



(444)

GOVERNMENT OF MADRAS

ADMINISTRATION REPORT
OF THE
ELECTRICITY DEPARTMENT
FOR
1939-40

MADRAS
PRINTED BY THE SUPERINTENDENT
GOVERNMENT PRESS
1940

SECTION II—DETAILED REPORT—

PAGE

Pykara Electricity System—	
Civil and hydraulic works	22
Power station	22
Coimbatore receiving station	23
110 K.V. changeover—Pykara-Coimbatore transmission lines	23
Transmission lines and substations	24
Interruptions and breakdowns	25
Special works	25
“Ascii” treatment	25
Commercial activity	25
Conversion fund	26
Construction subdivision	26
Meter and relay tests	26
Administration and accounts	27
Stores	27
Mettur Electricity System—	
Power station operation	28
Additions and improvements to equipments	28
Construction	29
Meter and relay tests	29
Commercial	30
Mettur Workshops	30
Andhra Power System—	
Vizagapatam Thermal System—	
Power station	30
Additions and improvements	30
Distribution systems and rural electrification	31
Commercial	31
Bezawada Thermal System—	
Power station	31
Additions and improvements	31
Service interruptions	32
Additions to load	32
Commercial	32
Cocanada Thermal Scheme	32
Accidents	33
Large construction works executed by the Construction branch—	
Pykara System—Plant extensions	33
Transmission line division	33
Mettur System	34
Investigations and surveys	35
Technical work—	
Electrical	36
Civil	37
Hydrometric work	37
Electrical installations in Government buildings	38
Inspection and administration of the Indian Electricity and Cinematograph Acts and Rules	38
Staff	44

APPENDICES.

PAGE

A	Construction Works undertaken with expenditure to end of 1939-40	47
B	Budget provision for capital works in 1940-41	49
C	Establishment charges of the Department and fees earned during 1939-40 and estimated for 1940-41	50
D	Table of electric supply costs and records—	
	(1) Companies	52
	(2) Local authorities	56
E	Capacity of plants installed of electric supply undertakings in service	58
F (1)	Electric supply undertakings in service	59
(2)	Licences under construction	59
(3)	New applications for licence received	60
(4)	Licensed undertakings put into service during the year	60
(5)	Licensees who reduced their tariffs	60
(6)	Licensees who charge more than 6 annas per unit for lighting and fans	60
G	List of villages and townships supplied with electrical energy in power systems	61
H	List of textile mills, etc.	64
I	List of tea factories	65
J	Load and revenue results of Government managed municipal undertakings	66

LIST OF ILLUSTRATIONS.

	<i>Facing page</i>
PAPANASAM, DIVERSION WEIR—APRIL 1940—FROM LEFT FLANK SHOWING INTAKE CHAMBER AND COMPLETED SECTION OF WEIR. ISLAND PORTION IN RIGHT BACKGROUND	11
PAPANASAM, DIVERSION WEIR—APRIL 1940—INTAKE CHAMBER SHOWING TWO 9-FOOT DIAMETER STEEL PIPES UNDER ERECTION ..	12
PAPANASAM, TAMBRAPARNI DAM—APRIL 1940—VIEW FROM LEFT FLANK SHOWING TEMPORARY COFFER DAM ON RIGHT AND BATTERY OF 3 MORTAR MIXERS ON LEFT	13
PAPANASAM, TAMBRAPARNI DAM—APRIL 1940—VIEW FROM RIGHT FLANK, RIVER-BED FOUNDATIONS COMPLETED AND RIVER DIVERTED OVER DAM ON LEFT CONTRACTION JOINT AT CH. 350 SHOWING DRAINAGE GALLERY IN UPPER CENTRE	14
PYKARA PLANT EXTENSIONS—TWO ADDITIONAL 12,500 K.V.A., 110/11 K.V. TRANSFORMERS AT SINGARA	22
COIMBATORE RECEIVING STATION SHOWING NEW TRANSFORMER REPAIR HOUSE	23
PAPANASAM, DIVERSION WEIR—METHOD OF TREATING ROCK JOINTS IN ISLAND PORTION BEFORE FILLING AND FACING WITH WATER- PROOF MASONRY	34
PAPANASAM, TAMBRAPARNI DAM—JANUARY 1940—EXCAVATION OF UNSOUND ROCK IN JOINT AT CH. 500	35

CHARTS.

1 PROGRESS OF THE ELECTRICITY DEPARTMENT	<i>Frontis- piece.</i>
2 (a) PEAK LOAD	<i>Facing page</i> 2
(b) ENERGY GENERATED	3
(c) ENERGY DISTRIBUTED	4
(d) REVENUE ASSESSED	5
3 ORGANIZATION OF THE SUPERIOR STAFF OF THE DEPARTMENT ..	PAGE 20

ADMINISTRATION REPORT OF THE ELECTRICITY DEPARTMENT FOR 1939-40

SECTION I—GENERAL REVIEW.

INTRODUCTORY.

In spite of the generally adverse conditions prevailing during the year progress continued to be, on the whole, satisfactory.

The execution of works and general progress were overshadowed in the early part of the year by the intense rearmament programme in Europe and later on by outbreak of war. Supply and delivery of materials was uncertain and long delayed. Prices continued to rise, some materials advancing 40 to 70 per cent above pre-war levels. This affected the departmental activities not only directly but also indirectly by its effect on consumers who were kept off by scarcity and cost of equipment. It is, therefore, all the more gratifying that the upward trend of demand on the systems experienced in previous years was maintained. Chart I shows the progress from year to year and Charts 2, a, b, c, d show the detailed growth of load, revenue and units generated and distributed in Government systems.

2. (a) The aggregate of the demands on the different systems was 38,350 K.W., total generation 168.35 million K.W.H. and the revenue Rs. 55.34 lakhs.

(b) This was the seventh year of operation of Pykara System. The peak load on Pykara reached 24,900 K.W. as against 17,900 K.W. in the previous year. Installation of the new plant was completed during the year and the Pykara-Coimbatore line operation was changed over from 66 K.V. to 110 K.V. During the erection and test of the new plant, power was purchased from Mettur. Glen-Morgan plant also had to be called to assistance occasionally. The year's working resulted in a net return of 7.26 per cent on the capital cost of Rs. 2.98 crores.

(c) The Mettur System was in its third year of operation. The normal system peak load reached 10,900 K.W. In January 1940, however, when the major part of the load at Pykara was temporarily transferred to Mettur, the peak reached 22,900 K.W. The largest single increase in load was Dalmia Cement Works at Dalmiapuram reaching a maximum demand of 1,500 K.W. There was lack of rain in the catchment of the Cauvery in the early part of the year and consequently the storage in the Mettur Reservoir decreased and the lake level fell. The turbines had to

operate on a head as low as 74.0 feet in July 1939. The output of each of the three existing generating sets at this head is only 4,500 K.W. To meet the load growth and a recurrence of this state Government sanctioned the installation of the fourth generating set and third transformer at Mettur at a total estimated cost of Rs. 10 lakhs. The year's working resulted in a net return of 4.47 per cent on capital cost of Rs. 1.97 crores.

(d) The peak load on Vizagapatam Thermal Station reached 1,010 K.W. Load conditions necessitated increase in the plant capacity and an order for a new 1,500 K.W. turbo set estimated to cost Rs. 3.1 lakhs was accordingly placed. This was the second year of operation and the working resulted in 4.44 per cent net return on capital cost of Rs. 20.54 lakhs.

This was the first year of operation of the Bezvada Scheme. The peak load on the Power Station reached 1,540 K.W. The largest single consumer on the system was Andhra Cement Factory whose load, however, was not regular. The rapid load increase necessitated addition to the plant and transformer capacity. Preparations for placing orders for one 3,000 K.W. turbo generator, one 33,000 lb. evaporation boiler and one 1,500 K.V.A. transformer at an estimated cost of Rs. 7.28 lakhs were made. The year's working resulted in 3.38 per cent net return on capital investment of Rs. 22.54 lakhs.

(e) Expenditure on construction works during the year was Rs. 69.21 lakhs; out of this Rs. 31.69 lakhs was incurred in the Construction Branch which is in charge of the major works and the balance on line extensions and distribution schemes executed departmentally and contract works supervised by the operation staff in the respective systems. The main items of construction were—

- (1) Completion of Pykara Plant Extensions,
- (2) Papanasam Hydro-Thermal Scheme,
- (3) 66, 33 and 11 K.V. lines, and
- (4) Preliminary survey of the transmission line from Singarappet to Madras and investigation of the Moyar Scheme.

(f) Three new licensees commenced supply under the Indian Electricity Act making a total of 77 and four more were under construction. Fifty-four new cinemas permanent and temporary were established.

(g) Duty on consumption of electricity was introduced in the year. Revenue from the duty was Rs. 4.9 lakhs and from inspections Rs. 70,500.

(h) Total quantity of energy generated from Government and licensee sources was 238 million units giving a consumption of only about 5 units per head of population for the whole Presidency.

The year marked the retirement of Sir Henry Howard. Sir Henry founded the department 13 years ago and has been Chief Engineer since. Fortunately his advice is still available in his capacity as Consulting Engineer to Government.

To commemorate Sir Henry's distinguished career as Chief Engineer, the officers of the department erected a bust at the head of the Pykara Works. This was unveiled by Sir C. P. Ramaswami Ayyar, Diwan of Travancore, to whom the scheme owes its inception.

Important features of the different activities of the department are given below. More detailed accounts are given in Section II.

PYKARA HYDRO-ELECTRIC SYSTEM.

3. *General.*—The year under review was the seventh year of operation of the Pykara System and marked the completion of a further important stage of development by the installation of two additional 12,500 K.V.A. generating units at Pykara and the raising of the operating voltage of the Pykara-Coimbatore double circuit transmission line from 66 K.V. to 110 K.V. The growth of demand was satisfactory and the progress in load development of the preceding years was well maintained.

4. The peak load at Pykara reached 24,900 K.W. as against 17,900 K.W. of the previous year and the energy generated was 114.7 million units as against 84.3 million units. In addition Mettur supplied the Pykara System 2.36 million units during the months of April and May 1939 when the new plant at Pykara was under erection and the available capacity was inadequate to meet the system demand and a further 1.45 million units during the rest of the year.

5. The energy distributed and sold during the year was 107.43 million units against 90.98 million units of the year 1938-39.

6. The revenue earned was Rs. 38.5 lakhs or roughly an increase of 25 per cent over that of the preceding year.

7. *Growth of demand and extensions to transmission system.*—The following statement shows the growth of demand on the generating station and the revenue returns since the inception of the scheme:—

Year.	Peak load. K.W.	Energy output. Million units.	Gross revenue including miscellaneous receipts in lakhs of rupees.
1933-34	3,150	10.9	4.4
1934-35	6,600	30.0	10.5
1935-36	10,100	50.3	16.3
1936-37	14,900	75.6	24.0
1937-38	16,500	82.4	27.6
1938-39	17,000	84.3	31.0
	900 (Glen Morgan)	16.8 from Mettur	
1939-40	24,900	114.7	38.5
		3.81 from Mettur	

8. Thirty miles of single circuit 66 K.V. line from Virudunagar to Kovilpatti was completed and the substations at Sattur and Kovilpatti were brought into use.

9. The Madura-Sivaganga 22/33 K.V. transmission line of 27 miles length was completed, the Sivaganga substation energized and supply to the following three licensees was commenced :—

- (a) East Ramnad Electric Supply Corporation, Limited.
- (b) Reliance Electric Supply Corporation, Limited, Okkur.
- (c) Nattarasankottai Electric Supply Corporation, Limited.

10. Agricultural development maintained good progress, 582 pumping sets with a connected load of 2,144 h.p. being installed during the course of the year. The total connected horse-power of pump sets in the system reached 10,718, the number of sets being 1,810.

11. Major and minor extensions aggregating to a total cost of Rs. 9.6 lakhs were completed.

12. Tables I and II below give particulars of the length of high tension lines in service and the load connected :—

Table I.

Voltage.	During 1939-40.		Aggregate.	
	Single circuit.	Double circuit.	Single circuit.	Double circuit.
	MILES.	MILES.	MILES.	MILES.
110 K.V.	..	* 49	..	* 49
66 "	30	..	54	179
33 "	..	..	28	..
22 "	60	..	415	61
11 "	84	5	591	14

* Changeover from 66 K.V. to 110 K.V.

Table II.

Description.	Connected load on	
	31st March 1939.	31st March 1940.
	K.W.	K.W.
Textile industry	19,006	22,314
Cement works	3,352	3,395
Licensees	12,401	15,180
Tea factories	3,561	3,677
Agricultural and miscellaneous	11,181	13,950
	<u>49,501</u>	<u>58,466</u>

Growth of these loads is illustrated in Chart 1.

13. *Textile mills*.—Six new textile mills, one at Coimbatore, three at Madura, one at Dindigul and one at Kovilpatti, were connected up during the year making a total of 37.

Two mills have contracted to take power in 1940-41 and two more are likely to come in.

There was a slump in the cotton market in the earlier part of the year and the labour situation threatened to take a serious turn. On the outbreak of war, however, lost ground was made up by the industry.

A list of textile mills is given in Appendix H.

14. *Cement works*.—The Madukkarai Cement Company continues to be the largest individual consumer. The increase in its demand was, however, very small—only 43 K.W.

15. *Tea factories*.—Three more tea factories were connected making a total of 38.

A list is given in Appendix I.

16. *Rural development*.—Spread of electric supply in the countryside continued to grow. Sixteen village distributions were undertaken, one in the Nilgiris, eight in the Coimbatore area and seven in Madura area and fourteen more rural areas were electrified.

17. Altogether at the end of the year, Pykara power was available in 165 villages and outposts. There were 1,810 agricultural pumps, 143 industrial services and 3,382 domestic services. The list of villages electrified up to 1939-40 is given in Appendix G.

18. Seven panchayats were added to the supply making the total number of panchayats 38 and street lighting in panchayat areas covered 3,047 lamps.

19. The use of electric motors for sugarcane crushing is finding favour and there are grounds for the hope that Desi sugar production may become a cottage industry.

Two power looms were installed in Ganapathy village near Coimbatore. The results are being watched with care and interest.

20. *Licensees*.—There are 19 licensees in the system and they are, in general, working satisfactorily. The licensees who commenced taking power during the course of the year were :—

- (1) East Ramnad.
- (2) Okkur.
- (3) Nattarasankottai.
- (4) Kodaikanal.

The following licensees' undertakings, all municipal, were managed by the department :—

- (1) Dharapuram Municipality.
- (2) Udamalpet Municipality.
- (3) Sivakasi Municipality.
- (4) Bodinayakanur Municipality.
- (5) Periyakulam Municipality.

Udamalpet, having reached a profit earning stage, was handed over to the municipality on 1st April 1940.

21. *Conversion fund.*—The amount advanced during the year was Rs. 46,406 making a total of Rs. 11,96,430 since Pykara operation commenced. Of this total, Rs. 7,54,944 has been repaid. Details of advances and repayments since 1933-34 are given in Section II.

22. *Hire-purchase system.*—The hire-purchase facilities offered by the department with the low rate of interest have been increasingly availed of by ryots and small industrialists and about 90 loans were sanctioned and disbursed during the year.

23. *Accidents.*—There were in all 54 accidents, 13 being to departmental employees. Fatal accidents were 14, one of which was to a departmental employee.

Compensation amounting to Rs. 845 was paid in four cases.

