed estimate is in hand

A detailed estimate amounting to Rs. 1,730 for sanitary installation in the newly-built overseer quarters was prepared but is still under correspondence with Public Works Department.

The construction of filters, the rising main and the distributary chambers has been completed.

The arrangements made to reduce flooding of the compound have proved capable of dealing with the specified conditions and prevent the accumulation of flood water, though temporary flooding still occurs.

*Laheriasarai Hospital water-supply and drainage.*—Work is in hand and a 5" tube-well has been sunk and tested. The erection of the pumping plant and the construction of the engine house has been completed but pumping cannot be started for want of electric current. The supply is being given from the old well. The construction of the surface drain is nearly completed.

*Muzaffarpur Water-supply.*—The existing supply is inadequate and proposals to improve it are under consideration in connection with the preparation of a combined drainage and water-supply improvement scheme.

Owing to the decrease of the yield from the two existing tube-wells it was decided to sink another 9" diameter tube well without waiting for the completion and consideration of the comprehensive schemes and an estimate amounting to Rs. 32,607 was sanctioned and arrangements made for the necessary funds.

It was found that no contractor had plant immediately available for the construction of a 9" diameter tube-well so two 5" diameter tube-wells were sunk 15 feet apart and connected at the top to a common head valve.

The tubes were sunk to a depth of 400 feet and in test were found capable of yielding 14,000 gallons per hour. To utilise an old oil engine a suitable second hand pump was bought and has been installed.

The jail water-supply has been completed.

*Chapra Flood protection work.*—An estimate for Rs. 24,050 has been sanctioned for the construction of a sluice on the Khanwa Nala. Part of the work was done before the rains of 1926. The work has been almost completed. The preparation of a flood protection scheme could not be taken in hand for want of staff.

*Gaya Water-supply.*—The supply of water available having proved inadequate it was decided to proceed with the construction of the tube-well recommended by Mr. Bransby Williams in his report dated 8th June 1924. Owing to shortage of boring plant for 9" diameter tube-wells a cluster of three 5" diameter tube-wells was sunk. It proved impossible to sink a deep tube-well as rock was met at 100 feet below the surface. The yield of the tube-wells was tested with the existing plant but no satisfactory results could be arrived at. The contractors have been informed to make their own arrangements for proving the yield pending which no payment for the work is being made.

*Arrah Waterworks.*—During the monsoon of 1925 the intake at the Bahiara Pumping station was damaged by floods in the River Sone and some protection work was hurriedly done in June 1926 at a cost of about Rs. 4,800. The work proved satisfactory.

*Arrah Drain flushing scheme.*—This matter is under consideration and a proposal to obtain the necessary water

from a tube-well has been approved. Should this source of supply prove satisfactory it will probably be economical to abandon the present water-supply intake at Bahiara and obtain the whole of the water-supply from tube wells.

*Dhanbad School of Mines Water-supply and Sanitary Installation.*—An independent water-supply has been completed at a cost of nearly Rs. 50,000. Water is pumped from a deep well by means of electrically-driven Sulzer's centrifugal pump to an elevated service reservoir from which it is distributed to the school building.

Work in the sanitary installation estimated to cost Rs. 32,100 has all been completed with the exception of some items the total value of which is Rs. 6,000.

*Jharia Drainage scheme.*—Work in the scheme is being carried out by the District Engineer, Manbhum, and is expected to be completed shortly. Owing to shortage of staff it has not been proved possible to complete the design of the outfall work but it is now in hand and will be ready shortly.

*Deoghar Water-supply.*—It has not been possible to sink the proposed trial boring because no contractor has been found willing to undertake the work. The possibility of an infiltration gallery in the bed of the Dharwa river is being investigated.

*Bhabua Drainage.*—After considerable delay a decision has been made in the dispute between the Municipal Board and the contractor and arrangements made to complete the work.

*Bhagalpur Water-supply.*—Various alternative schemes for the reorganization of the water-supply have been prepared and the cheapest for a designed daily supply of 1,500,000 gallons recommended by Government to the Municipal Board.

No decision has yet been made on this urgent matter.

*Kanke Mental Hospital Water-supply and Drainage.*—These schemes have been completed and are working satisfactorily in the charge of this department.

*Cuttack Ravenshaw College.*—Water-supply improvement scheme estimated to cost Rs. 28,850 has been sanctioned and work is in hand. Good progress has been made.

## DIX I.

Orissa for the year ended the 31st March 1927.

7	8	9	10	11	12	13	14	15
Osya.	Hawalbach (Central Jail and Reformatory).	Hilasa (Government Staff Quarters).	Kanko (Mental Hospital).	Mounghyr.	Muzabarpur.	Patna-Bankipur.	Patna General Hospital.	Ranchi Government House.
1913.	1914.	1913.	1925.	1913.	1920.	In progress.	1927.	1913.
67,562	...	...	...	46,625	32,755	...	...	...
67,562	1,650	1,000	5,000	40,000	32,755	25,200	1,327	200
...	...	...	...	69,235,022	...	2,094,790	...	...
...	...	...	...	5,163,797	...	132,135,473	25,686,760	...
867,906,200	17,203,400	2,522,790	62,274,260	94,403,809	63,529,991	134,228,253	26,003,700	1,569,080
1,062,756	47,379	6,911	149,217	258,640	228,648	37,745	70,319	4,298
157	25*2	6*9	25*6	6*5	6*9	14*5	62*9	21*4
10*0	...	2*5	...	7*5	6*0	6*0	24	7*5
26*0	86*14	13*0	51*8	...	...	33*2	62*0	154*21
174*3	95*40	111*0	141*1	27*4	No. 1=83*0 2=41*2 3=85*5 H. L.=75	100*0	...	...
1*0 3	133 54	121*0	242*9	37*4	...	132*2	62*0	134*21

	1	2	3	4	5	6	
Particulars.	Arrab.	Bhagalpur.	Buxar (Central Jail).	Dalhganj.	Darbhanga (Medical School).	Dhanbad (School of Mines).	
Serial no.	Year of completion.	1894.	1898.	1925.	1904.	In progress.	1927.
<b>SUPPLY CONNECTIONS.</b>							
13	Unmetered connections made, 1926-27.	3	...	...	...	...	106
13	Total number of unmetered connections.	5	...	...	14	35	108
14	Metered connections made, 1926-27.	1	...	...	1	...	1
15	Total number of metered connections.	10	...	...	1	...	1
<b>ANNUAL CHARGES AND COST OF WATER.</b>							
16	Maintenance charges, Rs. ...	12,057	54,555	3,119	4,869	...	1,596
17	Interest and sinking fund...	964	...	...	...	...	...
18	Total charges, Rs. ...	13,021	54,555	3,119	(1) 4,869	...	1,596
19	Total charges per 1,000 gallons, in annas.	3'8	2'9	4'5	4'6	...	3'1'4
<b>INCOME FROM WATER-WORKS.</b>							
20	From assessment, Rs. ...	13,355	...	...	4,629	...	...
21	From metered supplies, Rs.	3,856	...	...	32	...	(6) 37'5
22	Other receipts Rs. ...	...	...	...	25	...	...
23	Total Income Rs. ...	22,311	*69,409	...	4,686	...	37'5
24	Total receipts per 1,000 gallons, in annas.	6'4	3'7	...	4'5	...	...
25	Profit or loss on year's working.	+9,200	+14,854	...	-183	...	...
26	Profit or loss in annas per 1,000 gallons.	+2'6	4'8	...	-17	...	...

(1) Includes Rs. 1,668 arrears paid this year.

(2) Includes Rs. 10,160 for percentage charges.

(3) Includes Rs. 1,895 for electrical charges.

(4) Quantity of water supplied from 12th December 1926 or in 110 days.



## DIX I—concl'd.

7	8	9	10	11	12	13	14	15
Gaya.	Hazribagh (Central Jail and Reformatory).	Hinoo (Government Staff Quarters).	Kanke (Mental Hospitals.)	Monghyr.	Muzaffarpur.	Patna-Bankipur.	Patna General Hospital.	Ranchi Government House.
1913.	1914.	1913.	1925.	1913.	1920.	In progress.	1927.	1913.
...	...	...	...	25	61	...	42	...
...	...	...	...	83	351	192	43	...
...	...	...	...	...	1	...	...	...
...	...	...	...	40	7	990	...	...
...	9,520	3,074	23,375	23,270	27,538	52,494	3,328	2,917
...	...	...	...	...	5,778	...	...	...
39,606	9,520	3,074	23,375	23,270	33,312	(2) 52,494	(3) 3,328	2,917
1'6	9'08	19'4	7'1	3'9	6'3	5'2	2'0	29'7
42,167	...	...	...	†23,188	37,551	(7) 86,202	...	...
...	...	...	...	3,405	1,500	...	...	...
16,322	...	...	...	...	...	2,980	...	...
59,489	...	...	...	31,593	39,141	89,162	...	...
2'4	...	...	...	5'3	9'7	10'6	...	...
+13,853	...	...	...	+9,323	+5,829	+36,688	...	...
+9	...	...	...	+14	+24	+44	...	...

(6) Income for supplying 50,000 gallons to contractor.

(7) Includes Rs. 11,118 arrears from Patna City Municipality for 1925-26 paid this year.

‡ Lift for 1925-26 taken this year.

† Includes Rs. 2,067 arrears of water rate collected this year.

\* Figures received by wire.

## Annual maintenance accounts of various waterworks in Bihar and

Serial no.	Particulars.	Arrab.	Bhagalpur.	Buxar (Central Jail).	Cuttack.	Daltanganj.	Darbhanga (Medical School).
1	2	3	4	5	6	7	8
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	Establishment and Fees ...	5,937	...	540	...	471	...
2	Fuel and Lubricating oil—						
	(a) Coal ...	3,332	...	2,567	...	...	...
	(b) Fuel oil ...	...	...	...	...	...	...
	(c) Electrical charges ...	...	...	...	...	...	...
	(d) Lubricating oils ...	354	...	12	...	...	...
3	Stores and materials ...	1,434	...	...	...	...	...
4	Cleaning channels or wells ...	34	...	...	...	...	...
5	Cleaning settling tanks ...	...	...	...	...	...	...
6	Cleaning and renewing filter beds.	...	...	...	...	48	...
7	Purchase of sand for filters ...	...	...	...	...	...	...
8	Purchase of alumina ferric ...	262	...	...	...	277	...
9	Purchase of bleaching powder ...	...	...	...	...	...	...
10	Repairs to distribution system ...	340	...	...	...	354	...
11	Repairs to—						
	(a) Pumping machineries ...	374	...	...	...	...	...
	(b) Rising main ...	...	...	...	...	...	...
	(c) Buildings and grounds ...	...	...	...	...	...	...
	(d) Tools and Plant ...	...	...	...	...	...	...
12	Cost of water analysis ...	...	...	...	...	...	...
13	Cost of water ...	...	...	...	...	3,719	...
	Total charges ...	12,067	* 54,555	3,119	...	4,869	...