24. *Financial results.*—The figures below show the financial working of the Pykara System during the year :—

	RS.
(1) Capital outlay including interest	2,98,26,050
(2) Gross revenue	37,13,407
(3) Operation and maintenance	6,05,965
(4) Depreciation Fund	6,73,191
(5) Special Reserve Fund	2,69,276
(6) Total expenses	15,48,432
(7) Net revenue	21,64,975
(8) Net return on capital outlay	7.26 per cent.

The figures are exclusive of suspense.

The net amount to the credit of the reserve funds after operations in the year was—

	LAKHS.
Depreciation fund	15.92 (9.18 invested).
Special reserve fund	6.37 (3.67 ,,).

25. The net return was 7.26 per cent as against 7.4 per cent in 1938-39 and 8.5 in 1937-38. This is due to the heavy investment on Pykara Plant Extensions and the Madura lines which are not yet earning full revenue.

26. *Staff.*—The year's working showed the imperative need of re-organizing and strengthening the ministerial and stores staff of the system. Notwithstanding unremitting efforts by all members, the state of work left much to be desired. Proposals for improvement have been submitted to Government and sanction is still awaited.

METTUR HYDRO-ELECTRIC SYSTEM.

27. *General.*—The year under review was the third year of operation of the Mettur System and was generally satisfactory, a steady growth in load being recorded. There were several occasions when the system was paralleled with Pykara to give

relief or to enable tests to be carried out. Conditions of parallel running were at all times satisfactory. The machines at Mettur were called upon to operate under widely varying heads from 153 feet to 74 feet.

28. The peak load at Mettur was 10,900 K.W. as against 7,700 K.W. in the previous year and the energy generated was 46.49 million units as against 44 million units. The figures for 1938-39 include the supply to Tiruppur which was temporarily transferred to Mettur owing to the insufficient plant capacity at Pykara. Tiruppur load was, however, re-transferred to Pykara in June 1939 on installation of the new plant.

29. The increase due to development in the Mettur area itself exceeded 4,000 K.W. The steadily increasing load and the fact that the machines although rated at 12,500 K.V.A. each on full head have varying outputs as little as 3,000 K.W. per set on low operating heads, made an addition to the plant imperative. The purchase of a fourth generating unit and third transformer was accordingly sanctioned by Government and orders placed. When this addition is made the maximum plant that can be installed on the Mettur Dam will have been completed.

30. The following statement shows the growth of load and revenue :—

Year.	Peak load	Energy output (million units).	Gross revenue including miscellaneous revenue in lakhs of rupees.
	K.W.		
1937-38	5,700	17.4	3.45
(5 months)			
1938-39	7,700	44.0	11.03
1939-40	10,900	46.49	13.34

31. In the southern area of the system which comprises Erode, Salem, Trichinopoly, Tanjore, Kumbakonam, Tiruvarur and Negapatnam, there was all-round progress. A notable addition to load was that of the Dalmia Cement Company (1,500 K.W.). A 22 K.V. ring main of 56 miles was constructed to supply this load from Trichinopoly Substation. There was also considerable growth of load in the East Tanjore Electric Supply Corporation area.

32. In the northern area comprising North and South Arcot districts, Chittoor and parts of Salem, there was much departmental construction activity. The following high-tension substations were energized during the year :—

Tiruvannamalai.	Arni.
Polur.	Pakala.
Vettavalam.	Karimangalam.

Eighteen miles of 33 K.V. line was constructed from Chittoor to Pakala and 15 miles 11 K.V. line from Pakala to Chandragiri to supply Tirupati-Tirumalai Devasthanam Licensee.

33. Power supply was extended to urban and rural areas, the more important among them being Arkonam, Dharmapuri, Krishnagiri, Nagari, Namagiripet, Sholingur, Tirukkoyilur, Tirutani, Tiruvattipuram, Wandiwash and Yercaud. Tables III and IV below give particulars of the transmission lines and connected load. But for the economy necessitated by war in the latter half of the financial year, extensions would have been more. It is to be re-called that the southern area of this system was originally supplied from Pykara and transferred to Mettur when it began operation. The northern area was developed initially after the advent of Mettur supply, except the towns of Vellore, Conjeeveram and Chittoor and Tirupati Devasthanam which had their own generating plants but changed over to Hydro-Electric supply from Mettur.

Table III.

Item number.	Voltage.	Constructed in the year.		Total in service.	
		Single circuit.	Double circuit.	Single circuit.	Double circuit.
		MILES.	MILES.	MILES.	MILES.
1	110,000	..	..	..	..
2	66,000	..	..	188.5	228.5
3	33,000	35	..	177.7	..
4	22,000	165.75	..	231.5	..
5	11,000	208.85	..	303.8	1.75

The connected load on the system under different categories is tabulated below and compared with the previous year.

Table IV.

	On 31st March 1939.	On 31st March 1940.
	K.W.	K.W.
Licensees	18,110	23,480
Textile (direct supply)	720	760
Railways	1,340	2,090
Agricultural and miscellaneous	720	2,370
Industrial (direct supply)	370	1,340
	21,260	30,020

34. *Licensees.*—A special feature of the area under the Mettur System is that large blocks of territory are assigned to company licensees. In the southern area—

Messrs. Trichinopoly-Srirangam Electric Supply Corporation Limited.
 „ Salem-Erode Electricity Distribution Company Limited.
 „ Kumbakonam Electric Supply Corporation Limited.
 „ East Tanjore Electric Supply Corporation Limited.
 „ Negapatam Electric Supply Company Limited.

between them cover an area of 7,650 square miles. In the northern area—

Messrs. South Arcot Electric Supply Distribution Company Limited,
 „ Vellore Electric Supply Corporation Limited,
 „ North Arcot District Electric Supply Corporation Limited,
 „ Chittoor Electric Supply Corporation Limited,
 „ Carnatic Electric Supply Corporation Limited and

The Tirumalai-Tirupati Devasthanams have an area of 3,500 square miles in their charge.

There are also five municipal licensees, Tanjore and Karur in the South and Conjeeveram, Tiruppattur and Tiruvannamalai in the North.

35. The direct departmental development is therefore sandwiched between the blocks already assigned and is not as rich as many parts of the licensees' areas. Neglect of progressive development in some of the latter is retarding what should be the normal load growth of the system.

36. *Industrial development.*—Nearly 3,000 K.V.A. of connected load was added to the system during the year.

The rolling mills at Negapatam did not work during most of the year but restarted in May 1940.

Work on erection of the Mettur Chemical Factory was in abeyance during the whole year and the expected power load has not materialized.

A list of textile and other mills in the system is given in Appendix H-B.

37. *Agricultural and rural development.*—The number of agricultural irrigation pumps connected during the year was 137 with an aggregate horse-power of 697. The total number of pumps on the system on 31st March 1940 was 201 with a connected load of 1,071 horse-power. Large accession of agricultural load is expected from the line extensions recently completed.

A list of towns and villages electrified is given separately in Appendix G.

38. *Hire-purchase loans.*—There was an appreciable increase in the number of applications for hire-purchase loans and the number of pump sets supplied. One hundred and fifty-eight applications for supply of pump sets and industrial motors were received and loans amounting to Rs. 44,930 sanctioned during the year for the purchase of 112 pump sets.

39. *Municipal undertakings.*—The Karur Scheme was handed over to the municipality with effect from 1st April 1939 leaving only two undertakings—Tiruppattur and Tiruvannamalai—under the management of the department in the Mettur area.

The Tiruppattur municipal undertaking was in its second year of operation but the revenue was barely sufficient to meet operation and maintenance charges and the annuity payable to Government.

The Tiruvannamalai undertaking by comparison is slightly more satisfactory.

40. *Construction*.—More than thirty extensions costing over Rs. 7 lakhs were executed departmentally.

Some commercial work was done but most of the commercial staff was diverted to construction work to make supply possible in areas where development was likely and commercial work had scope.

41. *Accidents*.—There were 36 accidents, 3 of which were to departmental employees. Nine were fatal. A sum of Rs. 922 was paid towards compensation for departmental accidents.

42. *Financial results*.—The figures below show the financial working of the Mettur System during the year:—

	RS.
1 Capital outlay including arrears of interest ..	1,97,26,450
2 Gross revenue	12,34,443
3 Operation and maintenance	2,93,095
4 Depreciation Fund	1,13,392
5 Special Reserve Fund	45,357
6 Total expenses	4,51,844
7 Net revenue	8,82,599
8 Net return on capital outlay	4.47
	per cent.

The figures are exclusive of suspense. Although there is no depreciation as yet allowed on the main plant and new parts of the system the southern area has been more than five years in service and depreciation and reserve fund allowance is made for that area.

The amount to the credit of the funds on 31st March 1940 was:—

	RS.
Depreciation Fund	2,47,892
Special Reserve Fund	99,157

The net return is 4.47 per cent against 2.3 per cent of the previous year. The financial results were therefore progressively satisfactory.

43. *Mettur Workshops*.—The total output of the shops during 1939-40 was Rs. 5,25,000 as against Rs. 2,92,350 of the previous year, the increase being due mainly to larger departmental requirements consequent on the greater volume of construction works.

The shops worked three shifts for over five months in order to cope with the demand, the labour strength exceeding 250. Subsequently the severe restriction on construction on account of war reacted unfavourably and led to retrenchment. At the end of the year, the labour force had been reduced to half the maximum strength.



PAPANASAM, DIVERSION WEIR—APRIL 1940—FROM LEFT FLANK SHOWING INTAKE CHAMBER AND COMPLETED SECTION OF WEIR. ISLAND PORTION IN RIGHT BACKGROUND

44. *Administration.*—Owing to the increased activities in the northern area, the present allotment of two Assistant Engineers for operation and maintenance was found inadequate. One additional Assistant Engineer with headquarters at Vellore was found necessary and proposals were submitted to Government.

A general redistribution of work among the divisions and subdivisions was also under examination with a view to more efficient working.

PAPANASAM HYDRO-THERMAL SCHEME.

45. Work on the scheme was continued energetically throughout the year.

46. On the outbreak of war, Government decided to curtail expenditure to the minimum that would bring the scheme into effective operation. This is possible only to the extent of omitting water storage and the second circuit, with connected sub-station equipment, of the Kovilpatti-Madura 66 K.V. transmission line. A revised estimate for Rs. 139 lakhs was therefore prepared in September and is now being tentatively worked to. The reduction of Rs. 40 lakhs is roughly made up of Rs. 10 lakhs on the transmission system and Rs. 30 lakhs on the Tambraparni Dam.

It is hoped that it will be possible to provide funds in 1941-42 for continuing both these works. The omission of the transmission line will prejudice operation to the main load centre of Madura and the discontinuance of the dam construction will not only limit the capacity of the scheme to water available from the natural flow of the river, but will throw out of employment the large labour force working on the dam and render the ultimate completion of the work very much more costly.

47. Specifications for the machinery, switchgear, transmission lines, pipes and hydraulic equipment were prepared in the Technical Divisions in Madras and issued early in the year.

The plant comprises three vertical units each consisting of an 8,150 h.p. reaction water turbine and a 7,250 K.V.A. 11 K.V., 600 r.p.m. alternator. Orders were placed for the former on Messrs. English Electric Company and for the latter on Messrs. British Thompson-Houston Company in September. The connected switchgear and three 7,250 K.V.A. 11/66 K.V. transformers were also ordered from Messrs. British Thompson-Houston Company. Messrs. Associated Electrical Industries (India), Limited, will carry out the erection and function as main contractors responsible for co-ordinating different items. According to the pre-war tenders the plant should have been ready for service by June 1941. Considerable delays have already occurred due to the war and it seems likely now that completion will not be possible until at earliest the end of 1941. The latest advice at the time of going to press is that all manufactures are in progress and are proceeding as quickly as war conditions permit. The value of the plant including erection is Rs. 14.83 lakhs.

The order for transmission lines was placed in January 1940 with Messrs. Callenders Cable and Construction Company. The main double circuit line from Papanasam to Kovilpatti will be of steel lattice towers manufactured in India and painted for protection. The single circuit line from Kayattar to Tuticorin will be of English galvanized steel towers. The tender completion date was July 1941 but due to difficulties in obtaining supply and export licences both in India and England it is evident that there will be some months' delay in completing this work also. The value of these contracts is Rs. 11.26 lakhs. Detailed surveys of these transmission lines, 84 miles in total length, were made by the Transmission Line Construction Division during the year.

The order for the penstocks and surge tank was placed with Messrs. Boving & Co., in August. The surge tank was to be of their own manufacture, the penstock being made by their principals, Messrs. Ferrum of Katowice, Poland.

The contract for the 9-foot diameter low pressure pipe was let to Messrs. The Indian Hume Pipe Company for rivetted steel construction from Tata plates fabricated by Messrs. Humes in a workshop to be erected by them at site.

On the invasion of Poland at the beginning of September, new arrangements for the penstock had to be made and an order was placed for rivetted steel pipes with Messrs. The Indian Hume Pipe Company. Both the diameter and plate thicknesses had to be increased to compensate for the lack of facilities for manufacturing modern high pressure pipes in India and the cost of the new contract is considerably higher than that originally placed. The order for the 8½-foot diameter steel lining pipes through the dam was also placed with Messrs. The Indian Hume Pipe Company. The value of these three contracts is Rs. 7.2 lakhs. The order for the surge tank and manifold adjoining it was left with Messrs. Bovings and that for the valves at the head of the penstock has also been placed with them.

48. Construction during the year was largely concentrated on the two principal civil works, the Tambraparni Dam and the Diversion Weir. Excellent progress was made on each of these and they are both ahead of the scheduled programme. The whole river-bed foundations for each have been completed and the 1940 monsoon flow can be passed over the masonry structures. The exceptionally dry working season from January 1940 admitted uninterrupted work and materially assisted the progress. Several lengths of the diversion weir have been finished for the full section and the whole work is expected to be completed according to schedule by March 1941. The quantity built during the year was 571,800 cubic feet, expenditure was Rs. 4.10 lakhs and the average labour force employed during the working season was 1,200.

On the Tambraparni Dam the foundations for the left half river bed section were completed during 1939 working season and masonry built up to river-bed level. At the end of the monsoon



PAPANASAM, DIVERSION WEIR—APRIL 1940—INTAKE CHAMBER SHOWING TWO 9-FOOT DIAMETER STEEL PIPES UNDER ERECTION



PAPANASAM, TAMBRAPARNI DAM—APRIL 1940—VIEW FROM LEFT FLANK SHOWING TEMPORARY COFFER DAM ON RIGHT AND BATTERY OF THREE MORTAR MINERS ON LEFT

the river was diverted over this and work on the foundations for the right half was taken up in September. The weather did not however, admit of continuous work until December since when excellent progress has been made, the foundations being completed by the end of March and masonry built up to approximately river-bed level by the monsoon. Work was continued at each flank and masonry raised in sections to 70 ft. above river-bed level. Excavation in the surplus course was continued throughout the year, the labour employed being varied to suit other demands.

The 8½ feet diameter discharge pipes will be erected as opportunities occur during the 1940 monsoons or, if this is not possible, early in 1941 and the dam level will be raised to about R.L. 745, the extent of the restricted programme, by the end of March.

651,700 cubic feet of masonry were built during the year and the total expenditure was Rs. 7.15 lakhs. The average labour force during the working season was 1,900.

49. Orders for the hydraulic controls for both the dam and diversion weir were placed with Messrs. Ransomes & Rapier. The parts to be built in should have been delivered early in 1940, but due to war deliveries are not now expected until about July.

50. Excavations for both the low pressure pipe and penstock were completed and a large proportion of piers and anchors built. The Indian Hume Pipe Company erected their workshop during the monsoon of 1939 and began fabrication of the low pressure pipe in October. By the end of March manufacture was in full swing and about 170 running feet pipe lengths had been transported to position and erection was in progress.

51. In order to provide an earlier supply for nearby townships and to build up load for the main scheme, feeder lines and distribution systems were constructed during the year to Ambasamudram, Kallidaikurichi, Sermadevi and Tenkasi. These were supplied from the construction power plant and it was possible to do this without increasing the peak day-time works load. The two 100 K.W. sets from Theni were added to this plant during the year bringing the installed capacity to 550 K.W. The peak load at the end of the year was 350 K.W., the largest individual consumer being the Indian Hume Pipe Factory at 100 K.V.A.

52. The construction workshops were kept fully employed with works manufactures such as transmission line fittings, diversion weir trash rack, etc.

53. Completion of the camp protected water-supply system was made in September 1939 by the installation of the Jewell air wash gravity filter plant and chloro-feeder.

The road bridge over the Serval Ar at Mundanthorai was completed before the 1939 monsoon and the two reinforced concrete bridges over the penstock and pipe line later in the year.

Anti-malarial measures were maintained throughout the year and the general health of the camps was good.

51. The total average labour force during the working season was 4,150 and the total expenditure during the year was Rs. 23.04 lakhs.

THERMAL SYSTEMS.

55. *Vizagapatam Thermal System.*—For accounting purposes, this was the first year of operation of the system. But the station had been in service since March 1938 and the transmission lines since July 1938.

The number of units generated during the year was 2,489,095 and the maximum demand 1,010 K.W. This load is beyond the capacity of the smaller unit which is 750 K.W. Trouble has also been experienced with the operation of this set. An order was therefore placed in January 1940 for an additional 1,500 K.W. set identical with the 1,500 K.W. set already installed. The completion date promised was April 1941. But owing to war developments it is now feared that there will be a delay of 12 months.

56. A stilling tank and second water inlet pipe from the harbour were found necessary and are being constructed.

57. The old plant taken over from the harbour was sold for Rs. 62,500. The total paid to the harbour authorities for this and the power-house building and site was Rs. 2 lakhs.

58. The most important additions to the load was Vizianagram municipal area to which supply was given in April 1939 and Salur Licensee in December 1939.

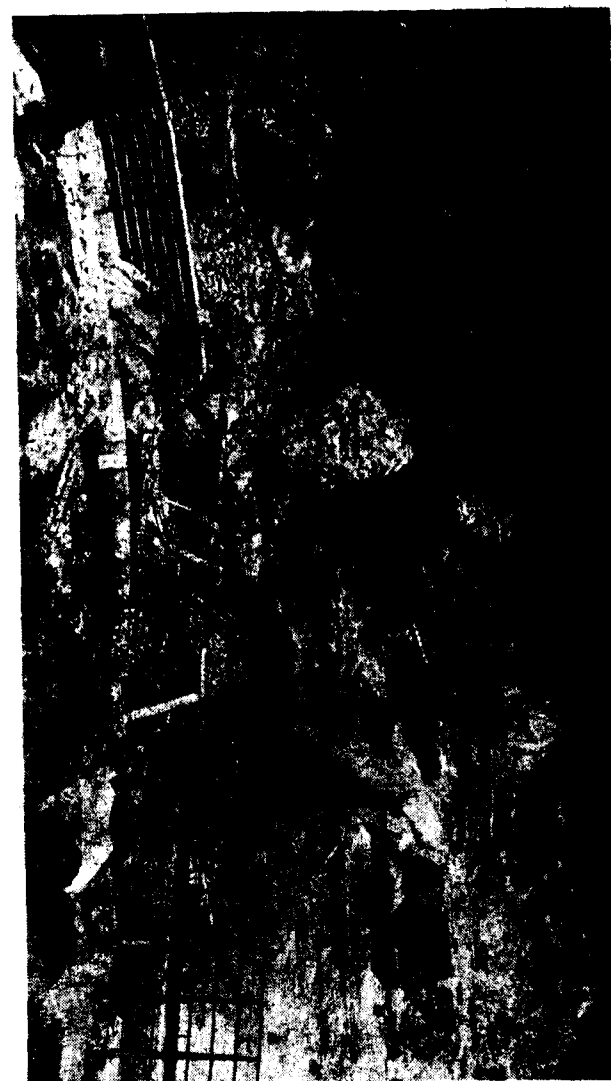
59. The following table gives the details of transmission lines :—

Voltage.	Constructed in the year.		Total in service.	
	Single Circuit.	Double Circuit.	Single Circuit.	Double Circuit.
	MILES.	MILES.	MILES.	MILES.
33,000	..	..	48	..
11,000	..	4.5	51	8

60. The total capital expenditure on the scheme was Rs. 22.6 lakhs (inclusive of Rs. 2.05 lakhs as arrears of interest) the gross revenue Rs. 1,36,323 and working expenses excluding suspense Rs. 1,26,295. The net return therefore is 44 per cent.

61. The part of the Presidency served by the system is industrially backward and load development is likely to be slower than in the south. Notwithstanding this, growth has exceeded expectations and at the time of going to press a further demand for ship-building requirements at Vizagapatam appears likely. In view of the delay in supply of the new plant commercial work has to be curtailed.

PAPANASAI, DIVERSION WEIR—APRIL 1940—FROM LEFT FLANK SHOWING INTAKE CHAMBER AND COMPLETED SECTION OF WEIR. ISLAND PORTION IN RIGHT BACKGROUND



62. *Bezwada Thermal System.*—The station was put in service at the end of March 1939 and the year under report is the first year of operation. Before the station was commissioned, 74 miles of 33 K.V. lines had been built and were utilized for selling surplus power of Bezwada Municipal Plant to Gudivada and partly to Ellore.

63. The maximum demand on the station was 1,540 K.W. and the units generated 46.8 lakhs. The principal new loads connected during the year were the Guntur Power and Light, Limited, about 260 K.W., Nuzvid Town Distribution, the Andhra Cement Works about 600 K.W. and a parcel of agricultural load at Patamatta.

64. In view of this and other favourable load conditions, it was decided to add to the plant capacity. Specifications were issued and tenders invited towards the end of the year. Orders have since (in May 1940) been placed for one 3,000 K.W. set of Messrs. Parsons' make and one 33,000 lb. evaporation boiler of Messrs. Babcock & Wilcox and auxiliaries, altogether estimated to cost Rs. 5.77 lakhs. The contract date for completion is May 1941. It is, however, feared that it will be delayed. An order for 1,500 K.V.A. transformer will be placed shortly.

65. The following statement gives the particulars of the transmission lines in service:—

Voltage.	Constructed during the year.		Total in service.	
	Single circuit.	Double circuit.	Single circuit.	Double circuit.
	MILES.	MILES.	MILES.	MILES.
33,000	18.5	1.25	91	1.25
11,000	14.4	..	27	..

66. The total capital expenditure on the scheme was Rs. 24.26 lakhs including Rs. 1.72 lakhs arrears of interest. The gross revenue was Rs. 1.89 lakhs and working expenses excluding suspense Rs. 1.06 lakhs. The return is therefore 3.38 per cent. The lower operation cost as compared to Vizagapatam which is also a steam station is due mainly to the higher cost of fuel at Vizagapatam.

67. A considerable accession of agricultural load was secured at Patamatta close to Bezwada. At present 23 pump sets have been installed and more are likely. The area is principally vegetable gardens and is favourably situated as it is near its market at Bezwada. To dispel the idea that the power rates were heavier than the cost of self-generation in this area where cheap rice husk is burnt as fuel in boilers, a demonstration was undertaken. This was very successful and it is expected that load will develop rapidly as a result.

68. *Cocanada oil-engine station and other schemes.*—The work on the extension of the Municipal Power-House at Cocanada which was taken in hand in the previous year was completed and the 800 K.W. set transferred from Bezwada installed and put in service.

69. The station was put in commercial use under the department on 1st January 1940, supplying power in bulk to Cocanada Municipal Council, the only consumer.

70. Sanction of the East Godavari Transmission System and Town Distribution Schemes which were to be supplied from the station was not received until the end of the year. Work has since been put in hand and everything possible is being done to complete it quickly but it is unlikely that full use of the plant and capital expenditure already incurred will be made before about the end of March 1941, i.e., 15 months after it should have been to take full advantage of the scheme as contemplated.

71. The other Thermal Schemes of Nandyal, Tadpatri and Madanapalle were not proceeded with owing to economy necessitated by war.

72. The West Godavari Scheme also remained unsanctioned, although oil-engines from Guntur which are intended to be used for this scheme have been purchased and paid for.

73. It may be said that war restrictions have caught electrical development in the northern part of the Presidency at a critical stage and will delay it considerably.

MUNICIPAL UNDERTAKINGS.

74. No new municipal schemes were brought under the managing agency of the department during the year. The following continued to be managed by the department :—

Pykara.

Dharapuram.
Udamalpet.
Sivakasi.
Periyakulam.
Bodinayakkanur.

Mettur.

Tiruppattur.
Tiruvannamalai.

75. Udamalpet was handed over to the council on 1st April 1940 having reached the profit-earning stage.

The results of working of these schemes are given in Appendix J.

This part of the departmental activity will gradually decrease and eventually disappear with time as all the municipalities in the south now have electric supply.

76. The problem of the municipalities in the north is being dealt with differently as some of them, e.g., Vizianagram and Bimlipatam, are not willing to take any responsibility for electric supply. These towns are now supplied by direct agency of the department.

LICENSED ELECTRIC SUPPLY UNDERTAKINGS.

77. Three new licences were put into service during the year making a total of 77 of which 34 are local bodies and 43 company licensees.

Two new licences were granted during the year.

78. The following is a summary of plant and units generated.—

	Installed K.V.A.	Generation million units.
Government Hydro-Electric stations ..	87,075	161.19
Government Thermal stations	7,447	7.20
Madras Electric Supply Corporation ..	53,750	59.57
Other generating licensees	7,150	10.03
Total .	155,422	237.99

INDIAN ELECTRICITY AND CINEMATOGRAF ACTS.

79. It has been felt for some time that owing to the increasing work in connexion with the Indian Electricity and Cinematograph Acts it was no longer possible for the Chief Engineer for Electricity to exercise detailed scrutiny and control over the inspectorate. The Government accepted the Chief Engineer's proposal that the Inspector's Division be constituted into a Circle charge under Chief Electrical Inspector to Government, an officer of Superintending Engineer's rank with enhanced powers and direct access to Government. The amalgamation which was made in 1933 has served its purpose very well. The procedures have been unified, tariffs standardized and impetus given to the electrical development of the Presidency. The work of the inspectorate can now therefore with advantage be handled by an independent agency. The Chief Engineer for Electricity will continue to be Electrical Inspector to Government for Government undertakings.

Inspections of 28 licensees' works were undertaken during the year and 52 accounts scrutinized.

Total number of electrical accidents was 138 of which 44 were fatal.

80. A tax on consumption of electrical energy was imposed during the year but small undertakings selling less than 200,000 units per year and energy sold at less than 2 annas a unit were exempted. Thus industrial load of any magnitude and agricultural load are exempted as well as small concerns in the development stage. The work of assessing and collecting the electricity duty is included in the functions of the Chief Electrical Inspector to Government.

81. A detailed report of the activities of the inspectorate appears in section II.

ELECTRIFICATION OF PUBLIC BUILDINGS.

82. The cost of new works undertaken during the year was Rs. 2.11 lakhs making a total of Rs. 51.22 lakhs on electrical works for which the division of Electrical Engineer (General) is responsible.

83. The cost of operation and maintenance was Rs. 1.51 lakhs, i.e., 2.95 per cent. Rupees 2.1 lakhs was paid in current consumption charges.

84. Owing to increasing work in this division, the staff is in need of reinforcement but proposals submitted to Government after careful study were not accepted.

They have since been resubmitted after longer experience and orders thereon are awaited.

85. The work of the Electrical Engineer (General) is concerned essentially with buildings. The civil engineering which is the major part being in charge of Public Works Department it is considered that the retransfer of this division to the control of the Chief Engineer, Public Works Department, will be a better organization. Proposals have accordingly been submitted. The general considerations by which the Electrical Engineer (General's) Division was transferred to the Electricity department in 1933 now no longer apply. Owing to the increase in volume of work, consequent on development, it is found in practice that even where the maintenance is in charge of the operation officers, e.g., at Ootacamund and Coimbatore, staff has to be specially employed for this work and therefore there is now no real saving in transferring the work to operation officers.

INVESTIGATION AND SURVEYS.

86. Surveys of transmission line for extending Mettur power to Madras were undertaken and completed. The Mettur-Singarapet line is already suitable for the purpose. The Singarapet-Madras Section was surveyed, tower positions located and all preliminaries completed. There is, however, for the present, no prospect of this line being taken up for construction and the results of the survey will therefore be recorded for future use.

87. The surveys of the West Coast line—Singara-Meppadi 66 K.V. double-circuit line and Meppadi-Cannanore and Meppadi-Calicut 66 K.V. single-circuit lines have also been completed. The extension stands postponed owing to the war. The results of the surveys have been recorded for future use.

88. Investigation of the Moyar Scheme which proposes to utilize the tail water of the present Pykara Plant was undertaken and is expected to be completed during the year.

TECHNICAL WORK AND PURCHASE AT MADRAS.

89. The Central Technical office was fully occupied and continued to function satisfactorily.

90. Eight major specifications were issued in addition to many minor ones. The cost of contracts awarded after receipt and scrutiny of tenders in the Electrical and Mechanical division was about Rs. 42 lakhs and cost of stores purchased about Rs. 56.5 lakhs.

91. Although the Superintending Engineers of operation systems have been given powers to purchase certain classes of material, and use is made of the facilities of the Indian Store Department, Delhi, the purchase work in the Electrical and Mechanical division is on the increase.

92. Of the Rs. 56.5 lakhs worth of orders placed, 37.8 per cent was for material of Indian manufacture, 32.8 per cent British and 29.4 per cent other countries. In addition Rs. 25 lakhs worth of orders for plant and spare parts were placed by the Director-General, India Store Department, London. Although the orders were technically placed in London, specifications were issued and tenders scrutinized by the Technical Office in Madras.