Elec. charges  
 (1) Water supply  
 (2) Percentage  
 (\*) Details no.

## DIX II.

Orissa for the year ended the 31st March 1927.

Dhanbad (School of Mines).	Gaya.	Hazaribagh (Jail and Reformatory).	Hinoo.	Kanke (Mental Hospital).	Monghyr.	Muzaffarpur.	Patna-Bankipur.	Patna General Hospital.	Ranchi Government House.
9	10	11	12	13	14	15	16	17	18
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
120	13,781	3,252	817	3,430	6,014	11,461	13,291	464	918
...	17,614	5,204	1,390	180	...	6,577	23,778	...	} 1,199
...	...	...	...	...	989	3,753	38	...	
1,258	...	...	...	16,089	...	...	...	1,595	114
...	315	223	123	12	533	2,313	465	933	...
...	5,416	88	108	950	1,610	1,177	3,051	46	...
...	2,021	...	...	...	...	163	...	...	...
...	378	...	9	...	...	...	...	...	...
...	...	56	...	338	...	...	...	...	...
...	...	...	...	...	772	...	...	...	...
...	...	91	...	1,697	729	...	...	...	...
9	...	15	...	128	...	...	171	...	...
...	...	170	...	50	69	1,043	1,542	...	125
...	46	578	554	125	...	924	...	...	} 307
...	...	...	...	...	...	...	...	...	
...	36	...	75	197	...	66	...	...	254
209	...	147	...	140	...	67	...	...	...
...	...	...	...	26	...	...	...	...	...
...	...	...	...	...	1,734	...	(2)10,160	...	...
(.) 1,596	39,000	9,820	3,074	23,575	23,270	27,538	12,494	3,328	2,917

for 3,354 units,  
from 12th December 1926,  
charges,  
yet supplied.

## APPENDIX III.

Statement of capital cost of various waterworks in Bihar and Orissa  
for the year ended the 31st March 1927.

[Provisional.]

Serial no.	Names of waterworks.	Cost up to 31st March 1927.	Cost during 1926 1927	Total cost.
1	2	3	4	5
		Rs.	Rs.	Rs.
1	Arrah ... ..	4,19,967	273	4,20,240
2	Bhagalpur ... ..	...	...	10,84,560
3	Buxar ... ..	*	...	...
4	Cuttack ... ..	*	...	...
5	Daltonganj ... ..	67,937	599	68,536
6	Darbhanga ... ..	1,00,161	12,514	1,12,675
7	Dhanbad ... ..	...	...	42,939
8	Gaya ... ..	(1) 8,38,238	...	8,38,238
9	Hazaribagh ... ..	99,079	...	...
10	Hinoo ... ..	* Not known	...	...
11	Kanke ... ..	4,76,765	3,656	4,80,421
12	Monghyr ... ..	5,43,870	21,224	5,65,094
13	Muzaffarpur ... ..	*	...	...
14	Patna-Bankipore ... ..	9,56,110	...	...
15	Patna General Hospital ... ..	25,174	6,148	31,322
16	Ranchi Government House ... ..	(2) 9,100	...	...

(1) Completion cost in 1913.

(2) Cost up to December 1913.

Figures not available.

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APPENDIX IV.

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## APPENDIX

## Analyses statement of major water-works in

Serial no.	Waterworks.	Bacteriological.			
		Total number of samples examined.	Number of samples examined of water as supplied to the public.	Number of samples of water as supplied to the public in which colonies exceed 100 p. c. c.	Percentage of samples below standard.
1	2	3	4	5	6
1	Arrah ... ..	36	24	20	83.3
2	Bhagalpur ... ..	23	15	11	73.3
3	Daltonganj ... ..	17	16	16	100.0
4	Gaya ... ..	30	30	29	96.6
5	Kanke (Ranchi) ... ..	24	19	6	31.5
6	Monghyr ... ..	24	16	14	87.5
7	Muzaffarpur ... ..	25	25	11	44.0
8	Patna-Bankipur ... ..	248	248	118	47.6

A drainage scheme estimated to cost Rs. 56,500 has also been sanctioned but little progress has been made. This scheme provides for surface drain trapped into sewer discharging into liquifying tanks. The effluent from these tanks will be pumped across the Taldanda Canal and there treated on to a filter discharging into an existing drain.

*Cuttack Medical School.*—Sanction has been received to an independent water-supply scheme and work started. The source of supply is a 5" diameter tube-well from which water will be pumped by electrically-driven centrifugal pump to an elevated service reservoir. Including internal fittings the work is estimated to cost Rs. 45,000.

A preliminary scheme estimated to cost Rs. 63,000 for the drainage of the hospital and Medical School has also been sanctioned.

The preparation of a detailed scheme is in hand but owing to the addition of many buildings, since the preliminary scheme was prepared, the cost of the work will be considerably increased.

*Puri Cholera Hospital.*—The pipes and fittings for a water-supply have been installed. Water is obtained from the Bengal-Nagpur Railway Company.

Surface drains have also been constructed round the buildings.

*Puri Water-supply.*—The tube-wells sunk at Malati-patpore and near the Indradhumna Tank having proved unsatisfactory, Government have approved a proposal to sink and test pump a tube-well sunk in the sandy area bordering the sea to the north-east of the town. It was intended to start the test pumping in March but owing to the strike in the Bengal-Nagpur Railway it was found impossible to send the boring plant to Puri at the time intended. It will probably be desirable to postpone the work until next cold weather as the most useful information can be obtained by carrying out the test pumping during the period March to May.

*Portable Pumping Plant.*—Six additional portable pumping sets were purchased and with the set purchased last year were used during the Mela at Sonapur in November 1926. They were found quite satisfactory though the yield from the wells proved inadequate to meet the demand.

## OPEN WATER WORKS.

*Arrah Water works.*—The spare parts recommended last year for the unfiltered water pumping plant have been obtained and the plant overhauled. The filtered water pumping sets also required overhauling.

The filter beds are not in a satisfactory condition as there has been considerable delay in obtaining a supply of the necessary sand.

The plant generally is in fair condition but as there is no standby for the unfiltered water pumps, special care is necessary.

*Bhagalpur.*—The neglect of the pumping plant referred to in the report for the previous year has continued and it is extremely doubtful if the unfiltered pumping plant can now be thoroughly repaired at a reasonable cost.

In spite of frequent inspections and advice little or nothing has been done and an entire failure of the supply is probable.

The state of the filter is little better than that of the pumping plant whilst the effective capacity of the settling tank has been greatly reduced by failure to remove the silt regularly.

*Daltonganj.*—The recommendation made in various inspection reports have been given effect to and consequently there has been some improvement in the bacteriological results.

*Gaya.*—The plant has been well maintained and the general condition is satisfactory.

*Kanke.*—The electrically-driven pumps have continued to give satisfactory results, the yield from the infiltration galleries have been satisfactory and the results obtained from the Paterson filters have been excellent.

*Monghyr.*—The plant has been maintained in a satisfactory manner and is in good order. An additional filter is being constructed but care should be taken to ensure that the demand due to a large increase in the number of house connections does not exceed the supply available.

*Muzaffarpur.*—The 248 ng plant has been maintained in good order but the old tube-wells is causing some anxiety.



*Patna-Bankipur.*—During the year special efforts have been made to bring the pumping plant into better conditions and as a result of regular tests and more careful supervision a large saving has been effected in the consumption of fuel.

Owing to the pumps drawing water from open wells into which the tube-wells discharge the water has frequently shown evidence of contamination. Temporary arrangements have now been made to chlorinate the water with the result that a water of a satisfactory degree of bacterial purity is now being supplied.

On account of the demand of water this year being considerably in excess of the supply which has further decreased on account of the yield from no. 1 well falling to 40 gallons per minute, special efforts had to be made to supply water to the areas at a distance from the water tower. A more equitable and efficient regulation of the existing supply was carried out which resulted in an improved water-supply for sometime. The demand having, later on, still further increased the new tube sunk at Digha had to be requisitioned and a temporary pumping plant installed. This almost doubled the available supply. If this step had not been taken the distress for want of water in a portion of the New Capital near the Government House, a portion of Amlatola and Gardaibagh and the distant portions of Bankipur would have been more acute.

*Government pumping plant.*—The pumping stations in the charge of the Public Works Department and in the various jails have been inspected and necessary advice and assistance given to the officers in charge.

*General.*—During the year standard forms for the submission of the monthly returns have been introduced at all waterworks and special efforts made to effect economy in the consumption of fuel.

The results have been encouraging as returns for the first ten months show a saving of more than Rs. 20,000 when compared with the results of the previous year on the basis of actual work done.

During the past year there has been a considerable increase in the number of pumping installations in the charge

of the department and proposals to place all Government pumping plant in the charge of the department and to appoint a third Executive Engineer with special mechanical training and experience has been submitted for the consideration of Government.

#### NOTE ON THE APPENDICES.

*Appendix I.*—The first notable point that strikes on a perusal of this statement is that out of the 57 principal towns in the province seven only have a piped water-supply and at least two of these are in a very precarious condition, viz., Bhagalpur and Muzaffarpur. This must necessarily reflect on the health and consequently the prosperity of the province.

The consumption of water per head per day this year compared with that of five years ago (1922) are as follows:—

—	1922 Gallons per head.	1927 Gallons per head.	Increase and decrease Gallons.
1	2	3	4
Arrah ... ..	3·6	4·2	+0·6
Bhagalpur ... ..	13·0	11·7	—1·3
Daltongauj ... ..	7·2	5·9	—1·3
Gaya ... ..	14·2	15·7	+1·5
Hazaribagh ... ..	28·5	28·2	—0·3
Hinoo ... ..	10·0	6·9	—3·1
Kanke ... ..	29·3	28·6	—0·4
Morghyr ... ..	5·4	6·5	+1·1
Muzaffarpur ... ..	5·7	6·9	+1·2
Fatna-Bankipur ... ..	14·3	14·5	+0·2
Ranchi Government House ... ..	21·7	21·4	—0·3

It will also be noticed that, apart from special supplies to Government institutions, the supply per head is very

small and that the rate-payers must be drawing on some other source of supply to meet their daily needs.