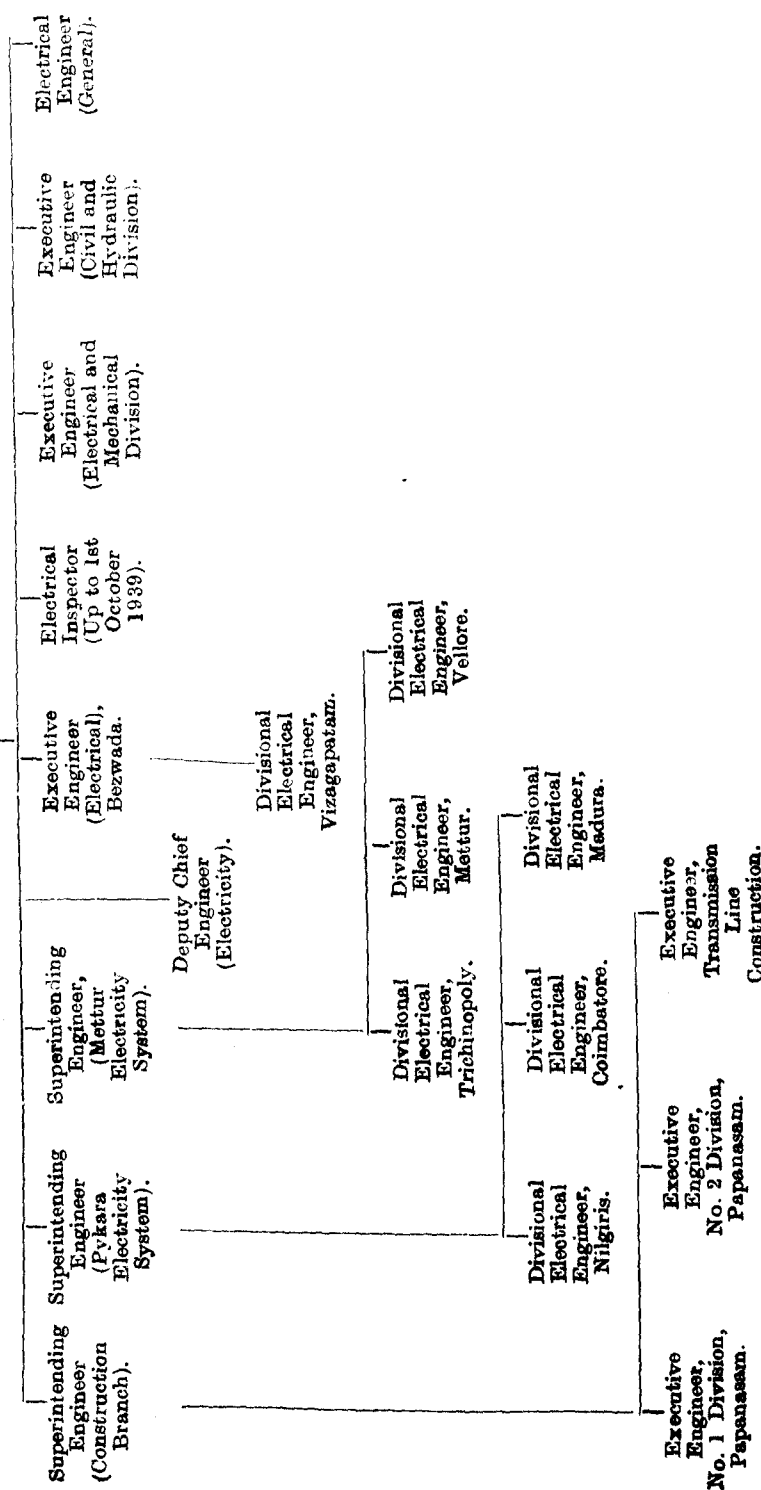
93. The Civil and Hydraulic Technical division issued six main specifications in connexion with the Papanasam Project and placed orders for manufactured equipment to the extent of Rs. 11.5 lakhs.

TARIFFS.

94. Revised tariffs for hydro-electric areas were submitted to Government and sanctioned. They were brought in force from 1st January 1940. The general basis was fully described in last year's report.

95. A new departure was the sanction by Government of purchase of selected material for resale to licensees undertakings. Owing to war conditions, scarcity of material, and long delay in obtaining them from abroad, it is hoped that these stocks will prevent general development from stagnating.

CHART 3.
ORGANIZATION CHART—HIGHER STAFF.
Chief Engineer (Electricity).



ORGANIZATION.

96. The frame work of the organization of the department during 1939-40 is shown in Chart No. 3 which is generally the same as that of the previous year except for the following :—

- (i) The post of Electrical Inspector was raised on 2nd October 1939 to the rank of Superintending Engineer with the designation Chief Electrical Inspector to Government and the Inspection Branch of the department with the Chief Electrical Inspector to Government at its head, had been transferred from this department. The Chief Electrical Inspector to Government is now working directly under Government.
- (ii) The Pykara Plant Extension Division was closed in June 1939 consequent on the completion of works.
- (iii) A second Construction Division for power-house, penstock, etc., was formed at Papanasam from June 1939.

ADMINISTRATION.

97. The formation of a Public Board or Commission to control electrical development has been strongly advocated in the past. The need for this is now being felt more acutely as the work of the department is hampered, to an extent increasing with its growth, by the present procedure.

WAR-TIME FINANCIAL POLICY.

98. Government has decided that at the present time funds for remunerative extensions and development must be curtailed. There are many such schemes awaiting sanction; surplus power is available and the department holds large stocks of materials with which they could be constructed.

If funds could be provided for even limited expansion agricultural and industrial productivity would be increased, additional revenue obtained and the war effort assisted by Empire trade. It is to be hoped that money for this highly desirable and profitable development will soon be made available again.

PROGRAMME FOR 1940-41.

99. The major works sanctioned and under execution are—

- Papanasam Hydro-Thermal Scheme.
- Installation of 3rd Turbo Set at Vizagapatam.
- Installation of the 3rd Turbo Set and Boiler at Bezwada.
- Installation of the 4th Generating Set and 3rd Transformer at Mettur.

The programme of the machinery supplies from England is uncertain owing to the pre-occupations of the war, and therefore it is at present impossible to forecast completion with any accuracy.

The Civil Engineering part of the Papanasam Hydro-Electric works will be completed according to schedule and be ready for the receipt of plant early in 1941.

Foundations and other civil engineering work in connexion with the other three items will be organized to fit in with the plant deliveries which are at present indefinite.

ACKNOWLEDGMENTS.

100. As in past years, valuable assistance was received from the Director-General of Stores, London, in conducting inspections and tests of plant and material purchased in England and other European countries. His technical staff also held many conferences with the manufacturers over problems of design as they arose during manufacture. The Chief Engineer wishes to record his appreciation of the help received.

The Chief Engineer also wishes to acknowledge the co-operation of the postal and railway authorities in the construction of the transmission lines of this department.

The whole staff of the department has worked hard and unremittingly. The Chief Engineer wishes to place on record his appreciation of the excellent work done during the year.

SECTION II—DETAILED REPORT.

PYKARA ELECTRICITY SYSTEM.

101. *Civil and hydraulic works.*—All the civil and hydraulic works in the Pykara system were maintained in good condition. The Mukurti Reservoir held its maximum storage of 1,400 m.c.ft. during the monsoon months.

The rainfall was very heavy this year compared to last year, the figures being as below :—

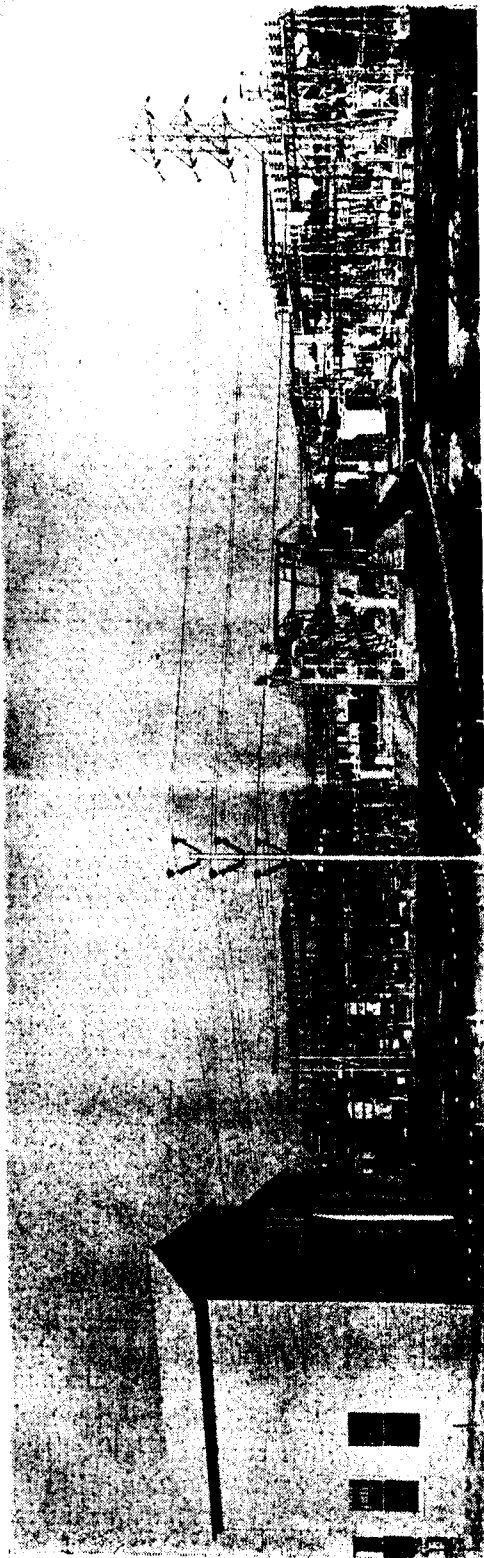
		1938.	1939.
		INCHES.	INCHES.
Mukurti ..	:: :: :: :: ::	66.09	97.99
Glen Morgan	:: :: :: :: ::	47.69	91.86

There was an exceptional downpour on the 16th and 17th of November 1939, the total for the two days amounting to nearly 23 inches. This heavy rain caused extensive slips on the flume channel and along the penstock lines. Power station operation was however not affected in any manner. The land slides were promptly cleared and urgent protective works on the flume and along the penstock were carried out. Further protection works have been taken in hand.

102. *Pykara Power Station.*—The two new 12,500 K.V.A. generating and transformer units were commissioned into service along with their auxiliary equipments. The first unit was put on commercial load in May 1939 and the second unit in August 1939.



PYKARA PLANT EXTENSIONS—TWO ADDITIONAL 12,500 KVA. 110/11 K.V.



COIMBATORE RECEIVING STATION SHOWING NEW TRANSFORMER REPAIR HOUSE

The new generators at Pykara are working satisfactorily in parallel with the old units. The old and new machines at Pykara have been run for many days in parallel with Mettur together with the Trichinopoly and Madura condensers in service. The operating conditions have been satisfactory. The voltage regulators of the 7,810 K.V.A. units at Pykara are shortly to be replaced by more sensitive regulators to improve the stability of operation.

The erection of a 11 K.V. transfer bus arrangement to enable any of the 11/110 K.V. transformers (except No. 2) being supplied from any of the generators was completed.

The old generator and auxiliary cubicle O.C.Bs. were replaced by round tank breakers of higher rupturing capacity.

The end turns of the three 7,810 K.V.A. alternators were retaped; the work was commenced in September 1939 and completed by middle of January 1940.

The buckets on Pelton wheel runner of No. 2 machine were found worn and the complete runner was replaced by an available spare runner wheel. The worn buckets are being reconditioned by welding. Another complete spare runner of stainless steel has been ordered for the station.

103. *Coimbatore Receiving Station.*—Three 6,000 K.V.A. 110 K.V./66 K.V. auto-transformers were installed at this station to supply the Madura and Tiruppur 66 K.V. feeders from the 110 K.V. bus at Coimbatore. The taps on existing four 5,000 K.V.A. 110-66/22-11 transformers were also suitably altered for 110 K.V. operation.

The erection of new 11 K.V. feeder kiosks with more robust formers for this station were ordered. One has reached the site, feeders from the old to the new kiosks was gradually effected.

Two additional 5,000 K.V.A. 110 K.V./22-11 K.V. transformers for this station were ordered. One has reached the site, and when serviced would release a 3,000 K.V.A. transformer which then will be transported to and re-erected at Madura.

To facilitate proper inspection work on all the large transformers in the station and to undertake major repair works a new Repair House with a 30-ton overhead handoperated crane was constructed. Necessary extensions to transformer tracks were effected.

The oil piping system for all the transformers and 110 and 66 K.V. O.C.Bs. was completed.

104. *110 K.V. Changeover—Pykara-Coimbatore Transmission Lines.*—The changeover of the Pykara-Coimbatore section from

66 to 110 K.V. was an operation of major importance and involved in brief—

- (i) Reinforcing the main line insulation;
- (ii) Modifications to the transformers and structures at Pykara, Kattabettu and Coimbatore;
- (iii) Shutting down the Nellithorai sub-station; and
- (iv) Transferring loads fed from Nellithorai sub-station to the Coimbatore Receiving Station.

The work of increasing the line insulation was carried out on one line at a time by having night shutdowns. It was commenced in 1936 and completed by stages well ahead of the actual changeover.

The work at the various stations was planned in advance and so co-ordinated as to be completed simultaneously at all places. By active co-operation between the contractors for the new equipment and the field staff, the work was completed without any hitch and in time.

Intermittent load relief from Mettur was obtained as and when required.

The Pykara-Coimbatore lines and the station structures at the different places were tested at 110 K.V. on the 21st May and 110 K.V. operation was actually commenced from the 28th May 1939.

The two 250 K.V.A. transformers at Nellithorai were released after shutting down this station; one of these is now installed at Sembatti sub-station and the other at Sattur sub-station. The 66/11 K.V. 750 K.V.A. transformer released at Kattabettu was transferred to the Mettur System.

105. *Transmission lines and sub-stations.*—The power lines communication circuits and sub-station equipment in the system were periodically inspected and maintained in good condition. Co-ordination of insulation of the tower line with reference to station equipments was examined afresh and suitable revised gap settings were adopted.

There was a general revision of settings on the relays on the main lines after the 110 K.V. changeover.

The P.G. clamps on all the river and railway crossing spans on the Coimbatore-Madura line were removed as there were indications of electrolytic action and possible risk of snapping of conductors. The jumpering arrangements were modified to overcome this drawback.

Stock bridge vibration dampers were provided at tension points on the Coimbatore-Tiruppur 66 K.V. lines.

Cadmium copper conductors were provided on the Madukkarai feeders for the first 16 spans within the town limits.

The 30 miles of 66 K.V. line from Virudunagar to Kovilpatti was energised and put in operation.

The 27 miles of 33/22 K.V. line from Madura to Sivaganga was completed and taken over for operation purposes.

The following sub-stations were brought into commission :—

- Sivaganga sub-station.
- Sattur sub-station.
- Kovilpatti sub-station.

All the 11 K.V. O.C.Bs. at Madura sub-station were replaced by the contractors (Messrs. General Electric Company) by breakers of higher rupturing capacity. One 22 K.V. control cubicle was installed at this station for the Sivaganga feeder.

106. *Interruptions and breakdowns.*—There were no serious interruptions to supply during the year.

Due to defective clamping arrangements there were two breakdowns on the Coimbatore-Madura lines but continuity of supply was maintained through the second circuit.

One of the two new 1,000 K.V.A. transformers (110 K.V./11 K.V.) at Kattabettu broke down due to a fault on the L.T. side. The 11 K.V. breaker was damaged in ineffectually clearing a feeder fault and produced a bus short circuit on the transformer. The coils were burnt out and have to be replaced.

107. *Special works.*—On the Pykara-Coimbatore line, tower No. 132 on the banks of the Bhavani was in danger due to erosion and undermining of the bank slopes. Permanent protection arrangements are in hand.

The eastern arm of the Anamalais Ring Main was changed over from 11 K.V. to 22 K.V. operation. The western arm of this ring was changed over to 22 K.V. in 1937 and the completion now of the work on the eastern arm is expected to ensure satisfactory operating conditions.

The Kodaikanal Municipality supply was changed over to Hydro-electric supply from the 1st April 1940. The sanction of the Government for the work was received in the middle of December 1939. The work was of an arduous nature involving the construction of about 11 miles of 22 K.V. line in a hilly country with thick jungle and at altitudes varying from 1,000 feet to 7,000 feet. It was executed departmentally in time. Completion of the work in such a short time reflects credit on the organization.

108. *"Ascu" treatment.*—The "ascu" treatment of wooden poles was continued during the year and about 360 poles of different varieties were treated. A major portion of these poles have been used in rural extensions.

109. *Commercial activity.*—The commercial branch was active during the year and about 124 proposals were submitted for sanction, involving roughly 2,742 H.P. of agricultural load, 328 H.P. of industrial load, 237 domestic services and 564 street lights.