The cost of pumping 1,000 gallons of water excluding interest and sinking fund charges, compares with that of 1922 as follows :—

—	1922		1927		Increase or decrease in amount.	Increase or decrease in percentage.	Remarks.
	Rs. s. p.	Rs. s. p.	Rs. s. p.	Rs. s. p.			
Arrah ...	0 8 10	0 3 6	0 5 4	—60%	Reduction due to economy on establishment and better condition of machinery.		
Bhagalpur ...	0 3 4	0 2 11	0 0 5	—12½ %	Reduction due to less expenditure on repairs.		
Daltonganj ...	0 2 7	0 4 7	0 2 0	+77½ %	Reasons for increase not traceable from records.		
Gaya ...	0 2 8	0 1 7	0 1 1	—44 %	Reduction due to pumping larger quantity of water and lower fuel consumption.		
Hazaribagh ...	0 4 6	0 9 1	0 4 7	+101½ %	Reasons for increase not traceable from records.		
Hineo ...	1 1 3	1 3 5	0 2 2	+12½ %	Due to reduction in the quantity of water pumped.		
Kanke ...	1 6 6	0 7 1	0 15 5	—68½ %	Due to change over from steam plant to an efficient electric plant.		
Nanchi ...	1 12 1	1 13 8	0 1 7	+5½ %	Increase due to slight increase in repairs and renewals.		
Monghyr ...	0 7 2	0 3 11	0 3 3	—45½ %	Reduction due to pumping larger quantity of water and more efficient maintenance.		
Mursliapur ...	0 3 2	0 6 3	0 2 1	+86 %	After the failure of the old headworks, the water-supply, although maintained by sinking additional wells, has not yet been reorganized on proper lines.		
Patna-Bankipur ...	0 8 6	0 6 2	0 2 4	—27½ %	Decrease due to heavy reduction in coal consumption and a general improved condition of the plant.		

This shows that in the waterworks maintained by Government there has been an increase of nearly 10 per cent. in the case of Hazaribagh Jail and a decrease of 68½ per cent. and 27½ per cent. in the case of Kanke and Patna-Bankipur water-supplies respectively in the maintenance cost during the past five years due to causes briefly noted in the remarks column against each. As regards water-

works maintained by municipalities there has been an increase of 66 per cent. and 77½ per cent. in the case of Muzaffarpur and Daltonganj and a decrease of 60 per cent., 45½ per cent. and 40½ per cent. in the case of Arrah, Monghyr and Gaya, respectively, reasons for which are briefly given in the remarks column.

The working of the waterworks during the year has resulted in a profit of Rs. 9,290, Rs. 8,323, Rs. 5,829 and Rs. 36,688 in the case of Arrah, Monghyr, Muzaffarpur and Patna-Bankipur, respectively, and a loss of Rs. 183 in the case of Daltonganj. This shows that waterworks if established in other towns would prove very profitable. From figures received from Gaya and Bhagalpur it appears that last year's working of these waterworks also resulted in a profit of Rs. 18,883 and Rs. 14,854.

The position of the Patna-Bankipur and Arrah Waterworks appears to be especially satisfactory as the percentage of profit works out at 71 per cent. and 68 per cent. respectively.

*Appendix IV.*—The analysis shows that the water supplied by all the waterworks was chemically pure throughout. Bacteriologically, however, the quality of water supplied was not so satisfactory, Daltonganj, Gaya, Monghyr and Arrah being specially bad in this respect. The presence of B. Coli as many as 86.6 per cent and 81.2 per cent. of samples tested in the case of Gaya and Daltonganj respectively is specially disquieting and needs special attention on the part of their respective Superintendents. The Muzaffarpur and Patna-Bankipur waterworks show specially good results which are undoubtedly due to the supply in these places being obtained from tube-wells which, although shallow, yield a much purer water than the rivers.

*Appendix VIII.*—This statement is based on figures supplied by the Superintendents in charge of the various waterworks. Many of the figures relating to this year's working have been verified personally by the Assistant Mechanical Engineer but no such verification was possible in the case of figures relating to the year 1925-26. Moreover, in preparing the statement it had to be assumed that the various pumping plants remained in the same

condition as they were in the year 1925-26. As a matter of fact some of them have actually gone worse and the other improved as a result of the repairs effected.

The statement, however, gives a fairly good idea of the improvement effected in the working of these plants as a result of the advice and assistance given by this department and more particularly the Assistant Mechanical Engineer.

#### GENERAL REMARKS.

The following remarks are made by Mr. S. E. Platt, Superintending Engineer, in regard to the staff employed in the Department :—

“ With few exceptions the work of the staff has been satisfactory and the writer wishes to acknowledge the help given to him and especially to bring to the notice of Government the good work done by Mr. T. S. Soorma, Executive Engineer, Mr. Muhammad Sadique, Assistant Engineer, Babu B. D. Dhawan, Assistant Mechanical Engineer, Babu S. R. Banerjee, Personal Assistant and Babu N. P. Sen, Overseer.”

T. S. SOORMA,

*Offg. Superintending Engineer,  
Public Health Department,*

*Bihar and Orissa.*

*The 6th September 1927.*

## Statement of operations of various waterworks in Bihar and

		1	2	3	4	5	6
Particulars.		Airah.	Bhagalpur.	Buxar (Central jail).	Daltonganj.	Darbhanga (Medical School).	Dhanbad (School of Mines).
Serial no.	Year of completion.	1894.	1888.	1925.	1901.	In progress.	1927.
POPULATION.							
1	By Census of 1921 ...	40,769	63,873	...	9,817	...	...
2	Approximate population served.	36,000	69,578	1,138	7,700	400	250
CONSUMPTION OF WATER.							
3	Unmetered supplies ...	52,185,123	...	...	16,371,60	3,901,070	761,211
4	Metered supplies ..	3,057,347	...	...	255,520	...	(5) 60,000
	Total quantity supplied, in gallons.	55,242,470	294,769,765	10,851,900	16,627,000	3,901,070	(4) 811,211
6	Daily average supply, in gallons.	151,349	807,424	29,731	45,563	10,688	7,374
7	Consumption per head per day, in gallons.	4.2	11.7	26.1	5.9	26.7	29.8
8	Hours of daily supply (average).	10.25	...	9.0	9.0	24.0	24.00
LIFT OF PUMPS.							
9	From river or well to pump (L. L. ft.).	31.4	68.05	...	...	43.8	65.0
10	From filtered water pump to tank (H. L.)	62.3	110.60	40.5	...	...	...
11	Total lift in feet ...	93.7	178.65	40.5	40.0	48.8	65.0

## IV.

Bihar and Orissa for the year 1926-27.

Bile salt lactose test for presence of B. coli.				Chemical.		
Total number of samples examined.	Number of samples examined of water as supplied to the public.	Number of samples of water as supplied to the public in which B. coli were detected in less than 10 c. c.	Percentage of samples below standard.	Total number of samples examined.	Number of samples considered good.	Number of samples considered bad.
7	8	9	10	11	12	13
36	24	11	45.8	36	36	Nil
23	15	9	60.0	23	23	Nil
17	16	13	81.2	16	16	Nil
30	30	26	86.6	30	30	Nil
24	19	Nil	...	24	24	Nil
24	16	7	43.7	24	24	Nil
25	25	4	16.0	25	25	Nil
248	248	62	25.0	24	24	Nil

## APPENDIX

Comparative statement of fuel consumption, working expenses,

Serial no.	Waterworks.	Pumping Plant.	Fuel consumed,	Fuel consumption per 1,000 foot gallons	Total lift. (average)
1	2	3	4	5	6
			Tons.	Lbs.	Feet.
1	Arrah ... ..	Steam Plant ... ..	217.5	'845	93.7
2	Bhagalpur ... ..	Do. ... ..	789.7	'0947	110.6
	Do. ... ..	Oil Plant ... ..	84.4	'0044	88.05 } 110.60 }
	Buxar ... ..	Steam Plant ... ..	160.7	'8292	40.0
4	Daltonganj ... ..	.....	...	...	40.0
5	Darbhanga ... ..	Oil Plant ... ..	1.13	'01306	40.8
6	Dhanbad ... ..	Electrical Plant ... ..	...	...	65.0
7	Gaya ... ..	Steam Plant ... ..	1399.0	'0404	199.3
8	Hazaribagh ... ..	Do. ... ..	199.0	'1930	133.54
9	Hinoo ... ..	Do. ... ..	90.8 (1)	'6501	124.60
10	Kanke ... ..	Electrical Plant ... ..	13.5	...	242.9
11	Monghyr ... ..	Oil Plant ... ..	8.27	'00524	37.4
			16.96	'0136	41.1
12	Muzaffarpur ... ..	Do. ... ..	...	...	65.5
	Do. ... ..	Steam Plant ... ..	343.4	'1901	75.0
13	Patna-Bankipur ... ..	Do. ... ..	1806.75	'2013	133.2
14	Patna General Hospital ... ..	Electrical Plant ... ..	...	...	62.0
15	Ranchi (Government House).	Oil Plant ... ..	3.7	'0351	134.21

(1) For steam plant.



V.

and receipt of waterworks in Bihar and Orissa for the year 1926-27.

Percentage of charges for—			Per 1,000 gallons.		Per head of total population.			Remarks.
Establishment.	Fuel or power.	Other charges.	Total working cost.	Total receipts.	Total working cost.	Total receipts.	Profit or loss.	
7	8	9	10	11	12	13	14	15
			As.	As.	As.	As.	As.	
48.34	27.55	23.21	3.8	6.4	5.11	8.71	+3.60	
...	...	...	...	...	...	...	...	
...	...	...	2.9	3.7	12.6	...	...	
17.30	82.30	40	4.5	...	...	...	...	
9.67	nil	90.33	4.6	4.5	7.93	7.63	-.30	
...	...	...	...	...	...	...	...	
7.32	78.62	13.66	31.4	...	...	...	...	
34.79	44.47	20.74	1.6	2.4	...	...	...	
33.11	52.99	13.90	9.08	...	...	...	...	
26.67	45.31	28.22	19.40	...	...	...	...	
14.69	68.63	16.46	7.10	...	...	...	...	
29.71	4.25	66.04	3.90	5.3	7.95	10.79	2.84	
41.62	37.51	20.87	8.30	8.7	16.2	19.0	+2.8	
...	...	...	...	...	...	...	...	
28.32	46.29	29.39	6.2	10.6	33.29	56.48	11+23.20	
13.64	56.94	29.42	2.0	...	...	...	...	
31.47	41.16	27.43	29.7	...	...	...	...	