Excepting for about 8 of these proposals, the rest have been sanctioned. The following are the more important of the schemes sanctioned during the year:—

	RS.
(i) Chennimalai-Palayakottai extensions (Erode taluk)	64,540
(ii) Ettiyapuram extensions (Kovilpatti taluk). ..	31,000
(iii) Muthanampalaiyam-Vijayapuram extensions (Palladam taluk)	12,130

The following important schemes are awaiting sanction:—

	RS.
(i) Theni-Scepalakottai extensions (Periyakulam taluk)	1,35,500
(ii) Rousdonmullai-Nilambur extensions (Nilgiris-Malabar district)	91,625
(iii) Gudimangalam-Murugapatti extensions (Udamalpet taluk)	33,130
(iv) Melur extensions	56,000

Financial stringency consequent on the war will restrict further extension work.

110. *Conversion fund*.—The year to year operation of the conversion fund since its inception is given below:—

Year.	Disbursements.	Realization of principal.
	RS.	RS.
1933-34	2,01,295	17,805
1934-35	1,06,861	55,003
1935-36	2,53,487	52,739
1936-37	2,72,626	1,18,194
1937-38	89,999	1,84,957
1938-39	2,25,756	1,61,101
1939-40	46,406	1,65,145
Total	11,96,430	7,54,944

It having been decided not to make any advance to new Textile Mills in the Coimbatore district the amounts to be advanced in future will gradually decrease.

111. *Construction subdivision*.—The construction subdivision was entrusted with all the major schemes and a few minor schemes totalling a capital outlay of Rs. 7,95,658 were completed by this branch during the year. Further extensions aggregating to a total of Rs. 2,55,150 are under execution the most important of which is the Theni-Cumbum extensions involving an outlay of Rs. 1,62,200.

112. *Meter and relay tests*.—The testing subdivision undertook the first installation test on equipments connected with the new units at power house and in phasing out the transformers and accessories at Pykara and Coimbatore during the 110 K.V. changeover.

The equipments in the newly completed sub-stations at Sivaganga, Kovilpatti and Sattur were tested and serviced into commission.

Meter and relay tests in the Thermal areas were carried out as in the previous years. Special tests at the Papanasam Construction Power House were undertaken.

Under special requisition of the Travancore Government, relay testing work in the power station and sub-station of the Pallivasal scheme was carried out during March 1940.

113. *Administration and accounts*.—The work in the Central office continued to grow on account of the development of the system. The increase in services and distributions was roughly 80 per cent but additional staff sanctioned to cope with the increasing work was entirely inadequate and the several sections were greatly overstrained.

In respect of the labour force employed, the payments by a travelling cashier are being tried on an experimental measure.

A departmental Manual has been compiled from the various Government and Departmental Orders in three volumes containing the procedure, appendices and the forms.

The increasing work in the Central office justifies extensive use of suitable mechanical devices. An Adrema machine for making out the addresses and relevant particulars of about 6,000 consumers every month has been installed. Addition of other mechanical devices like electrically operated duplicator and an adding and listing machine is very desirable but has had to be postponed owing to financial stringency.

The large office is accommodated in rented private houses and the need for a departmental building suitably designed for its special purposes is acutely felt.

114. *Stores*.—The quantity of material in stock was found to be inadequate to meet the increasing demand, specially as delivery periods were prolonged owing to the international situation. The reserve limit of stock was raised by 100 per cent to 20 lakhs and large orders were placed under favourable terms. This includes 3.5 lakhs emergency stock for the licensees.

Stores administration and accounting methods were found to be no longer suitable for the greater activity and wider scope of the system. The position was aggravated by the fact that timely sanction for additional staff to keep pace with increasing work could not be obtained. As a result of the study undertaken in co-operation with the Accountant-General reorganization was decided on. The Chief store-keeper originally in charge of physical custody of stores as well as purchases and accounting, is proposed to be placed in charge of physical custody and field dispositions only, accounting and purchasing being transferred to Central Office Agency. The number of sub-stores is intended to be reduced from 21 small units to 11 larger units in charge of responsible officers.

The receipts, issues and the balance of stock for the year are given below :—

	RS.
Receipts during the year	28,91,583
Issues during the year	17,73,946
Balance at the end of the year	18,72,074

METTUR ELECTRICITY SYSTEM.

115. *Power Station operation.*—The operation of the Mettur Power-house during 1939-40 was satisfactory and had also some interesting features. To start with the effects of April 1938 flooding continued to be felt on the electrical side and required incessant vigilance from the operating staff. The power station was called upon frequently to give relief to Pykara which was busy with tests on additional plant there. The relief ranged from 1,000 K.W. to 12,500 K.W. On one such occasion all the three machines were overloaded and withstood the strain satisfactorily.

As already stated turbines had to be operated on heads varying from 74 feet (gross) to 153 feet and performance was throughout satisfactory. Repairs to brake nozzles were put in hand towards the end of the year with the maker's erector in charge. The No. 1 machine nozzles were renewed and refitted. Those for Nos. 2 and 3 have been attended to in the current year.

There were no serious interruptions to supply.

116. *Additions and improvements to equipment.*—Important additions and improvements to equipment are given below :—

(a) An automatic D.C. bearing oil pump motor was installed to safeguard against auxiliary A.C. supply failure.

(b) Emergency flood discharge outlet on the north-western side of the power-house was sanctioned and the work has since commenced.

Emergency lowering and hoisting gears for the main shutters in the dam were ordered and received at site. The equipment for No. 1 machine was completely fitted and work on others was in progress. Operation is possible both from the control room in the power-house and from the top of the dam.

(c) Two 2,000 K.V.A. transformers 66/22-11 K.V. and equipment for supplying load to Dalmia Cement Factory were added at Trichinopoly sub-station and a 22 K.V. ring main of 56 miles constructed.

(d) In Tiruvarur sub-station provision for paralleling two 750 K.V.A. transformers was made in view of the increased load of the licensee.

(c) Four power transformers were ordered during the year to provide for the increasing 33 K.V. load at Vellore, 11 K.V. supply at Conjeeveram substation and the 22 K.V. load at Villupuram.

(f) In order to ensure improved regulation to Namagiripet, the existing steel conductor in the Salem-Rasipuram section was arranged to be changed to copper and provision of a telephone line between the places made.

(g) In view of increased power demand in the Salem area a 22 K.V. line from Mettur to Salem was planned and necessary transformers have been ordered.

117. *Construction.*—During the year over 30 extensions costing Rs. 7,04,500 had been sanctioned and of these 16 were completely executed.

List of schemes completed during 1939-40.

Serial number and name of scheme.	Amount of estimate.
	RS.
(1) Arkonam Panchayat area	25,600
(2) Extensions of supply to Kunnathur village, Polur taluk	8,537
(3) Extension of supply to Vallam, Tanjore district ..	25,400
(4) Extension of supply to Singarappet village, Salem district	10,150
(5) Extension of supply to Puliamangalam village, Arkonam taluk	11,500
(6) Extension of supply to Panapakkam and Kalrod-palli, Chandragiri taluk	9,400
(7) Extension of supply to Kalambur, Polur taluk ..	14,700
(8) Extension of supply to Yercaud, Salem district ..	57,700
(9) Extension of supply to Erode Municipal Park, Cosmopolitan Club and Veerappan Chatram near Erode	7,000
(10) Extension of supply to Laddivadi and Pudupatti, Namakkal taluk	24,000
(11) Other extensions costing less than Rs. 5,000 each ..	19,600

Among the schemes shortly to be completed are—

	Estimate amount.
	RS.
(i) Karur-Kodumudi	56,900
(ii) Villupuram-Vriddhachalam	1,62,400
(iii) Kaveripauk-Kalavai	37,600

118. *Meter and relay tests.*—The year 1939-40 was a busy one. With the energising of a number of substations in the northern area, one junior Engineer was found insufficient to cope with both site and laboratory tests. A second junior Engineer and a third tester and an instrument mechanic were posted.

Site tests in 25 substations and 6 outdoor metering structures included testing of 106 relays and 57 H.T. meters and attendant instruments. Improvements to system protection involving erection of new relays and wiring were carried out at Mettur, Erode and Trichinopoly.

Laboratory tests included testing of 2892 Nos. stock meters as against 950 last year. Repairs of meters and relays were also undertaken.

119. *Commercial*.—There was a limited amount of commercial activity.

The department took part in the Tiruvannamalai and Rasi-puram exhibitions with advantage. A door to door propaganda was carried out in the electrically backward areas.

120. *Mettur Workshops*.—Workshops continued to be the important manufacturing centre for line materials like cross-arms, guy sets, air break gang operated switches, street lighting fixtures and outdoor meter boxes.

Among the more important jobs under execution were the emergency shutter for the 4th unit and the counterweights for the emergency shutters of all the four units.

The additions to the equipment in the shop were 2 sets of hacksaw machines, manufactured in the shops and one screwing and one drilling machine purchased. The equipment was still inadequate especially in the machine shop. Arrangements were well in hand to equip an additional shaft in the switchgear shed.

ANDHRA POWER SYSTEM.

Vizagapatam.

121. *Power station*.—The steam turbine plant with the 750 K.W. and 1500 K.W. sets was in operation during the year. Undue wear of the governor drive and vibration was experienced with the 750 K.W. set, from September 1939. In December the set had to be opened up for detailed examination and was then reassembled with small rectification. Its service now is restricted to emergencies and to relieve the 1500 K.W. set during repairs.

The work of putting the set back to service has been taken in hand by the manufacturers since December and the necessary spares have been ordered.

The service to consumers was maintained satisfactorily throughout the year. The output of the station is 2.489 million units against 1.783 million units last year. The peak load of the station rose from 820 K.W. to 1010 K.W.

122. *Additions and improvements*.—Erosion and corrosion of the condenser cooling tubes were attributed among other causes to sea pollution during low tides. As a first step a stilling tank is being erected for intercepting the solid matter in the sea water. Owing to increased plant capacity arrangements for a second pipe from the sea are being made.

123. *Distribution systems and rural electrification*.—The following additional loads were connected up as they became available.

- (i) Supply to Vizianagram distribution—30th April 1939.
- (ii) 40 H.P. pumping load of Sri C. N. Reddy—27th September 1939.
- (iii) Supply to Donkinavalasa mines—3rd January 1940.
- (iv) „ Jagannatha Raju Rice Mill—3rd November 1939.

The following extensions are in progress and are expected to be supplied shortly :—

- (i) Supply to mills of Ascharaj Lal Gurwara at Garividi.
- (ii) Supply to Jonnada.
- (iii) Supply to Agricultural pumps on the Chittivalasa-Bimlipatam Line.

The following rural schemes were investigated during the year :—

- 1 Bhupal Raju Mill at Thalavalasa.
- 2 Supply to Penubarthi village.
- 3 „ Garbham.
- 4 „ Nellimarla Water Works.
- 5 „ Moida village.
- 6 „ Pumping load of Sri Achanna Nayudu of Garbham.
- 7 „ Pumps in salt pans in Balacheruvu.
- 8 „ Malakapuram Water Works.
- 9 „ Vizianagram estate.

In all about 500 K.V.A. additional load was connected during the year including Vizianagram and Bimlipatam distributions.

124. *Commercial*.—Agricultural load is developing steadily but considerable propaganda is found necessary as the villager is still ignorant of the economy and convenience of the use of electric power.

Bezwada.

125. *Power station*.—The station at present consists of two turbo sets of 1,500 K.W. each 2—22000 lb. evaporation boilers and the necessary auxiliaries. It started service on 25th March 1939. Foundation piles have however already been driven for one more turbo set and two more boiler units. As already stated one more turbo set and one boiler are proposed to be added immediately to take care of the increased load.

126. *Additions and improvements*.—The staff quarters at Bezwada and Tenali were completed and occupied during the year. An office building and double garage near the power station were constructed during the year and occupied on 1st December 1939 and 6th March 1940, respectively.

The existing cooling pond required extensions owing to the rapid growth of load and to provide for the third unit proposed to be installed. The work was sanctioned in June 1939 at an estimated cost of Rs. 28,100 and 50 per cent of it is completed.

127. *Service interruptions.*—Supply to Masulipatam suffered frequent momentary interruptions. The trouble was traced to pollution of the insulators in summer months, due to settling of salty dust between Gudivada and Masulipatam, which formed conducting paths in early morning dew. In the whole section between Gudivada and Pedana a distance of about 18 miles, ordinary pin insulators were changed to fog type and all the line insulators were cleaned. The trouble has been definitely controlled and the interruptions are now very few and far between. Most of the few cases now occurring have been traced to bird faults. These also have been brought under control by special investigation and fixing of suitably designed anti-perch devices, etc.

128. *Additions to load—Industrial.*—The Andhra Cement Company's load is working satisfactorily with a connected load of nearly 800 K.W.

Rice hullers and other small industrial load aggregating to 95 H.P. were connected during the year.

Guntur licensees have extended their distribution to Mangalagiri town.

Rural electrification.—Twenty-three agricultural services for pumping of 82 H.P. connected load were in service during the year.

The power was extended to Nuzvid town, Patamata, Pedana and Gollapalli villages.

Two rural schemes sanctioned are in progress and supply is expected to be made shortly to the following villages :—

- (i) Tadigadapa, Penamalur, Poranki and Idupugallu villages.
- (ii) Gunadala.

A number of rural extensions are under investigation and it is anticipated that agricultural pumping and rice huller load will show further increase in 1940-41. A 50-H.P. motor was under demonstration at Pedana in a rice mill. In consequence the drive was changed over from Steam Engine burning rice husk to electricity. This is a result of important commercial significance because the popular power unit in this area is the Steam Engine burning rice husk for steam raising. A rapid change over to electricity of such mills is anticipated. The present limitations of the plant may restrict, temporarily, the growth in this direction.

129. *Commercial.*—The activities of the commercial branch were satisfactory. Extension schemes of estimated cost of Rs. 3,16,310 were under execution during the year.

Cocanada.

130. At the end of last year the power house extension work was in progress and orders were placed for the switchgear equipment and materials with Messrs. General Electric Company and Messrs. Crompton Engineering Company.

The power house extension work and cooling pond were completed in August 1939.

The 300 K.W. set purchased from the Bezwada Municipal Council was dismantled at Bezwada in May 1939 and re-erected at Cocanada in December 1939. The erection of switchgear, fuel oil tanks and transformers was in progress and completed in December 1939.

The plant at present available at Cocanada consists of two of 80 K.W., one of 250 K.W. and one of 300 K.W.

Construction of 24 miles of 11 K.V. lines to Samalkot, Peddapur, Pithapuram, Golaprolu, Ramachandrapuram and Mandepetta and the distribution schemes in the townships proposed to be supplied by the Cocanada scheme have been sanctioned for execution during 1940-41.

ACCIDENTS.

131. There were 14 non-fatal accidents during the year, 9 occurred in Bezwada and 5 in Vizagapatam area. All were non-departmental.

LARGE CONSTRUCTION WORKS EXECUTED BY CONSTRUCTION BRANCH.

132. In addition to the Papanasam construction described under Section I which was its principal work, the Construction Branch was in charge of the following works in Pykara and Mettur systems as well as investigations and surveys.

Pykara System.

133. *Plant extensions.*—The work on the Pykara plant extensions which had been in progress throughout the previous years was completed. Erection of No. 4 unit was completed in May 1939 and No. 5 unit in August 1939. Load tests were conducted on these machines in September 1939. The cost of works in the year was Rs. 2.21 lakhs.

The Repair house at Coimbatore which was under construction was completed.

134. *Transmission Line Construction Division*—(i) *Virudunagar-Rajapalayam extensions.*—The substation equipments at Virudunagar, Valliyur and Rajapalayam were completed in all respects and permanent supply given in June 1939.