## STATEMENT

Statistics with regard to Drainage and Sewerage works

Name of the place or works.	Approximate population served.	Total length of existing pucca drains.	Total length of pucca drains added during the year.	Cost of pucca drains added during the year.	Total length of sewer if any in feet.
1	2	3	4	5	6
1. Arrah ... ..	Rs. 31,000	Rs. 1,17,000	Rs. Nil	Rs. Nil	Rs. Nil
2. Daltonganj ... ..	6,900	65,086	500	536	Nil
3. Gaya ... ..	67,562	70,439	Nil	Nil	22,117
4. Jamalpore ... ..	17,000	79,200	1,000	226	Nil
5. Kiseenganj ... ..	4,000	10,560	Nil	Nil	Nil
6. Sahebganj ... ..	12,000	91,810	Nil	Nil	Nil
7. Madhupur ... ..	7,708	17,670	Nil	Nil	Nil
8. Giridih ... ..	461	3,248	Nil	Nil	Nil
9. Monghyr ... ..	30,000	2,61,000	...	...	...
10. Motibari ... ..	13,823	69,080	...	...	...
11. Patna Administration Committee ...	9,459	Nil	...	...	47,817
12. Patna City Municipality ... ..	18,800	32,165	...	...	...
13. Puri ... ..	10,000	15,307,920	...	...	...
14. Chapra ... ..	42,415	sq. ft. 41,367	1,085	275	...
15. Dumka ... ..	4,020	16,225	328	328	...
16. Bhabua ... ..	5,438	7,941	2,650	6,596	...
17. Muzaifarpar ... ..	32,765	37,620	...	...	...
18. Purnia ... ..	13,000	23,760	590	616	...
19. Jharria ... ..	10,000	14,444 r.ft.	12,328 r.ft.	17,844 r.ft.	8,786 r.ft.
20. Deoghar ... ..	8,500	33,400	...	...	...
21. Hazaribagh ... ..	8,000	32,340	250	250	...
22. Sasaram ... ..	18,000	42,200	...	...	...
23. Sewan ... ..	7,000	20,991	1,506	616	...
24. Bhaagalpore ... ..	25,000	64,120	4,117	2,172	...
25. Kanke Indian Mental Hospital ...	3,500	46,614	800	1,322	10,907
26. Dhanbad Municipality ... ..	11,473	31,650	324	310'8	...
27. Dhanbad School of Mines ... ..	225	...	4,807	9,009	Nil
28. Darbhanga Medical school ... ..	400	3,123	...	...	...
29. Laheriasaral Hospital ... ..	400	...	1,259	1,643	...
30. Cuttack Municipality ... ..	500	10,390	860	890	...
31. Sambalpore ... ..	13,546	40,200	...	...	...
<b>Total</b> ... ..	...	...	...	...	...

## VI.

in Bihar and Orissa for the year ended 31st March 1927.

Total length of sewer added during the year.	Cost of sewer added during the year.	Total capital cost up to 31st March 1926, spent on construction.	Total capital expenditure during the year.	Total capital cost of expenditure up to 31st March 1927.	Total cost of maintenance.	Remarks.
7	8	9	10	11	12	13
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
Nil	Nil	4,18,005	Nil	4,18,005	5,708	
Nil	Nil	41,391	536	41,927	1,274	
Nil	Nil	5,55,204	...	5,55,204	640	
Nil	Nil	51,232	228	51,460	7,000	
Nil	Nil	19,212	Nil	19,212	715	
Nil	Nil	64,316	Nil	64,316	2,394	
Nil	Nil	20,385	Nil	20,385	1,487	
Nil	Nil	4,769	...	4,769	Nil	
...	...	1,79,647	...	1,79,647	4,280	
...	...	68,319	...	68,319	Nil	
10	231	4,92,798	231	4,93,027	29,914	For maintaining sewer etc.
...	...	44,430	...	44,430	Nil	Not available.
...	...	1,55,480	...	1,55,480	...	
...	...	15,000	...	1,52,757	Nil	
...	...	...	326	3,760	Nil	
...	...	6,746	6,598	13,342	2,247	
...	...	...	...	...	6,490	
...	...	17,820	616	18,336	42	
604 ft.	5,712	59,135	23,556	82,691	Nil	
...	...	...	Not known	...	1,104	
...	...	...	250	...	498	
...	...	...	...	...	453	
...	...	...	616	...	558	
...	...	...	2,172	...	4,949	
...	...	1,34,712	1,322	1,36,034	606	
...	...	...	...	...	1,774	
2,865	20,208	Nil	9,009	34,307	...	Including sanitary installation.
...	...	2,945	...	2,945	1,033	
...	...	...	1,548	1,543	Nil	
...	...	13,064	890	13,954	Nil	
...	...	...	...	...	274 11 ' 9	
...	...	...	...	...	74,429	

## STATEMENT VII(a).

List of outline schemes prepared and dealt with during 1926-27.

Serial no.	Place.	Nature and name of scheme.	Amount.	Remarks.
1	2	3	4	5
1(a)	...	Bhagalpur water supply reorganization scheme.	Rs. 15,00,000	} Sent to Government.
(b)	...	Bhagalpur water supply, alternative proposal.	9,00,000	
2	Dinapur ...	Dinapur Cantonment water-supply.	2,00,000	Sent to the Executive Officer, Dinapur Cantonment.
3	Ranchi ...	Water-supply to Government residences at Ranchi near the Government House including it.	40,500	Sent to the Executive Engineer, Public Works Department.
4	Patna ...	Patna-Bankipur water-works, Mithapur extension.	25,600	Submitted to the Joint Water-works Committee.
5	Arrah ...	Exploratory boring in connection with the Arrah drain flushing—(3 alternative schemes).	2,000	Submitted to Government on 14th February 1927.
			7,000	
			11,000	
		Total ...	20,000	

STATEMENT VII(a)—*concl'd.*

Serial no.	Place.	Nature and name of schemes.	Amount.	Remarks.
1	2	3	4	5
			Rs.	
6	Buxar ...	Buxar Central Jail water-supply:—  Proposed elevated reservoir and its connection with the existing rising main and distribution system.	13,500	Sent to the Inspector-General of Prisons.
7	Darbhanga ...	Darbhanga Medical School Sanitary Installation to the female hostel.	10,000	Sent to Government.
8	Patna ...	Patna General Hospital, sterilisere and hot water installation.	60,160	
		Total ...	27,69,760	
		Say ...	27,70,000	

## STATEMENT VII(b).

List of detailed schemes prepared during 1926-27.

Serial no.	Place.	Nature and name of schemes.	Estimated amount	Progress.	Remarks.
1	2	3	4	5	6
			Rs.		
1	Patna ...	Patna-Bankipur Extension Scheme.	3,49,000	Sanctioned.	
2	Do. ...	Replacing the existing house meters by Glenfield Kennedy meter.	24,864	Do.	
3	Do. ...	Patna General Hospital:-- Revised estimate for Independent water supply.	32,500	Do.	
4	Do. ...	Patna Training College and collegiate school drainage.	20,21	Do.	
5	Do. ...	Patna University :-- Tikiatoli housing and drainage scheme.	17,794	Do.	
6	Do. ...	Revised estimate for improvement of Gulzarbagh Press water works.	14,548	Do.	
7	Do. ...	Providing a portable air compressor for test pumping of tube wells.	13,300	Do.	
8	Do. ...	Patna Sewerage Extension, west of Taylor Road.	12,170	Do.	
9	Do. ...	Purchase of portable pumping plant for mela water supply.	9,350	Do.	
10	Do. ...	Patna Medical College sanitary installation in the E type residences which will be converted in the cottage hospital.	9,360	Do.	

## STATEMENT VII(b)—contd.

Serial no.	Place.	Nature and name of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
			Rs.		
11	Patna ...	Patna Medical College Sanitary installation in the proposed Physiological laboratory and its extension.	8,910	Sanctioned.	
12	Do. ...	Patna Kadam Kuan Khasmahal land—providing cesspits and drains, etc., for latrines in different plots.	3,472	Do.	
13	Do. ...	Patna-Bankipur water works, extension of 2" C.I. main for water connection to the proposed additional quarters in "R" block.	1,455	Do.	
14	Do. ...	Patna-Bankipur water works extension of main.	1,317	Do.	
15	Do. ...	Patna-Bankipur water works :—  Superintendent's quarters. Division of road and culvert over kutcha drain.	380	Do.	
16	Do. ...	Patna Medical College :—  Proposed pucca drain along the cold storage building.	94	Sent to Public Works Department.	
17	Do. ...	Providing wire-netted wooden frame and shutters in the water tower, Patna.	68	Sanctioned.	

STATEMENT VII (b)—*contd.*

Serial no.	Place.	Nature and name of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
			Rs.		
18	Patna ...	Patna Government House :— Providing a urinal and a flushing latrine in the north-west corner of kitchen block.	2,030	Sanctioned.	
19	Do. ...	Patna General Hospital:— Providing push cocks in place of bib cocks in the main building and Isolation block.	233	Do.	
20	Do. ...	Patna Training College Hostel :— Night latrine and covered passage.	2,000	Sent to Public Works Department.	
21	Do. ...	Improvement to wells in the compound of the Collector's residence, Patna.	3,350	Sent to the Collector, Patna.	
22	Do. ...	Patna Government House :— Providing a galvanized water tank on the top of the dispensary building.	135	Sanctioned.	
23	Do. ...	Sinking an Abyssinian tube well $1\frac{1}{2}$ ' dia. in Patna.	300	Sent to Government but not sanctioned.	
24	Do. ...	Surface drainage scheme for the proposed residences on the west of Taylor Road at New Capital.	1,530	Sanctioned.	
25	Do. ...	Additional taps in the western block of the Anglo-Indian Telegraphists' quarters, Patna.	410	Do.	