(ii) *Supply of power to Virudunagar-Kovilpatti.*—The Virudunagar-Kovilpatti 66 K.V. line is a single circuit line with R.C.C. supports and normal span of 750 feet. During construction it was found necessary to substitute steel for R.C.C. cross-arms. Messrs. P. Natesan and Company were the contractors. The work was completed in June 1939. The substation equipment at Sattur and Kovilpatti was supplied and erected by Messrs. Associated Electrical Industries (India), Limited. Permanent supply was given in June 1939.

(iii) *East Ramnad extensions*.—Pykara supply was given to the East Ramnad Electric Supply Corporation as well as the self-generating licensees at Karaikudi, Kanadukathan, Sivaganga, and Okkur by construction of the following lines:—

- (a) Madura-Sivaganga 22/33 K.V. line (29 miles).
- (b) Sivaganga-Karaikudi 22/33 K.V. line (26 miles).
- (c) Sivaganga-Okkur line 11 K.V. (8 miles).
- (d) Sivaganga-Manamadura 22 K.V. line (11 miles).

The supports for these lines were supplied and erected by Messrs. McKenzies and are of R.C.C. (M.R.C. patent). The poles are cast in handy sections grouted together at site. The results of the method of manufacture were satisfactory.

The substation equipment at Sivaganga was supplied and erected by Messrs. Cromptons and the transformers by Messrs. International General Electric Company (India), Limited, Bombay. The additional equipment at Madura was erected by Messrs. General Electric Company (India), Limited, Madras. Temporary supply was given to the licensees between May and October 1939 and permanent supply effected in October 1939.

As per conditions of contract with licensees, the lines from Sivaganga to Manamadura and Karaikudi were handed over to Messrs. East Ramnad Electric Supply Corporation by whom they have to be maintained.

Mettur System.

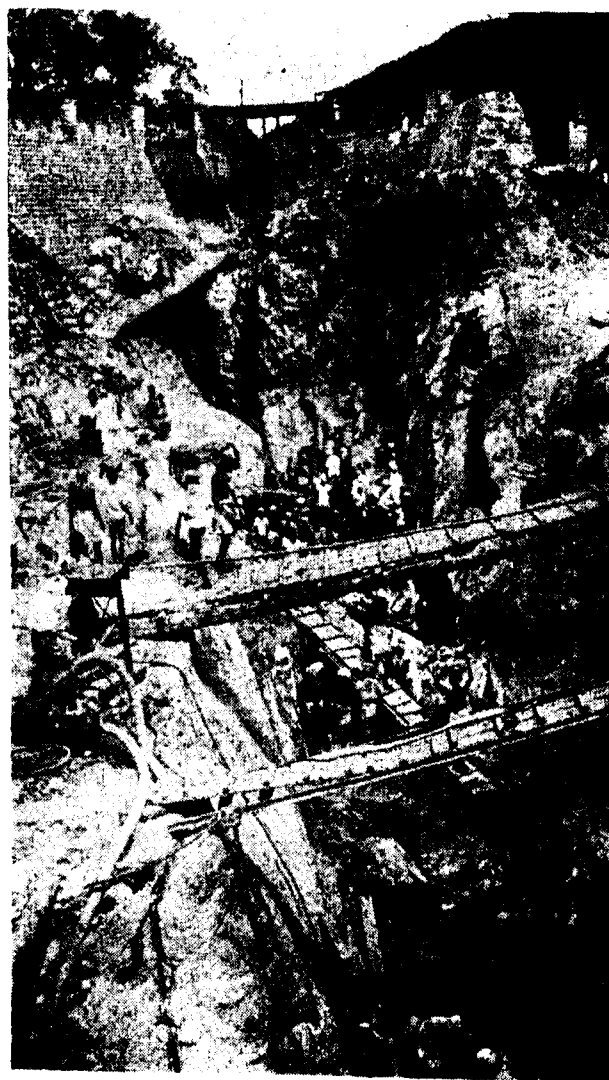
135. (i) *Singarappet-Karimangalam-Dharmapuri-Krishnagiri extensions*.—The lines were completed last year. The substation equipment at Karimangalam and the additional equipment at Singarappet were erected by Messrs. General Electric Company (India), Limited. The transformers were supplied and erected by Messrs. Associated Electrical Industries (India), Limited, and the metering equipment at Dharmapuri, Krishnagiri and Kaveripatnam by Messrs. P. Natesan and Company. Permanent supply was given by May 1939.

(ii) *Singarappet-Villupuram, Tiruvannamalai-Arni and Vellore-Conjeeveram extensions*.—The lines were completed last year and temporary supply given. The substation equipment and transformers at Tiruvannamalai, Vettavalam, Villupuram, Polur, Arni, Ranipet, Kaveripauk and Conjeeveram were completed this year and permanent supply given between June and July 1939. At these substations the structures are of R.C.C.

(iii) *Villupuram-Tindivanam 22 K.V. line with branch line to Maduraipakkam*—Estimate amount Rs. 1,20,500.—The extension is for supply to Edapalayam, Tindivanam, Maduraipakkam and other rural centres. The lines are constructed of steel tubular poles with a normal span of 350 feet. The contractors for the work were Messrs. P. Natesan and Company. These lines as per



PAPANASAM, DIVERSION WEIR—METHOD OF TREATING ROCK JOINTS IN ISLAND PORTION BEFORE FILLING AND FACING WITH WATERPROOF MASONRY



PAPANASAM, TAMBAPARNI DAM—JANUARY 1940
—EXCAVATION OF UNSOUND ROCK IN
JOINT AT CH. 500

conditions of contract with the licensees Messrs. South Arcot Electricity Distribution Company were handed over to the licensees for maintenance.

(iv) *Kaveripauk-Arkonam extension.*—This extension is for supply to Arkonam Panchayat, Water-works and Railway Colony. Major part of the work was completed last year.

The Kaveripauk-Arkonam 33 K.V. line is of steel tubular poles with normal span of 400 feet. The line was erected by Messrs. Cromptons.

The substation equipment at Arkonam was supplied and erected by Messrs. General Electric Company (India), Limited, Madras, and the transformers by Messrs. Associated Electrical Industries (India), Limited, Madras. Permanent supply was given in October 1939.

(v) *Chittoor-Pakala-Chandragiri extensions Rs. 2,70,000.*—This extension is for supply to Pakala, Chandragiri and Tirupati Devasthanam. Chittoor-Pakala 33 K.V. line with a normal span of 400 feet on steel tubular poles was erected by Messrs. Crompton Engineering Company. The Pakala-Chandragiri 11 K.V. line was erected by Messrs. P. Natesan and Company. The additional equipment at Chittoor was supplied and erected by Messrs. Crompton Engineering Company. The equipment at Pakala and the metering equipment at Chandragiri were erected by Messrs. P. Natesan and Company. The transformers at Pakala were supplied by Messrs. A.C.E.C. (India), Limited, Madras. The extensions were energised in October 1939.

Investigations and Surveys.

136. The following investigations were either completed or undertaken during the year:—

- (i) *Singara-Meppadi 66 K.V. double circuit line (37 miles).*—The proposed line runs entirely over hills and thick jungle. The normal span is 1,050 feet in order to take full advantage of the rolling country.
- (ii) *Meppadi-Cannanore (62 miles) and Meppadi-Calicut (31 miles).*—The normal span is 750 feet. The surveys have been completed. Due to war the construction of these lines has been postponed. The surveys were started in September 1938 and completed in May 1939.
- (iii) *Singarappet-Madras 110 K.V. line surveys.*—The installation of the fourth generating unit at Mettur has been sanctioned by the Government. Simultaneously investigations were taken up and completed for a 110 K.V. line from Singarappet to Madras (123 miles). The line runs close to Polur and passes through the Conjeeveram substation. The surveys were started in May 1939 and completed in November 1939.

(iv) *Moyar Hydro-Electric Scheme*.—As a further stage of the Pykara Scheme the investigation of the Moyar Scheme, in which the tail water from Pykara Plant is proposed to be utilized, was undertaken. The proposal is to divert the tail water along a flume about six miles long and allow it to drop 1,300 feet to Moyar river with a power-house just above its M.F.L. This will be linked by a 110 K.V. transmission line to Erode and Pykara stations. The investigations were started in November 1939 and are expected to be completed by June 1940. These surveys cover very difficult and unhealthy country.

TECHNICAL WORK.

137. *Electrical*.—Technical reports and preliminary estimates were prepared for the following major schemes :—

	Estimate of initial cost in lakhs of rupees.
(1) Revised report on the Bezwada Thermal Scheme ..	21·866
(2) Revised report on East Godavari distribution Scheme ..	3 245
(3) Estimate on West Godavari Distribution Scheme ..	7·675
(4) Bellary Thermal Scheme—Supply to town and to Hagari Water-works and agricultural pumps ..	2·196
(5) Supply to Thadigalappa and other villages ..	0·493
(6) Revised report on Tallaprolu-Viravalli Scheme ..	0·642
(7) Report on the installation of third Turbo-alternator set at Bezwada ..	7·280
(8) Report on the installation of third Turbo-alternator set at Vizagapatam ..	3·100
Total ..	46·497

Specifications were issued, contracts awarded and construction work commenced on the following :—

	Approximate contract amount in lakhs of rupees.
(1) Third Turbo-alternator unit for Vizagapatam ..	2·000
(2) Papanasam Scheme—Turbine and generators ..	8·285
(3) Papanasam Scheme—Transformers ..	2·055
(4) Papanasam Scheme—Indoor and outdoor switchgear.	5·171
(5) Papanasam Scheme—Transmission lines ..	11·260
(6) Mettur Power-house—2,000 K.V.A. transformers ..	0·459
(7) Additional equipment at Coimbatore ..	0·370
(8) Transformers for Conjeevaram and Papanasam substations ..	0·270
(9) Transformers for Udumalpet and Tiruppur substations ..	0·600
(10) Transformers for Madura, Sembatti and Tuticorin substations ..	1·380
(11) Third 12,500 K.V.A. transformers and switchgear for Mettur ..	1·580
(12) Additional generating unit for Mettur ..	7 210
(13) 5,000 K.V.A. transformers for Coimbatore ..	1·420
Total ..	42·060

NOTE.—(i) Contracts for items (1), (2), (3), (4), (6) and (12) were placed by Director-General, India Store Department, London.
(ii) Contract for item (13) was placed in 1938-39 and construction work is in progress.

The following table gives particulars of important orders placed through the Madras office :—

	Lakhs of Rs.
(1) For operation and maintenance	1·231
(2) For extensions	39·999
(3) For new schemes	14·114
(4) Extras for schemes for contracts placed in 1937-38 and 1938-39	1·198
Total ..	56·542

The above table does not include spare parts covered by English indents and the cost of generating plant, and other equipment for Papanasam, Mettur and Vizagapatam Schemes ordered by Director-General, India Store Department, London. The approximate total amounts for these are—

	Lakhs of Rs.
Spares	0·292
Vizagapatam Scheme	2·000
Papanasam Scheme	15·511
Mettur Scheme	7·669
Total ..	25·472

138. *Civil*.—Specifications were prepared and orders placed for the following works :—

- (1) Low pressure pipe line and Surge tank.
- (2) Diversion weir—gates, screens and control at Head-works.
- (3) Penstock Venturi Meter and Valves.
- (4) Tambraparni Dam—discharge pipe and controls.
- (5) Papanasam power-house, structural steel work.
- (6) Papanasam power-house—Electrically operated travelling crane.

Specifications for power-house steel doors and windows have been prepared and tenders are to be called for.

139. Some of the major schemes studied were—

- (1) Cauvery pumping scheme in Salem district.
- (2) Tungabhadra Hydro-Electric Scheme.

Possibilities of development of power were examined from a study of the maps in the case of Sirumalai, Suruliar and Talacona Schemes. A reconnaissance of the lastmentioned scheme was also made and report submitted.

140. *Hydro-metric work*.—Collection, computation and recording of rainfall and run-off data for the several basins in the Presidency which are under observation are being continued.

The results of the evaporation observations so far made at Glen Morgan were analysed and recorded. The station was shifted to Tambraparni Basin for making observation of evaporation loss there.

ELECTRICAL INSTALLATIONS IN GOVERNMENT BUILDINGS.

141. In addition to the maintenance of electrical installations in Government buildings the more important works carried out by the Electrical Engineer's (General) Division, were—

	RS.
(1) New extensions to the Secretariat buildings	12,500
(2) Madura hospital	67,000
	(approximate)
(3) Lady Willingdon Leper Settlement	35,760
(4) Cocanada hospital	15,000
(5) Government Press—Erection of lift and wiring work	30,000
(6) Gosha hospital	10,700

Increasing amount of work handled is shown by the following statement :—

	1937-38 LAKHS RS.	1938-39 LAKHS RS.	1939-40 LAKHS RS.
Total cost of electric installation to end of year	47.30	49.11	51.22
New works done	2.43	1.81	2.11
Maintenance cost	1.77	1.53	1.51
Current consumption paid	2.4	2.3	2.1
Percentage cost of maintenance on capital			
	PER CENT.	PER CENT.	PER CENT.
cost	3.74	3.12	2.95

INSPECTIONS AND ADMINISTRATION OF INDIAN ELECTRICITY AND CINEMATOGRAPH ACTS.

142. The Chief Electrical Inspector to Government is in direct charge of the work. His report is reproduced below.

General.—The year under review continued to be one of progress and development. There was all round activity. The number of licensees giving supply increased from 74 at the end of last year to 77. Of these 34 are managed by local authorities and the rest numbering 43 by companies. The total number of licences granted also increased from 77 at the end of last year to 79. One undertaking, Neikuppai, the licence for which was granted during the course of the year completed a portion of its compulsory works and commenced supply at the village Pulangurichi within its area of supply. Details of licences granted during the year, and licensees in operation and construction, etc., are enclosed as appendices to the report.

The details of capacities of plant installed in the generating stations of licensees are given in appendix E. The Calicut, Nellore, Cuddapah and Tellicherry-Cannanore licensees increased their generating plant capacities during the year to meet the increased demands on their stations. The total installed capacity of all the generating plants installed in the licensees' generating stations is

62,900 KVA. approximately. The Madras Electric Supply Corporation, Limited, has the largest plant installed capacity of 53,750 KVA. The corresponding total installed capacity at the end of last year was 66,200 KVA. approximately. The decrease is due to 10 licenses—5 in Chettinad area, 1 in Mettur area and 4 in the thermal areas—closing down their generating stations due to the advent of Government power. There are at present 23 generating licensees. Their number is not likely to decrease much hereafter for some time to come, due to their far away locations from Government lines and stations.

Town and rural electrification.—The licensees are to an increasing extent coming forward to develop the agricultural and other rural loads within their areas of supply. Though the development cannot be stated to be entirely satisfactory still it could be said to be well on the way for more rapid development. The present international situation to a large extent impedes progress of rural electrical development. The total number of towns and villages having the benefit of electric supply in the licensees' areas as far the information available in this office is 371.

Tariffs.—A list of licensees who reduced their tariffs in one form or other during the year is given in Appendix F-5. The tariffs for various purposes continued to decrease and electricity is becoming cheaper in most of the licensees' areas. The rates prevalent in the various licensees' areas are far from uniform. As the licensees are not uniform economic holdings the varying rates are likely to continue for some more time. Uniformity is rather difficult to achieve all at once. It is insisted upon wherever possible. Appendix F-6 gives a list of licensees who charge more than 6 annas per unit for lights only or lights and fans. As conditions have improved in these licensees' areas it is hoped these few licensees would also reduce their rates for these purposes before the end of the next official year.