STATEMENT VII(b)—*contd.*

Serial no.	Place.	Nature and name of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
			Rs.		
26	Patna ...	Internal water connection to the quarters of the Band Master, Patna.	281	Sanctioned.	
27	Do. ...	Minor sanitary works in the Biological, Pathological and Physiological laboratories at Patna Medical College.	321	Do.	
28	Do. ...	Internal water connection to the chambers of the Hon'ble President and six members of the Legislative Council, Bihar and Orissa.	1,338	Do.	
29	Do. ...	Internal water connection to the Post and Telegraph Office and Postmaster's residence in the Civil Court compound, Bankipur.	400	Do.	
30	Do. ...	Patna Medical College :— Proposed fire valve, spindle hydrants and fire hydrants in several buildings.	4,985	Sent to Government.	
31	Do. ...	Bihar College of Engineering water connection to the Hindu and Muhammedan kitchens attached to the Engineering Hostel.	280	Sanctioned.	
32	Do. ...	Internal water connection to the residence of the Secretary, Legislative Council, Bihar and Orissa, Patna.	6.5	Do.	

## STATEMENT VII, b) - contd.

Serial no.	Place.	Nature and name of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
33	Patna ...	Internal water connection to the residence for the Deputy Inspector General of Police, Central Range, Bankipur.	Rs. 700	Sanctioned.	
34	Do. ...	Bihar College of Engineering :—  Internal water connection to the residence of the Senior Professor and Superintendent of Mechanical Apprentice Department.	685	Do.	
35	Do. ..	Patna Medical College:—  Providing two water taps in the animal house.	52	Sent to the Principal, Patna Medical College.	
36	Do. ...	Internal water connection to the residence for the 8th Secretary, Bihar and Orissa, Patna.	835	Sanctioned.	
37	Do. ...	Patna General Hospital:— Providing a water tap in the European kitchen.	54	Do.	
38	Do. ...	Patna Medical College:— Dismantling the water connection in the residence of Dr. Ali Hasan from the Municipal main and connecting it with the Hospital main.	45	Sent to Superintendent, Patna General Hospital.	
39	Do. ...	Internal water connection to the residence for the Chaplain in the New Capital, Patna.	580	Sanctioned.	

## STATEMENT VII (b)—contd.

Serial no.	Place.	Nature and name of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
40	Patna ...	Internal water connection to the residences and quarters for the staff of the Public Health Department, Engineering Branch.	Rs. 2,155	Sanctioned.	
41	Do. ...	Patna storm drainage, bridges and culverts over drainage channel passing through the Golf course and Polo ground.	3,200	Sent to Director of Public Instruction.	
42	Do. ...	Patna-Bankipore water works :—  Internal water connection to the residence for Deputy Superintendent of Police at Bankipore.	355	Sanctioned.	
43	Do. ...	Patna Bankipur water works :—  Internal water connection to the residence for the Assistant Electrical Engineer.	665	Do.	
44	Do. ...	Patna New Capital Storm drainage :—  Kbajipura channel sluice	200	Do.	
45	Do. ...	Internal water connection to the proposed residence of the 2nd Executive Engineer, Public Health Department, Bihar and Orissa.	740	Do.	

## STATEMENT VII(b)—contd.

Serial no.	Place.	Nature and names of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
46	Patna ...	Patna-Bankipur water-works :—  Providing two showers and additional-tap in the residence of the Personal Assistant to the Post Master General, Bihar and Orissa.	Rs.  246	Sanctioned.	
47	Do. ...	Patna Collegiate School Hostel :—  Providing day latrine and night latrine with covered passage.	3,750	Do.	
48	Do. ...	Internal water connection to the ferro-print washing room on the 1st floor of the north wing of the Patna Secretariat.	275	Do.	
49	Do. ...	Internal drainage and washing platforms for two residences for the Assistant Engineers of the Public Health Department, Patna.	1,164	Sent to Government.	
50	Do. ...	Patna Internal drainage :—  Extension of intercepting drain behind the quarters nos. 18 and 20 for the staff of the Legal Remembrancer and Legislative Council, Bihar and Orissa.	600	Sanctioned.	

## STATEMENT VII(b)—contd.

Serial no.	Place.	Nature and names of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
51	Patna ...	Patna drainage construction :—  In the residence of the Executive Engineer, Central Division, Chaplain, Assistant Electrical Engineer, the Assistant Secretary, Legislative Council, the offices of the Executive Engineer, Central Division, and outhouses.	Rs.  3,200		Sent to Public Works Department.
52	Do. ...	Patna Secretariat :—  Constructing six-seated water flushed latrine and four-seated urinal on the south side of the Patna Secretariat.	3,150		Sanctioned.
53	Do. ...	Patna-Bankipur water works :—  Providing an additional tap for the use of sweepers attached to the Anglo-Indian Telegraphists' quarters.	174		Do.
54	Do. ...	Internal water connection to the 10 sets of "C" type quarters for the staff of the Executive Engineer, Patna Division in "R" block.	1,090		Do.
55	Do. ...	Replacing existing $\frac{3}{4}$ " and $\frac{1}{2}$ " service pipes with 1" and $\frac{3}{4}$ " service pipes for the improvement of water supply in the residence of the Assistant Secretary, Revenue Department, Bihar and Orissa.	220		Do.

STATEMENT VII (b) - *contd.*

Serial no.	Place.	Nature and names of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
53	Patna ...	Providing a urinal in the pantoy of Hon'ble Minister's residence.	Rs. 70	Sanctioned.	
57	Do. ...	Internal water connection to the offices of the Electrical Inspector and Electrical Engineer, Bihar and Orissa, and attached Subdivisional office and workshop south of Bayley Road.	750	Do.	
58	Do. ...	Patna-Bankipur water works :—			
		Internal water connection to the residence for Deputy Inspector General of Police, Central Range, Bankipur.	650	Do.	
59	Do. ...	Patna Internal drainage, Intercepting drain and extension of storm drain for additional quarters of the Public Health Department, Engineering Branch and other Department, south of old Patna distributary.	2,850	Do.	
60	Do. ...	Internal water connection to the Power House town out-post near the junction of Bayley and Circular Road.	186	Do.	
61	Do. ...	Providing two stand posts for the menials' barrack at Adalatganj.	320	Sent to Government.	
62	Do.	Internal water connection to the Hon'ble Minister's residence.	196	Sanctioned.	
63	Do. ...	Drinking trough for the draught animals, Patna.	200	Sent to Patna City Municipality.	

STATEMENT VII (b)—*contd.*

Serial no.	Place.	Nature and names of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
64	Patna ...	Water connection to the additional bath room attached to the residence of the Inspector of Schools, Patna.	Rs. 50	Sent to Patna City Municipality.	
65	Do. ...	Patna High Court lawn-watering.	10,000	Sent to Under Secretary, Public Works Department.	
66	Do. ...	Patna-Bankipur water-works:—  Erection of six additional stand posts in the Patna City Municipality.	1,000	Sanctioned.	
67	Do. ...	Replacing existing 2" and 3" C. I. main with 4" C. I. main over Taylor Road for the improvement of water-supply in Amlitola.	4,677	Do.	
68	Do. .	Providing two public water stand post in the new market extension, Patna.	500	Sent to the Patna Administration Committee.	
69	Do. ...	Patna-Bankipur water-works. Providing a drain for the stand post platform shifted from the side of mosque on the road to old Lunatic asylum	170	Sanctioned.	
70	Do. ...	Patna-Bankipur water-work. Extension of 3" C. I. main for the proposed residence, west of Taylor Road.	2,927	Do.	

STATEMENT VII (b)—*contd.*

Serial no.	Place.	Nature and names of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
71	Patna ...	Patna-Bankipur water-works. Extension of 2" main for water connection to additional proposed quarters on the south of the old Patna distributary.	Rs. 1,500	Sanctioned.	
72	Do. ...	Patna City Municipality. Kadam Kuan drainage for Improvement Trust land.	400	Sent to Collector of Patna.	
73	Do. ...	Patna-Bankipur water-works. Dismantling the existing stand post and re-erecting the same at the junction of Patna-Gaya Road and Bankipur-Dinapur Road.	94	Sanctioned.	
74	Do. ..	Spares for 2" Solovane pump.	100	Do.	
75	Do. ...	Purchase of 2" G.I tanks for use in melas.	420	Do.	
76	Do. ...	Purchase of certain instruments and fine tools for testing of pumping plant works.	2,500	Do.	
77	Do. ...	Purchase of certain instruments and fine tools for testing of pumping plant works.	750	Do.	
78	Do. ...	Tools and plants new supply for t e 1st half year.	700	Do.	
79	Do. ...	T. F. Evinrude pump new supply.	630	Do.	
80	Co. ...	Mela pumping plants. Purchase of G. I. tanks and pipe, etc.	1,550	Do	



STATEMENT VII(b)—*contd.*

Serial no.	Place.	Nature and names of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
81	Patna ...	T. P. new supply for the 2nd half year ending March 1927.	Rs. 2,300	Sanctioned.	
82	Do. ...	T. P. testing tube wells by air lift (purchasing 4" and 1½" pipes, etc.)	420	Do.	
83	Rajgir ...	Running of pumping plant for Rajgir mela.	638	Do.	
84	Do. ...	Rajgir Mela ground. Running the pumping plant.	456	Do.	
85	Sonepur ...	Running of pumping plant for Sonepur Mela for 1.26 for Road watering.	232	Sent to Chairman, Siwan District Board.	
86	Do. ...	Running pumping plant for Sonepur mela for domestic supply.	1,278	Sent to Government.	
87	Buxar ...	Buxar Central Jail drainage—Improvement of outfall.	1,300	Sent to Jail Superintendent.	
88	Do. ...	Buxar Central Jail :— Alteration of stand pipes and providing spill water drains and platform inside the jail.	1,100	Sent to Jail Superintendent.	
89	Arrah ...	Arrah water-supply :— Repairs to the protective work at Bahiara.	4,858	Sanctioned.	
90	Hajipur ...	Hajipur municipality :— Improvement of wells	5,200	Amount of the estimate reported to the Collector.	