As the meter rents charged by the licensees for single phase meters were found to be high, in accordance with the instructions of Government all the licensees were circularized to reduce their meter rents for single phase domestic service meters to 4 annas per month. A number of local authority and company licensees complied with the request. But 31 company-managed licensees did not see eye to eye with the proposal. In all these cases where the licensees were not willing to reduce their meter rents voluntarily it was decided to take up the question while scrutinizing their annual accounts to see if any reduction was possible.

Amendment to Indian Electricity Act and Rules.—To remedy certain irregularities as well as to facilitate easy interpretation and efficient administration rules 51, 60, 73 (1), 74 (2), 120 and 124 of the Indian Electricity Rules, 1937, were amended by the Central Electricity Board. Proposals to amend rules, 3, 58, 47 and 118 as well as incorporation of new rules like 2 (i), (ee), 48-A and rule 67 of Indian Electricity Rules, 1922, are under the consideration of the Central Electricity Board. The Chief Electrical

Inspector to Government attended the third meeting of the Central Electricity Board on 9th January 1910 at New Delhi and took part in its deliberations. The Madras Presidency Licensees' Association requested Government for a general relaxation of certain provisions of the Indian Electricity Act and Rules during the period of war, and sometime thereafter but the request was turned down by Government. As the finally amended rule 51 was not available from the Central Electricity Board till the last week of January 1940 it was relaxed throughout the Presidency till October 1939 first and then till April 1940.

Administration of Madras Electricity Duty Act.—The Madras Electricity Duty Act and Rules came into force on 1st April 1939. A revenue of Rs. 3.75 lakhs was anticipated from this source during the year. But the actual receipts for the first 11 months of the official year for which returns have been so far received are Rs. 4.99 lakhs and therefore have exceeded the anticipated revenue by about 33 per cent. The Madras Electric Supply Corporation, Limited, has been the heaviest payer, the amount paid by them for the first 11 months being Rs. 2,18,821-13-6. Next in order come Madura with Rs. 27,962-15-3 for 10 months and Trichinopoly-Srirangam with Rs. 26,252-6-5 for 11 months. At the end of the year 46 licensees were paying electricity duty of which 26 are company-managed licensees and the rest local authority licensees. The Electricity Duty Act and Rules were first administered by the Electrical Inspector on behalf of the Chief Engineer for Electricity. But consequent on the enhancement of the powers, functions and status of the Chief Electrical Inspector to Government the Duty Act and Rules were transferred for direct administration by the Chief Electrical Inspector to Government, by Government in G.O. No. 252, Electricity, dated 7th February 1940.

During the year 28 licensees were inspected under the Duty Act. It was not possible to inspect all the licensees due to want of adequate time and staff. The Duty Assistant Engineer was hard pressed with the heavy work involved. Even in the case of the 28 licensees inspected it was not possible to go in detail through their accounts and ledgers. The amount of work done at headquarters too was considerable. A number of circulars on the interpretation of rules and on the mode and form of submitting the returns were issued to the licensees.

The introduction of electricity duty has given the licensees a reasonable plea against the reduction of rates. However for a number of purposes like street lighting, domestic bulk supply, etc., which were being charged at rates just above two annas before, rates were reduced to two annas and less, so as to avoid these units being dutied. Though the Government have lost money by way of revenue by these reductions still they have been agreed to as these particular classes of consumers stood to gain by the same

There was a demand by individual licensees as well as by the licensees' association for passing on the Electricity Duty to consumers but the proposal was not approved.

It cannot be stated with any degree of exactitude to what extent the licensees have been affected by the imposition of the Electricity Duty. Only a scrutiny of their accounts for 1939-40 could reveal the same. Hence it is not possible to comment on its effects at the present stage.

Electricity and accidents.—There were 138 accidents during the year in all out of which 44 proved fatal. Table I gives a comparative statement of electrical accidents for the last four years :—

Table I.

Year.	Fatal accidents.	Non-fatal.	Total.
1936-37	32	45	77
1937-38	36	43	79
1938-39	49	89	138
1939-40	44	94	138

Though the length of lines and the number of places electrified have increased, it is gratifying to note that the number of accidents has not increased. Actually the fatal accidents have decreased from 49 during 1938-39 to 44 during 1939-40.

Table II.

Serial number and areas in which the accidents took place.	Employee.	Non-employee.	Animal.	Total.
(1) Government Hydro-Electric areas.	..	19	..	19
(2) Government Thermal	..	..	..	..
(3) Licensees' areas	6	18	1	25
Total	6	37	1	44

Table III.

Serial number and causes of accidents in broad outline.	66 K.V.	33 K.V.	22 K.V.	11 K.V.	L.T.	Total.
(1) Climbing of poles and towers out of curiosity or intention to commit suicide ..	17	..	1	9	3	30
(2) Climbing of poles in spite of warning	..	..	..	..	2	2
(3) Faulty wiring	..	..	..	..	1	1
(4) Snapping of conductors ..	..	..	..	..	2	2
(5) Development of potential in poles, etc., due to faulty earthing	..	..	..	..	2	2
(6) Accidental (other causes) ..	..	..	..	..	7	7
	17	..	1	9	17	44

An analysis of the fatal accidents shown in tables II and III shows that the majority of the fatal accidents are still from unauthorized climbing of poles and towers in the rural areas. It is considered that good propaganda on the dangers of climbing poles by beating of tom-tom at frequent intervals would to a very large

extent reduce further loss of lives. That fatal accidents due to climbing are largely due to ignorance, is illustrated from the fact that during the year under review fewer fatal accidents are reported from the Coimbatore to Erode and Erode to Negapatam 66 K.V. lines where a number of the accidents due to climbing have occurred during last few years. Propaganda about the dangers of climbing Transmission Line Poles should be intensified.

The Madras local authorities electrical undertakings.—The number of electric supply undertakings under the management of Municipal Councils increased by two during the year. There were 19 undertakings at the end of the last year. Karur and Palni were added to the list during the year. The Assistant Engineer in charge of Local authority undertakings carried out systematic inspection of their works and accounts. Proposals for the inclusion of all the Panchayat Board Electrical Engineers in the Madras Local Authorities' Service of Electrical Engineers were considered and detailed recommendations were made to Government on the subject.

The Bezwada, Cocanada and Masulipatam Municipalities closed down their generating stations and commenced taking supply from the Government Thermal Generating Stations. The Bezwada Engine Generator sets were disposed of to Messrs. Lahore Electric Supply Corporation, Limited. A scheme for the change over of the portions of the existing D.C. systems of supply at Bellary to A.C. is under consideration. As the maximum demand in the station reached very nearly the total installed capacity of the station, installation of additional generating sets had to be taken into consideration. The two 190 K.W. Engine generator sets which were at Dindigul were purchased from Government and efforts are being made for their installation at Bellary. The ban on the Hindupur municipal undertaking against connecting up any additional loads continued during the year. On the whole the working of the local authority undertakings has been satisfactory.

Accounts and debentures.—During the year accounts of 31 private licensees and 21 local authorities were scrutinized and suggestions offered. Besides these eight applications for the issue of debentures were also scrutinized and recommendations made to Government. An important policy on the capitalization of interest on borrowed capital invested in the capital works of the undertaking was formulated in the application of licensees for such capitalization and recommendations were made to Government on the subject. Final orders of Government on the subject are awaited.

Cinematograph Act and Rules.—The total number of cinemas in the Presidency at the end of 31st March 1940 was 491 of which 223 were permanent and the rest touring. The table below gives

an idea of the increase in the number of cinemas in the Presidency and of the growth of the industry as a whole during the last five years :—

Table.

Year.	Permanent cinemas.	Touring cinemas.	Total.
31st March 1936	125	100	225
Do. 1937	157	122	279
Do. 1938	189	183	372
Do. 1939	190	247	437
Do. 1940	223	268	491

From the table it is seen that the number of cinemas both touring and permanent continues to increase. The present world conditions have affected the enthusiasm of the investing public to a certain extent. Otherwise the increase would have been more. Due to the rapidly increasing number of cinemas the work of the subdivision has considerably increased. The inspection of almost all cinemas has been done systematically.

The position of film studios also has been affected very adversely by the disturbed world conditions and considering the severe handicaps under which this infant industry is already working it is desirable to defer taking up the question of issuing specified regulations affecting studios as was contemplated previously. The studios will be continued to be inspected under the Indian Electricity Act and Rules and the opportunity will be availed to gather data which would enable suitable regulations to be framed when the time is ripe.

Laboratory.—The supply voltage and the house service meters maintained by the licensees were tested as usual in the previous years.

The total number of tests carried out in the Electrical Standards Laboratory at Madras and at site in Licensee's areas was made up as follows :—

Substandards	129
Meters and instruments	1,466
Oil tests	56
Voltage and earth	191
Fire extinguishers	124

Of the 129 substandards 54 were from the (Government) Pykara and Mettur Systems and the rest from the Laboratory and other licensees. During the year with the exception of 22 licensees the rest have sent their rotating substandards for test and adjustment.

During the year the extra high pressure 66 K.V. single circuit line between Virudunagar and Kovilpatti was tested with the H.T.D.C. Testing Gear, and a new induction regulator was purchased for controlling the primary voltage of the main transformer.

A new motor alternator set was installed for converting D.C. to A.C. and to test the Commercial grade Electricity meters of Bezwada Thermal Schemes and Papanasam Hydro-Electric Project.

Expenditure and revenue.—The approximate revenue and expenditure of the division exclusive of those for the administration of the Madras Electricity Duty Act, 1939, stood at Rs. 70,500 and Rs. 74,200, respectively.

The approximate revenue derived from the Madras Electricity Duty Act, 1939, was Rs. 4.9 lakhs and the expenditure about Rs. 3,800.

The figures in the above two paragraphs are only provisional subject to any adjustments that might be made by the Accountant-General.

With effect from the 2nd of October 1939, the Electrical Inspectorate was separated from the control of the Chief Engineer for Electricity and placed under Government's direct control; the status of the Chief Electrical Inspector to Government has been raised to that of a Superintending Engineer from that date.

STAFF.

143. Important changes in the superior staff of the department during the year under report were as follows:—

Sir Henry Howard continued as Chief Engineer for Electricity up to 31st October 1939 and was appointed from 1st November 1939 as Consulting Engineer to Government.

Lieut.-Col. M. G. Platts, was up to July 1939, Superintending Engineer, Construction Branch, with headquarters at Madras and then proceeded on leave out of India. He was, owing to outbreak of war, recalled from leave and was on Special duty as Superintending Engineer from 29th September 1939. He assumed charge of the duties of the Chief Engineer for Electricity on 1st November.

Mr. L. Henshaw, Superintending Engineer, Construction Branch, was on leave from December 1938 to July 1939 and on return resumed charge of the duties of Superintending Engineer, Construction Branch, with headquarters at Papanasam.

Sri Rao Bahadur G. Sundaram continued as Superintending Engineer, Pykara Electricity System, up to end of June 1939. He proceeded on leave out of India from July 1939 to end of January 1940 and on return assumed charge of the post of Superintending Engineer, Mettur Electricity System.

Mr. E. J. B. Greenwood was on leave up to end of June 1939 and has been Superintending Engineer, Pykara Electricity System, from 1st July 1939.

Sri P. V. Chari continued as Electrical Inspector up to 1st October 1939. The post of Electrical Inspector was from 2nd October 1939, raised to the rank of Superintending Engineer with the designation Chief Electrical Inspector to Government and Sri P. V. Chari was appointed as Chief Electrical Inspector to Government from that date.

Sri T. J. Mirchandani continued as Executive Engineer (Electrical), Bezwada, up to June 1939 when he was appointed as Superintending Engineer, Mettur Electricity System. He was reverted from the Superintending Engineer's rank in February 1940 for want of vacancy from the date of return from leave of Sri Rao Bahadur G. Sundaram and assumed charge of the post of Deputy Chief Engineer (Electricity).

Mr. John Kuriyan continued as Superintending Engineer, Mettur Electricity System, and was reverted as Divisional Electrical Engineer, Nilgiris, from 1st June 1939.

Sri G. Yoganandam continued as Deputy Chief Engineer till February 1940 when he was transferred as Divisional Electrical Engineer, Trichinopoly.

Sri M. Subrahmanyam continued to be on leave for the whole of the year.

Mr. A. C. D. Rozario continued as Electrical Engineer (General) for the whole of the year.

Messrs. B. Ramasomayajulu and G. Krishnaswami Ayyar continued to hold charge of the Electrical and Mechanical division and Civil and Hydraulic division, respectively during the whole of the year.

Sri L. Ekambaram continued as Divisional Electrical Engineer till June 1939 and was reverted as Assistant Engineer for want of a vacancy.

A second Construction division was formed in the Construction branch and Sri N. Krishnamurti, Executive Engineer, Pykara Plant Extensions, was appointed as Executive Engineer, Construction division No. 2 from June 1939.

Sri P. V. A. Narayanamurti, who was appointed as Technical Assistant, Electricity Circle, Public Works Department, North-West Frontier Province, reverted in February 1940 and was posted as Assistant Engineer, Operation and Maintenance subdivision, Mettur System.

The following officers were admitted to full membership of the service during the year:—

Class I—Category 1—Superintending Engineers.

Sri Rao Bahadur G. Sundaram.

Class 1—Category 2—Executive Engineers.

- (1) Sri N. R. Narasimhamurti.
- (2) „ M. B. Kandaswami.
- (3) „ A. R. Narayana Rao.

Class 1—Category 3—Assistant Engineers.

- (1) Sri S. Padmanabhan.
- (2) „ V. K. Sethuraman.
- (3) „ T. N. Rajagopal.
- (4) „ N. Nagappa Nayak.
- (5) „ T. R. Krishnamurthi.

Sri R. Krishnamurthi, Junior Engineer was promoted as Assistant Engineer (Electrical) in a short leave vacancy.

Sri N. Gopalakrishnan, Chief Accountant, Mettur Electricity System, was reverted to the Audit Department and Sri C. V. Doraiswami was appointed as Chief Accountant, under emergency rules, pending selection of a candidate for appointment to the post.

MADRAS,
29th July 1940.

M. G. PLATTS,
Chief Engineer for Electricity.

APPENDIX A.

List of constructions undertaken with expenditure to end of 1939-40.

Name of schemes.	Expenditure during 1939-40.	Total expenditure to end of 1939-40.
	RS.	RS.
I. Government Schemes—		
1. Hydro-Electric Schemes—		
(1) Pykara Hydro-Electric Scheme—		
81. A.I.A. (1) Pykara Hydro-Electric Scheme	95,052	1,24,37,408
(2) Additional generating machinery at Pykara ..	2,56,891	39,58,728
(3) Distribution of power in the Pykara System (Major and Minor extensions) ..	9,88,347	51,34,413
(4) Supply of power to Virudunagar and Rajapalayam.	32,786	8,93,349
(5) Supply of electric power to Madura	63,491	31,59,462
(6) Supply of electric power to Kovilpatti	46,479	5,12,036
(7) Supply of electric power to Periyakulam, Theni and Bodinayakanur	— 6,354	2,05,078
(8) Supply of electric power to Gobichettipalayam and five other villages ..	13,402	1,65,073
(9) Supply of electric power to Ramnad district	1,51,643	4,14,929
(10) Mukurti Dam	..	14,95,150
81. A.I.A. Pykara Hydro-Electric Scheme—Total ..	16,41,737	2,83,75,626
(2) Mettur Hydro-Electric Scheme—		
81. A.I.B. (1) Mettur main scheme	2,91,087	1,04,68,957
(2) Erode-Trichinopoly extension	1,521	11,82,392
(3) Trichinopoly-Negapatam extension	— 540	22,01,479
(4) Extension of supply to Ranipet, Kaveripakkam and Conjeevaram	6,190	3,66,317
(5) Distribution of power in the Mettur system	18,71,476	31,02,938
(6) Extension of supply to Arkonam	17,843	1,89,678
(7) Supply of electric power to Pakala and Tirupati ..	2,09,548	2,12,631
(8) Fourth generating unit at Mettur	3,058	3,058
(9) Karur Electric Supply scheme	..	79,567
(10) Cost of works transferred from Pykara System ..	..	9,80,513
81. A.I.B. Mettur Hydro-Electric Scheme—Total ..	24,00,183	1,87,87,520

APPENDIX A—cont.