STATEMENT VII (b)—*contd.*

Serial no.	Place	Nature and names of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
91	Muzaffarpur	Muzaffarpur water works:— Internal water connection to the residence and office for the Postal Superintendent of Tirhut Division.	Rs. 580	Sanctioned.	
92	Do. ...	Muzaffarpur water works:— Internal water connection to the Collector's residence.	1,080	Sent to Government.	
93	Do. ...	Muzaffarpur surface drainage:—  Bench mark pillars and collecting preliminary information.	2,300	Sanctioned.	
94	Do. ...	Revised estimate for Muzaffarpur re-organisation of water-works.	34,968	Do.	
95	Darbhanga	Darbhanga Medical School:—  Additional taps for the gas plant.	250	Do.	
96	Laheriasarai	Laheriasarai hospital:—  Drainage and water supply (revised scheme).	31,122	Do.	
97	Gaya ...	Gaya water-works:—  Internal water connection to the residence for the Deputy Superintendent of Police.	620	Do.	
98	Do. ...	Gaya water-works:— Clearing the existing wells.	1,300	Sent to Chairman, Municipality.	

STATEMENT VII (b)—*contd.*

Serial no.	Place.	Nature and names of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
			Rs.		
99	Bhagalpur	Bhagalpur water-supply— boring and test pumping (supplementary estimate).	405	Sanctioned.	
100	Do. ...	Colgong municipality— construction of road side drains (part scheme).	1,770	Sent to municipal board.	
101	Do. ...	Surface drainage construction— Tarbana area, Bhagalpur.	12,160	Sent to Superintending Engineer, Public Works Department.	
102	Do. ...	Government Silk Institute :—  Internal water connection to the residence of the Assistant Superintendent.	343	Sent to Director of Industries, Bihar and Orissa.	
103	Monghyr...	Improvement of Chandias- asthan outfall, Monghyr.	12,400	Sent to the Chairman, municipality.	
104	Santal Parganas.	Sub-jail at Godda.—Internal water-supply.	1,620	Under checking.	
105	Singhbhum	Construction of a single outlet Rotary Boiler Tank at Bistapur town outpost, Jamshedpur.	205	Sanctioned.	
106	Dhaubad ...	Dhanbad School of Mines :— Sanitary installation ...	32,100	Sent to Superintending Engineer, Public Works Department, Chota Nag- pur Circle.	

## STATEMENT VII (b)—contd.

Serial no.	Place.	Nature and names of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
			Rs.		
118	Dhanbad...	Dhanbad School of Mines :— Internal water connection.	7,800	Sanctioned.	
119	Do. ...	Dhanbad School of Mines :— Estimate for conservancy arrangements.	2,170	Sent to Principal, School of Mines, Dhanbad.	
120	Do. ...	Dhanbad School of Mines :— Additional works in connection with water supply.	1,575	Sanctioned.	
121	Ranchi ...	Addition and alteration to pipe connection in Motor Garage attached to the Indian Mental Hospital, Kanke.	30	Do.	
122	Do. ...	Internal water connection to the Public Works Department staff quarters at Kanke.	300	Do.	
123	Do. ...	Addition and alteration to masonry kerbs in all the buildings, male and female enclosure in the Indian Mental Hospital at Kanke.	348	Do.	
124	Do. ...	Installing an Elsan closet in the Laboratory of the Secretaria at Doranda.	132	Do.	

STATEMENT VII (b)—*contd.*

Serial no.	Place.	Nature and names of schemes.	Estimated amount.	Progress.	Remarks
1	2	3	4	5	6
			Rs.		
125	Ranchi ...	Providing a stand pipe for the oil-men and coolies' quarters of the Electrical Department at Kanke.	130	Sanctioned.	
126	Do. ...	Providing a stand post for new servants' quarters in the European Mental Hospital at Kanke.	135	Approved.	
127	Do. ...	Providing sink and water connection in connection with the installation of Electrolytic Chlorogen plant at the Radium Institute, Ranchi.	245	Sanctioned.	
128	Do. ...	Disposal of effluent at out-fall no. 3 sewerage construction in the Indian Mental Hospital, Kanke.	4,638	Under modification.	
129	Do. ...	Kanke Indian Mental Hospital :— Additional surface drainage.	11,440	Sanctioned.	
130	Do. ...	Kanke Indian Mental Hospital :— Additional sewerage ...	14,000	Do.	
131	Do. ...	Indian Mental Hospital at Kanke :— Providing water connection to a 400 gallons W. I. tank in the male enclosure.	90	Do.	

STATEMENT VII (b)—*contd.*

Serial No.	Place.	Nature and names of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
			Rs.		
132	Kanke ...	Providing one electric water level tower in connection with water supply to Mental Hospital at Kanke.	1,540	Sent to Government.	
133	Do. ...	Internal water connection to the residence of the Hon'ble Member at Ranchi.	4,540	Sent to Public Works Department.	
134	Do. ...	European Mental Hospital, Kanke:— Providing wash hand basins.	2,908	Sent to the Board of Trustees.	
135	Do. ...	Pipe connection to the slaughter house attached to Indian Mental Hospital, Kanke.	111	Sanctioned.	
136	Do. ...	Indian Mental Hospital, Kanke:— Sanitary fittings in the residence of Medical Superintendent.	515	...	
137	Do. ...	Taking out and relaying pipe connection to the kitchen of the European Mental Hospital, Kanke.	47	Approved.	
138	Do. ...	Providing 2 sets of Lighting arresters in pumping station, Kanke.	56	Do.	
139	Itki (Ranchi)	Itki Sanatorium water supply (Part scheme).	14,600	...	
140	Sambalpur	Bargarh Basti—surface drainage.	9,140	Sent to Public Works Department.	

STATEMENT VII (b)—*concl'd.*

Serial no.	Place.	Nature and names of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
			Rs.		
141	Sambalpur	Trial boring in the Mahanadi river for Sambalpur water works.	280	Sanctioned.	
142	Cuttack ...	Sinking a tube well near the latrine of the hostel for male students attached to Orissa Medical School.	150	Do.	
143	Do. ...	Cuttack General Hospital and Orissa Medical School :—  Internal water connection and sanitary installation to the existing and proposed buildings.	9,800	Sent to Government.	
144	Do. ...	Cuttack General Hospital.—  Internal water connection and sanitary fittings to the proposed European Nursing home.	4,450	Sent to Inspector-General of Civil Hospitals.	
145	Do. ...	Cuttack Ravenshaw College water works :—  Supplementary water connection.	2,200	...	
146	Puri ...	Test pumping in connection with Puri water supply scheme.	18,800	...	
		Total ...	8,56,592		
		Say ...	8,57,000		

## STATEMENT VII(c).

List of works under construction in 1926-27 by the Public Health Department, Bihar and Orissa.

Serial no.	Name of work.	Estimated amount.	Remarks.
1	2	3	4
		Rs.	
1	Patna University water-supply and other sanitary works.	2,79,708	In progress.
2	Patna-Bankipur water works extension	3,41,000	Ditto.
3	Water-supply to Mental Hospital, Kanke.	5,95,975	Ditto.
4	Surface Drainage in Indian Mental Hospital.	1,22,935	Ditto.
5	Water-supply to Medical School at Cuttack.	45,000	Ditto.
6	Sewerage and Drainage Scheme in the Ravenshaw College, Cuttack.	56,500	Ditto.
7	Water-supply ditto ditto ..	28,850	Ditto.
8	Water works to School of Mines, Dhanbad.	50,000	Ditto.
9	Sewerage and sanitary installation in School of Mines, Dhanbad.	32,100	
10	Water-supply and sanitary installation to the new buildings in connection with the Patna Medical College.	1,26,925	In progress.
11	Independent water-supply scheme to Patna General Hospital.	32,500	Ditto.
12	Construction of Patna Sewerage ...	4,52,070 3,450	} Completed.
13	Construction of staff quarters at Digha headworks	22,425	
14	Water-supply Drainage and Sanitary installation for the Medical School at Darbhanga.	1,08,850 5,300	} Ditto.



STATEMENT VII(c)—*contd.*

Serial no.	Name of work.	Estimated amount.	Remarks.
	1	3	4
		Rs.	
15	Water-supply scheme for the Educational buildings at Tarbana area.	12,500	Completed.
16	Reorganization of Muzaffarpur water-supply.	32,607	In progress.
17	Water-supply and drainage for the Laheriasarai Hospital.	31,122	Ditto.
18	Gaya Jail Sanitary Improvements ...	23,100	Completed.
19	Patna Training College and Collegiate School drainage scheme.	20,024	In progress.
20	Providing a positive meter reading on the domestic supply service pipe construction at Government House, Patna.	1,950	Completed.
21	Construction of a six-seated latrine attached to the barracks for the menial staff of the Secretariat and Heads of Departments.	2,800	Ditto.
22	Sanitary installation in the Deputy Superintendent's quarters at Patna General Hospital.	2,150	Ditto.
23	Distribution system and pipe connection in Puri Cholera Hospital.	7,812	Ditto.
24	Water-supply to Bihta mela ground ...	111	.....
25	Water supply to Kajgir mela ...	...	
26	Drainage survey at Muzaffarpur ...	2,300	In progress.
27	Drainage for the play-ground attached to the Chapra Zila School.	4,500	Completed.
28	Surface drainage works in Jajpur Jail	560	
29	Additions and alterations to the distribution system of the Patna-Bankipur water works at Amlatola for the improvement of water-supply.	7,920	Completed.

STATEMENT VII(c)—*contd.*

Serial no.	Name of work.	Estimated amount.	Remarks.
1	2	3	4
30	Internal water-supply service construction in the Civil Court building at Gaya.	Rs. 1,190	Completed.
31	Providing a galvanized water tank for storage of water in the New Capital dispensary building at Patna.	310	Ditto.
32	Chapra flood protection scheme, Khanwa sluice.	24,050	Progressing.
33	Internal water-supply service construction in residence for the two professors of Patna Medical College.	1,543	Completed.
34	Bailing out water from the pond at Bihta.	166	Ditto.
35	Internal water-supply service construction in cold storage building at Medical College, Patna.	132	Ditto.
36	Internal water-supply service construction in the residence of professor of Anatomy at Medical College, Patna.	630	Ditto.
37	Internal water-supply service construction in the residence of the professor of Biology at Patna Medical College.	432	Ditto.
38	Sewerage and sanitary fittings in the quarters for two compositors and one pressman in Patna Government House.	1,425	Ditto.
39	Construction of internal drainage for the residence of Lady Principal, Girls' High School, Patna.	230	Ditto.
40	Internal water-supply service construction to the 'C' type quarters for the staff of Superintending Engineer, South Bihar Circle.	100	Ditto.
41	Internal water-supply service construction to the residence of Hon'ble Member.	1,000	Ditto.

## STATEMENT VII(c)—contd.

Serial no.	Name of work.	Estimated amount.	Remarks.
1	2	3	4
		Rs.	
42	Internal water-supply to the proposed Circuit House, Gaya.	8.0	Completed.
43	Internal water-supply service construction in the Press Superintendent's quarters at Gaya.	545	Ditto.
44	Subsidiary pumping station at 'R' block.	500	Ditto.
45	Internal water-supply construction in the residence of Professor, Patna Medical College in the Commissioner's Court compound.	770	Ditto.
46	Internal water-supply construction to the quarters of the Ass'tant of the Judicial Department, Amlatola.	95	Ditto.
47	Construction of drains for the disposal of sullage from the quarters of the Engineering Supervisor of Phones.	135	Ditto.
48	Surface drainage and Patna City Municipality Internal drainage Construction New College hostel latrines.	910	Ditto.
49	Water-supply service construction in quarters and hospital attached to Bakerganj Police line.	2,200	Ditto.
50	Internal water-supply to Sub-Assistant Surgeon's quarters at 'R' block.	96	Ditto.
51	Provision of a water borne latrine and urinal attached to Venereal Ward at Patna General Hospital.	4,440	Ditto.
52	Construction of intercepting drains for the disposal of sullage and storm water from the quarters, Supervisor and Overseer of Public Health Department.	2,690	Ditto.
53	Laying of a distribution main along service road between bandman's quarters in Patna-Bankipur water works.	680	In progress.

STATEMENT VII(c)—*contd.*

Serial no.	Name of work.	Estimated amount.	Remarks.
1	2	3	4
		Rs.	
54	Internal water-supply service construction in the Palamau Zila School, Daltonganj.	155	Work abandoned.
55	Accommodating disposed off people of the University site at Tikiatoli road.	17,794	In progress.
56	Water-supply to Sonepur mela ...	232	Completed.
57	Replacing the existing 2" and 3" C. I. main by 4" C. I. main over Taylor road for improvements to water-supply at Amlatola.	4,677	Ditto.
58	Internal water-supply to two sets of quarters for the assistant of Inspector-General of Civil Hospitals.	200	Ditto.
59	Provision of surgical wash hand basin in the Septic operation room at Patna General Hospital.	820	Ditto.
60	Internal water connection to the residences and quarters for the staff of the Public Health Department, Engineering Branch.	2,155	Funds awaited.
61	Internal water-supply to the residence of the Principal, Greer Bhumihar Brahman College.	980	Completed.
62	Internal water-supply to the residence of Postmaster and the Post and Telegraph office in the compound of Civil Court, Bankipur.	400	Ditto.
63	Internal water-supply to the residence of the Secretary, Legislative Council.	655	Ditto.
64	Extension of 3" main along the service road, west of Taylor road.	2,027	Ditto.
65	Providing push cock in place of bib cock in main buildings and isolation block, Patna General Hospital.	233	Ditto.

STATEMENT VII(c)—*contd.*

Serial no.	Name of work.	Estimated amount.	Remarks.
1	2	3	4
		Rs.	
66	Patna Government House providing a galvanized water tank with cover on the top of Dispensary buildings for supply of water when the water supply from the main is cut off.	135	Completed.
67	Internal water-supply service construction at Muzaffarpur Training school.	1,180	Ditto.
68	Internal water connection in the quarters of the Assistant Jailor and Sub-Assistant Surgeons attached to Buxar.	640	In progress.
69	Internal water connection to the quarters of the Tent master, compounder and engine driver attached to Buxar Jail.	448	Ditto.
70	Providing wash hand basin and European closet in the Surgeons and House Surgeon's room, Eye Hospital at Patna General Hospital.	1,440	Completed.
71	Construction of surface drains around the compound of Sub-Jail at Bettiah.	923	Ditto.
72	Patna Law College Drainage Scheme, College and hostel buildings.	506	Ditto.
73	Internal water-supply to the residence of the 8th Secretary, Patna.	835	Ditto.
74	Water-supply and Sanitary installation in the Dissection Block at Medical College, Patna.	786	Completed (supplementary to the main scheme).
75	Internal water-supply construction in the quarters of Circle Officers, Industries Department.	270	Completed.
76	Internal water-supply in the residence of the Executive Engineer, Second Division.	740	Ditto.
77	Internal water-supply in the residence of the Assistant Electrical Engineer, Patna.	865	Ditto.

## STATEMENT VII(c)—contd.

Serial no.	Name of work.	Estimated amount.	Remarks.
1	2	3	4
78	Providing additional $\frac{1}{2}$ " tap in the A-1 type quarters no. 1 on Khagole-road occupied by the Head Assistant of Political and Appointment Departments.	120	Completed.
79	Scheme for watering the Patna Medical College and Patna General Hospital ground.	30,000	In progress.
80	Additional standpost in Patna City municipality.	1,000	Ditto.
81	Internal water supply to the residence of the Staff Sergeant Instructor of the Bihar Light Horse.	1,720	Completed.
82	Additional water fittings in the residence of the Hon'ble Minister.	196	Ditto.
83	Internal water connection construction in the Jail buildings at Muzaffarpur.	4,580	Ditto.
84	Extension of the intercepting drain behind quarters nos. 18 and 20 on road no. 4 at Amlatola.	600	In progress.
85	Internal water-supply in the 'C' type quarters for the Assistant of the Judicial Department.	105	Completed.
86	Providing a hand-pump in the pump chamber for dewatering purposes and also vacuum gauge and pressure gauge for the pump to the Central Jail at Buxar.	230	In progress.
87	Internal water-supply service construction in the quarters of the Baud-masters at Patna.	281	Completed.
88	Provision of a water tap in the European kitchen at the Patna General Hospital.	54	Ditto.
89	Shifting a surgical and sink from the Anaesthetic room at Patna General Hospital.	113	Ditto.

## STATEMENT VII(c)--contd.

Serial no.	Name of work.	Estimated amount.	Remarks.
1	2	3	4
90	Water connection in the matron's kitchen and in the outhouses of nurses' and matron's quarters at Patna General Hospital.	Rs. 245	Completed.
91	Provision of minor sanitary fittings in the Biological, Pathological and Physiological laboratories at the Patna Medical College.	321	In progress.
92	Internal water connection to the Hindu and Muhammadan kitchens attached to the Engineers' hostel of Bihar College of Engineering.	280	Completed.
93	Internal water connection to the residence of the senior professor and the Mechanical apprentice classes at the Bihar College of Engineering.	685	In progress.
94	Providing water pipes in the western block of the Anglo-Indian Telegraphists' quarters at Patna.	440	Completed.
95	Internal water connection to the residence for Chaplain, New Capital, Patna.	580	Ditto.
96	Extension of Patna sewerage scheme for the residence on the west of Taylor road including water-flushed servant latrines.	12,170	In progress.
97	Storm drainage of the New Capital at Patna including drainage of the low land of the old distributary at Amlatola.	32,624 14,730	Completed.
98	Bhagalpur water-supply and test pumping.	12,400	Ditto.
99	Approach road to headworks and compound fencing at Digha.	19,912	Ditto.
100	Construction of intake well no. 3 at Digha.	10,850	Ditto.

## STATEMENT VII(c)—concl'd.

Serial no.	Name of work.	Estimated amount.	Remarks.
1	2	3	4
		Rs.	
101	Gaya Boring ... ..	17,000	Completed.
102	Construction of sullage drains for the hostel of Bihar School of Engineering and Training school at Bankipur.	5,877	Ditto.
103	Improvements to Gulzarbagh Press waterworks.	14,548	In progress.
104	Drainage scheme in the Puri Cholera Hospital.	7,440	
105	Installation of an Elsan closet in the lavatory of the Secretariat at Doranda, Ranchi.	132	Completed.
106	Sinking a tube-well near the latrine of the hostel of students attached to the Orissa Medical School, Cuttack.	150	Ditto.
107	Internal water-supply to the Public Works Department staff quarters at Kanke, Ranchi.	300	In progress.
108	Provision of sink and water connection in connection with the installation of electrolyte Plant at Radium Institute.	245	Completed.
109	Additions and alterations to masonry kerb in all buildings of male and female enclosure in the Indian Mental Hospital.	348	In progress.
110	Construction of a single outlet Rotary boiler tank at Bistapur outpost, Jamshedpur.	205	Completed.



## STATEMENT VII(d).

List of works under construction by local bodies.

Serial no.	Place.	Nature and names of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
			Rs.		
1	Jharia ...	Drainage ...	1,47,385	...	
2	Bhabua ...	Do. ...	14,000	...	

## STATEMENT VII(e).

Scheme submitted by local bodies and examined by the Superintending Engineer, Public Health Department, Bihar and Orissa.

Serial no.	Place.	Nature and names of schemes.	Estimated amount.	Progress.	Remarks.
1	2	3	4	5	6
			Rs.		
1	Puri ...	Silt clearing and re-excavating a tank in village Birnarsinbapur under the jurisdiction of the Sadr police-station.	9,110	...	
2	Patna ...	Constructing quarters for the clerks of the Patna Administration Committee.	8,000	...	

## STATEMENT VII(f).

List of schemes under preparation.

Serial no.	Place.	Nature and names of schemes.	Probable cost of estimate.	Remarks.
1	2	3	4	5
			Rs.	
1	Ranchi	Itki water-supply and drainage scheme.	75,000	
2	Do.	Radium Institute water-supply.	13,000	
3	Do.	Chakradharpur drainage	6,500	
4	Cuttack	Cuttack General Hospital and Orissa Medical School surface drainage and sewerage scheme.	66,000	Under check.
5	Do.	Do. do. Supplementary surface drainage and sewerage scheme.	40,000	Ditto.
6	Uhanbad	Dhanbad town drainage Jharja Sullage Disposal.	{ 8,00,000 22,000 }	} Being checked.
7	Sambalpur	Sambalpur water-supply (outline scheme).	5,00,000	
8	Deoghur	Deoghur water-supply ...	2,20,000	Under check.
9	Dumka	Dumka Sadr Hospital water-supply and sanitary installation.	10,000	Under modification.
10	Hazaribagh	Giridih drainage ...	40,000	Plans being collected.
11	Manbhum	Balarampur drainage (Bazar portion). Complete Rs. 80,000.	20,000	Levels have been taken.
12	Do.	Purulia Sadr hospital water-supply.	28,000	Being checked.
13	Purnea	Purnea drainage ...	70,000	Under check.

STATEMENT VII(f)—*contd.*

Serial no.	Place.	Nature and names of schemes.	Probable cost of estimate.	Remarks.
1	2	3	4	5
			Rs.	
14	Muzaffarpur ...	Muzaffarpur drainage ...	8,92,094	Outline scheme under check.
15	Do. ...	Internal water connection to the Regimental Quarter-Master Sergeant attached to the Bihar Light Horse.	1,330	
16	Patna ...	Kadam Kuan Improvement Trust land-drainage and sewerage.	2,60,000	
17	Do. ...	Patna General Hospital. Independent water-supply distribution system for lawn watering.	30,000	
18	Do. ...	Amlatola Independent water-supply scheme.	95,000	
19	Do. ...	Drainage and sewerage and sanitary installation of I. A. block, Patna University.	50,000	
20	Do. ...	Surface drainage scheme for the Khas Mahal area on the Patna-Gaya road.	30,000	Under modification.
21	Do. ...	Surface drainage and sewerage for the residence of the Hon'ble Member, Board of Revenue, Sth Secretary.	1,900	
22	Do. ...	Badshah Nawab Razvi Training College for women—Drainage.	5,200	
23	Do. ...	Drainage scheme for staff quarters at Digha.	865	

STATEMENT VII(f)—*contd.*

Serial no.	Place.	Nature and names of schemes.	Probable cost of estimate.	Remarks.
1	2	3	4	5
			Rs.	
24	Patna	...	720	Water-supply and sanitary fittings in the residence of the Hon'ble Member of the Board of Revenue (now allotted to the Director of Industries).
25	Do.	...	1,720	Water-supply and sanitary fittings in the office of the Executive Engineer, Central Division, Public Works Department.
26	Do.	...	90	Internal water-supply to one 'B' type quarters at Amlatola for the Education Department.
27	Do.	...	90	Internal water-supply to one 'B' type quarters at Amlatola for the Lady Doctor (to be replaced with quarters no. B-4 on Road no. 3 at Amlatola).
28	Do.	...	470	Internal water connection to 5 sets of 'C' type quarters for the Board of Revenue.
29	Do.	...	384	Internal water connection to 4 sets of 'C' type quarters for the Education Department at "R" Block.
30	Do.	...	650	Water connection to the residence for the Assistant Director of Public Health Department on Taylor Road now allotted to the Deputy Inspector-General of Police.

## STATEMENT VII(f)—contd.

Serial no.	Place.	Nature and names of schemes.	Probable cost of the estimate.	Remarks.
1	2	3	4	5
			Rs.	
31	Patna	... Extension of sewerage for the new office south of Bayley Road.	435	
32	Do.	... Extension of water connection to the Bath room and ferro print for the office of the Superintending Engineer, South Bihar Circle.	600	
33	Do.	... Sanitary Installation for the University Office.	6,886	
34	Do.	... Do. do. for the Patna Museum.	7,000	
35	Do.	... Patna Government House. Improvement to the water-supply in the kitchen block and house-keeper's bath room.	644	
36	Do.	... Patna sewerage extension for the residence north of the King George's Avenue.	2,400	
37	Do.	... Patna-Bankipore water-works extension of 2" main within the Patna Training College and Collegiate School compound.	2,080	Under modification.
38	Do.	... Internal water connection to the buildings in the compound of the Patna Training College and Collegiate School.	4,831	Ditto.

STATEMENT VII (f)—*contd.*

Serial no.	Place.	Nature and name of schemes.	Probable cost of the estimate.	Remarks.
1	2	3	4	5
			Rs.	
39	Patna	... Patna General Hospital, providing Indian water closet in the old Assistant Surgeon's quarters.	1,080	Under modification.
40	Do.	... Do. do. do. occupied by Dr. P. C. Roy.	775	Ditto.
41	Do.	... Patna Government House, raising the chimney of the septic tank in the out-house compound.	158	Under check.
42	Do.	... Patna General Hospital, providing meters in the residential buildings and quarters in the compound.	3,040	Ditto.
43	Do.	... Patna Prince of Wales Medical College. Internal water connection to the proposed residence for the Professor of Physiology.	684	Under modification.
44	Do.	... Patna General Hospital sanitary installation and water-supply in the acquired house of Dr. Asdarali Khan to be occupied by the Deputy Superintendent.	1,160	Ditto.
45	Do.	... Patna-Bankipur water-works dismantling the existing meter chamber and re-erecting the same at a safer place including provision of Venturi meter.	6,900	Under check.
46	Do.	... Drainage for the 10 sets of 'C' type quarters of the Patna Division in 'R' block.	2,200	

STATEMENT VII(f)—*concl. i.*

Serial no.	Place.	Nature and names of scheme.	Approximate cost of the estimate.	Remarks.
1	2	3	4	5
47	Patna ...	Sanitary installation to the Electrical Engineer's office and attached workshop.	Rs. 1,926	
48	Bhabua ...	Bhabua municipality, construction of a market.	7,300	Under modification.
49	Darbhanga ...	Darbhanga Medical School, providing, sanitary fittings, water-supply, sewer connection and surface drains in the Public Works Department Overseer's quarters	1,730	Under check.
50	Aurangabad ...	Aurangabad water-supply alternative scheme (1)	660	Under modification.
		(2)	1,300	
		(3)	2,272	
		(4)	2,482	
		Total ...	33,39,606	
		Say ...	33,00,000	

## STATEMENT VII(g).

Serial no.	Place.	Nature and names of scheme.	Approximate cost of the estimate.	Remarks.
1	2	3	4	5
1	Puri ...	Puri water-supply ...	Rs. 12,00,000	
2	Bhagalpur ...	Bhagalpur Drainage ...	6,00,000	Outline scheme.
3	Sambalpur ...	Sambalpur Drainage ...	50,000	
4	Arrah ..	Arrah Drain Flashing Scheme.	1,00,000	
5	Chapra ...	Chapra flood protection scheme.	40,000	
6	Motihari ...	Motihari water-supply ...	1,00,000	
7	Dumka ...	Dumka drainage scheme	50,000	
8	Patna ..	Water-supply and drainage for the proposed Veterinary College at Patna.	40,000	
9	Do. ...	Bihar College of Engineering :— (a) Water-supply ... } (b) Drainage and sewerage. }	40,000	
10	Do. ...	Water-supply to Gulzarbagh Dispensary.	2,500	
11	Muzaffarpur ...	Muzaffarpur Greer Bh mibar Brahman College water-supply for some blocks—Tower.	7,000	
12	Darbhanga ...	Sanitary installation in the Public Works Department Overseer's quarters and other buildings in the Darbhanga Medical School.	20,000	



## STATEMENT VII()—concl'd.

Serial no.	Place.	Nature and names of scheme.	Approximate cost of the estimate.	Remarks.
1	2	3	4	5
13	Darbhanga ...	Sanitary installation in the female hospital in the Darbhanga Medical School.	Rs 10,000	Detailed scheme.
14	Gaya ...	Gaya Jail water tower ...	15,000	
15	Kishanganj ...	Kishanganj supplementary drainage.	12,000	
16	Sasaram ...	Sasaram municipal market.	15,000	Outline scheme.
17	Patna ...	Surface drainage in the new blocks of Patna market.	4,000	
18	Do. ...	Water-supply and sanitary installation of the Professor of Physiology of the Prince of Wales Medical College.	700	
19	Do. ...	Drainage for the above residence.	500	
20	Do. ...	Internal drainage to the residence of the Professor of Biology of the Prince of Wales Medical College.	500	
21	Muzaffarpur ...	Water-supply in the female Training School, Muzaffarpur.	1,000	
22	Gulzarbagh ..	Water connection to the apprentice quarters and also to the quarters of Weaving Demonstrator of the Cottage Industry Institute at Gulzarbagh.	1,000	
		Total ...	23,09,200	

## APPENDIX

Statement of fuel consumption per mill foot gallons, as compared with

Serial no.	Waterworks stations.	Plant.	Total Mill foot gallons during the year 1926-27.	Rate per Mill foot gallons 26-26 lbs.	Total quantity of fuel which would have been used at the 26-26 rate.
1	2	3	4	5	6
1	Arrah .. ..	Steam ...	5761.0	108.68	270.5 tons.
2	Bhagalpur ...	Do. ...	18202.0	82.7	672.0
	Do. ...	Oil ...	42771.0	5.13	97.9
3	Buxar ...	Steam ...	434.0	1113.10	215.6
4	Darbhanga ...	Oil ...	Figures for previous year are		
5	Gaya ...	Steam ...	77309.7	41.63	1436.7
6	Hinoo ...	Do. ...	312.8	632.13	88.2
7	Hazaribagh	Do. ...	2309.6	273.22	281.7
8	Muzaffarpur	Do. ...	4044.4	148.5	267.1
	Do. ...	Oil Plant	3012.4	24.4*	9187.8†
9	Patna-Bankipur	Steam „	17879.0	365.85	2920.10
10	Ranchi ...	Oil „	207.6	49.8	4.6 tons
11	G. B. Sewage P. S.	Oil „	1241.0	36.0	19.94

Net savings

No. VIII.

previous year and the amount of savings effected thereon during 1926-27

Quantity actually used, 1926-27.	Savings effected or excess.	Rate of fuel.	Approximate amount saved or exceeded.	Remarks.
7	8	9	10	11
		Rs. a. p.	Rs.	
217.5 tons	-62.0 Tons	14 1 0	-872	
769.7	+97.7	14 0 0	+1,368(a)	(a) Due to unrepaired plant.
84.4	-13.5	100 0 0	-1,350	
160.7	-54.9	16 0 0	-878	
not available	for comparison.			
1396.0	-49.7§	10 0 0	-400	
90.8	+2.6	20 0 0	+52	
199.0	-82.7	18 7 0	-1,546	
343.4	+76.3	20 0 0	+1,526(b)	(b) Low lift steam plant worked uneconomically.
1750.0†	-4497.8†	12.5†	-3,467†	*Pint. †Gallons.
1606.75	-1313.55	13 14 0	-18,223	‡Lubricating oils in gallons.
3.2	1.4	271 4 0	-380	§Above the saving reported last year.
11.28	{ 8.68	90 0 0	-781	
	{ 207.1	1 12 0	-362	

Rs. 25,313.