List of constructions undertaken with expenditure to end of
1939-40—cont.

Name of schemes.	Expenditure during 1939-40. RS.	Total expenditure to end of 1939-40. RS.
I. Government Schemes—cont.		
1. Hydro-Electric Schemes—cont.		
(3) Papanasam Hydro-Thermal Electric Project—		
81. A.I.C. (1) Papanasam-Hydro Thermal Project	22,28,974	33,28,074
(2) Distribution of power in the Papanasam System ..	74,746	74,746
81. A.I.C. Papanasam Hydro-Thermal Electric Project—		
Total ..	23,03,720	34,02,820
1. Hydro-Electric Schemes—Total ..	63,45,640	5,05,65,976
2. Thermal Electric Schemes—		
(1) Vizagapatam Thermal Station—		
81. A.I.C. (1) Vizagapatam Thermal Station	46,997	17,25,899
(2) Supply of electric power to Bobbili	5,260	1,00,518
(3) Distribution of electric power in Vizianagram	48,078	1,54,397
(4) Distribution of power in the Vizagapatam Thermal area.	39,657	84,672
81. A.I.C. Vizagapatam Thermal Scheme—Total ..	45,998	20,65,486
(2) Bezwada Thermal Station—		
81. A.I.D. (1) Bezwada Thermal Station.	2,12,560	19,00,799
(2) Extension to Tenali	87,449	2,09,830
(3) Distribution of power in the Bezwada area	1,11,162	1,79,500
81. A.I.D. Bezwada Thermal Scheme—Total ..	4,11,171	22,90,129
(3) Cocanada Thermal Station—		
81. A.I.E. Cocanada Thermal Station.	1,17,826	1,24,042
81. A.I.E. Cocanada Thermal Station—Total ..	1,17,826	1,24,042
2. Thermal Electric Schemes—Total ..	5,74,995	44,70,657
I. Government Electric Schemes—Total ..	69,20,635	5,50,45,633
II. Municipal Electric Schemes—		
Udamalpet	6,432	91,048
Bodinayakanur	302	49,346
Periyakulam	5,054	70,636
Sivakasi	10,266	92,433
Dharapuram	9,592	91,159
Tiruppattur	8,594	1,05,650
Tiruvannamalai	49,321	1,32,027
III. 50. Civil Works—New Electrical Work	2,34,000	51,45,000

APPENDIX B.

Budget provision for capital works in 1940-41.

Capital expenditure.	Budget 1940-41. RS.
Hydro-Electric Schemes—	
81. A. I. A. Pykara Hydro-Electric Scheme—	
1 Pykara Hydro-Electric Scheme	2,05,400
2 Additional Generating machinery at Pykara	62,800
3 Distribution of power in the Pykara System	2,00,000
4 Supply of power to Virudunagar and Rajapalaiyam ..	1,000
5 Supply of electric power to Madura	61,400
6 Supply of electric power to Kovilpatti	100
7 Supply of electric power to Gobichettipalaiyam and five other villages	16,900
8 Supply of electric power to Ramnad district	800
9 Construction of transmission lines and other works for supply of power to intending consumers	4,00,000
10 Pension charges	6,800
81. A.I.A. Pykara Hydro-Electric Scheme—Total ..	9,55,200
81. A. I. B. Mettur Hydro-Electric Scheme—	
1 Mettur Main Scheme	2,67,800
2 Distribution of power in the Mettur System	1,00,000
3 Fourth generating unit at Mettur	6,11,000
4 Supply of electric power to Pakala and Tirupati ..	1,500
5 Construction of transmission lines and other works for supply of power to intending consumers	3,00,000
6 Pension charges	5,500
81. A.I.B. Mettur Hydro-Electric Scheme—Total ..	12,85,800
81. A. I. C. Papanasam Hydro Thermal Electric Project—	
1 Papanasam Hydro Thermal Project	53,88,590
2 Distribution of power in the Papanasam System	34,000
3 Pension charges	10,400
4 Suspense	1,00,000
81. A.I.C. Papanasam Hydro Thermal Electric Project—Total ..	55,32,990
I. 81. A.I. Hydro-Electric Schemes—Total ..	77,73,900
Thermal Electric Schemes—	
81. A. II. C. Vizagapatam Thermal Station—	
1 Vizagapatam Thermal Station	10,000
2 Distribution of electric power in Vizianagram	100
3 Distribution of power in the Vizagapatam Thermal Area.	1,00,000
81. A. II. C. Vizagapatam Thermal Station—Total ..	1,10,100
81. A. II. D. Bezwada Thermal Station—	
1 Bezwada Thermal Station	7,700
2 Distribution of power in the Bezwada area	1,00,000
3 Third generating set at Bezwada	5,25,000
81. A.II.D. Bezwada Thermal Station—Total ..	6,32,700

APPENDIX B—cont.

Budget provision for capital works in 1940-41—cont.

Capital expenditure.	Budget, 1910-41. RS.
II. Thermal Electric Schemes—cont.	
81. A. II. E. Cocanada Thermal Station—	
1 Cocanada Thermal Station	2,25,200
2 Distribution of power in Cocanada area	3,24,500
81. A. II. E. Cocanada Thermal Station—Total ..	5,49,700
81. A. II. Thermal Electric Schemes—Total ..	12,92,500
81. A. Capital Outlay on Electricity Schemes—Total ..	90,66,400
Deduct—Lump sum to probable savings ..	4,68,800
Grand Total—81. A. Capital Outlay on Electricity Schemes (outside the revenue accounts)	85,97,600

APPENDIX C.

Details of establishment charges of the department and fees earned during 1939-40 and estimated for 1940-41.

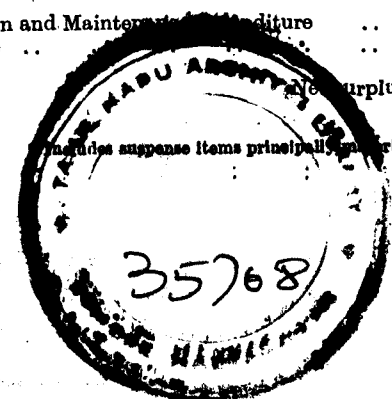
	Expenditure in 1939-40. RS.	Budget, 1940-41. RS.
Electrical Engineer (General)—		
Salaries, allowances, etc.	56,500	60,700
Revenue	..	..
Net cost ..	56,500	60,700
Electrical Inspector—		
Salaries, allowances, etc. (including that for the collection of the Madras Electricity Duty Act, 1939).	78,000	66,600
Revenue (excluding other receipts and the receipts from the Madras Electricity Duty Act, 1939.)	70,500	61,100
Net cost ..	7,500	5,500
Revenue from water power—		
Royalty from Mysore Government	15,200	1,01,000
Receipts from Electricity Duty, 1939 ..	4,90,700	4,25,000
Chief Engineer's office including technical section—		
Salaries, allowances, works, etc.	2,12,851	1,95,800
Revenue (charges recoverable from Governments and Departments).	2,10,128	1,83,500
Net salaries and allowances ..	2,728	32,300
Pykara Hydro-Electric System—		
Salaries, allowances, etc.	3,38,034	3,24,400
Less charges payable to or recoverable from Governments and others.	70,848	55,400
Net salaries and allowances	2,61,186	2,69,000
Operation and Maintenance expenditure	20,82,350	10,79,900
Revenue	37,13,630	37,81,300
Net surplus ..	13,90,094	24,32,400

* Includes suspense items principally materials purchased for stock.

APPENDIX C—cont.

Details of establishment charges of the department and fees earned during 1939-40 and estimated for 1940-41—cont.

	Expenditure in 1939-40. RS.	Budget, 1940-41. RS.
Mettur Hydro-Electric System—		
Salaries, allowances, etc.	2,36,999	2,34,700
Less charges payable to or recoverable from Governments, Departments and others.	1,39,754	22,900
Net salaries and allowances	97,245	2,11,800
Operation and Maintenance expenditure	* 11,58,482	2,12,500
Revenue	12,92,285	15,29,200
Net surplus ..	36,558	11,04,900
Vizagapatam Thermal Electric Scheme—		
Salaries, allowances, etc.	47,039	38,700
Charges payable to or recoverable from Government, Departments and others.	565	600
Net salaries and allowances ..	47,604	39,300
Operation and Maintenance expenditure	78,632	86,500
Revenue	1,38,323	1,81,000
Net surplus ..	10,087	55,200
Bezawada Thermal Electric Scheme—		
Salaries, allowances, etc.	47,868	47,700
Charges payable to or recoverable from Government, Departments and others.	12,769	3,600
Net salaries and allowances ..	35,099	51,300
Operation and Maintenance expenditure	* 3,45,961	2,06,500
Revenue	1,88,817	2,41,000
Net deficit ..	1,92,243	16,800
Cocanada Thermal Electric Scheme—		
Salaries, allowances, etc.	..	16,300
Charges payable to or recoverable from Government, Departments and others.	..	3,200
Net salaries and allowances ..	..	19,500
Operation and Maintenance expenditure	..	40,000
Revenue	..	65,100
Net surplus ..	..	5,600



* Includes suspense items principally materials purchased for stock.

R
CB. 211 Y N 39
N 40

APPENDIX D-1—cont. Table of electric supply costs and records—Companies—cont.

Serial number and name of undertaking.	Total of depreciation and reserve.	Dividend on ordinary shares.	Number of consumers.	Number of units sold.	On units generated or purchased.	Overall working costs per unit sold.	Lights and fans.	Average price obtained.				Maximum demand on station.	PER CENT.
								(17)	(18)	(19)	(20)		
(1)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	
1 Madras	72,38,813	8	13,878	48,990,140	0.25	0.94	3.20*	0.68	1.10	1.25	14,200 K.W.	39.4	
2 Kanadukathan	2,19,037	5	617	324,592	0.84	3.98	6.85	2.75	2.01	4.50	152 "	24.4	
3 Devakottai	1,32,372	*4.2	654	375,590	0.79	2.32	4.60	1.87	1.61	2.86	182 "	23.6	
4 British-Cochin	9,000	6	187	108,095	1.28	3.96	5.72	2.60	3.46	4.72	65 "	18.9	
5 Trichinopoly-Srirangam	3,32,280	10	6,441	5,864,833	0.43	1.14	3.46	0.79	1.95	1.42	1,652 "	40.5	
6 Rajahmundry	1,04,445	5	846	507,609	0.78	2.77	5.25	1.15	4.03	3.34	200 "	20.0	
7 Calicut	98,107	*2.5	1,548	1,042,213	0.71	1.74	5.05	1.06	3.72	2.72	425 "	27.9	
8 Karaikudi	1,31,852	10	832	456,217	0.85	2.82	4.76	1.84	2.00	3.46	200 "	26	
9 Vellore	56,818	6†	1,169	671,200	0.65	2.39	3.96	1.45	3.36	2.98	243 "	31.5	
10 Guntur	78,232	2.25	1,200	612,820	0.67	3.21	5.95	2.07	2.28	3.52	280 "	24.9	
11 Kumbakonam	90,233	5	1,724	715,865	0.65	2.44	4.68	1.11	2.02	2.66	340 "	24	
12 Nattarasankottai	10,481	..	218	143,706	1.10	4.34	6.40	1.76	2.75	3.66	81 "	20.4	
13 Salem-Erode	2,11,645	6†	2,776	3,452,561	0.56	1.29	4.62	0.87	2.14	1.53	1,385 K.V.A.	35.5	
14 Mangalore	1,54,111	..	1,612	787,228	0.65	3.08	5.20	1.35	2.76	3.27	360 "	25	
15 Palghat	30,189	8	582	202,240	0.97	2.98	5.50	0.80	2.41	3.70	99 K.W.	23.2†	
16 Tinnevely-Tuticorin	2,83,558	..	3,071	1,181,633	0.72	3.68	5.90	2.34	4.10	3.92	626.6 K.V.A.	25.6	
17 East Tanjore	85,158	*3	5,466	2,138,747	0.51	1.49	3.84	0.95	2.24	2.15	910 K.W.	28.8	

Serial number and name of undertaking.

18 Nellore	12,778	..	656	384,215	0.66	2.96	5.75	1.87	0.97	2.94	210 "	20.8
19 Tirupathi-Tirumalai	1,60,147	..	588	331,674	0.89	2.98	4.10	2.04	2.33	3.34	128 "	29.6
20 Chittoor	12,654	..	267	116,963	0.78	2.92	4.48	1.90	2.56	3.53	70 "	19.1
21 Negapatam	23,231	5	709	622,392	0.77	1.65	4.55	0.85	2.97	1.97	605 "	11.8
22 Okkur	8,634	..	198	112,767	1.30	3.80	8.20	1.45	2.61	3.64	52 "	24.8
23 Proddatur	..	..	222	90,433	1.52	2.92	4.17	1.74	2.84	3.28	62 "	16.6
On 24 South Arcot	22,000	4‡	1,596	1,095,609	0.55	1.97	5.20	1.23	4.57	2.54	410 "	30.6
25 Vizagapatam	56,969	8	1,087	718,431	0.95	2.65	6.07	2.48	2.98	2.98	302 "	27.1
26 Adoni	..	..	259	122,107	1.04	3.34	6.07	1.47	3.28	3.54	90 "	15.5
27 Gudiyattam	2,880	..	233	122,145	0.75	2.36	4.56	1.10	3.42	2.33	70 "	19.8
28 Gudivada	..	*1.5	185	58,448	1.25	3.50	6.25	2.19	3.20	4.02	34.5 "	19.2
29 Killore	3,810	..	440	124,268	1.03	4.03	6.00	1.02	4.60	4.90	82 "	17.3
30 West Rannad	3,054	3	420	309,938	0.71	1.27	4.25	0.61	3.25	1.53	218.75 "	16.2
31 Narasapur	..	..	294	66,299	1.31	3.50	5.84	1.95	2.75	4.48	50 "	15.2
32 Ongole	..	..	133	70,426	0.91	2.66	6.30	1.67	1.34	2.48	42 "	19.1
33 Cuddapah	4,932	3	387	98,754	1.32	3.96	6.30	2.00	2.52	4.60	50 "	22.3
34 Ambur-Vaniyambadi	1,000	..	583	173,177	0.75	2.22	4.30	1.06	3.52	2.94	72 "	27.4
35 Chingleput	2,500	..	201	45,197	1.52	5.30	6.30	2.12	3.05	5.04	51 "	10.1
36 Tellicherry-Cannanore	..	..	272	180,092	1.47	2.90	6.50	0.84	3.92	2.56	130 "	15.8
37 Chicacole	..	..	102	12,981	2.60	8.40	6.37	1.89	4.35	5.80	23.5 "	9.5†
38 Bobbili	500	..	48	10,262	1.10	8.10	4.50	1.48	2.98	6.50	23 K.V.A.	14.1‡
39 Anakapalli	..	..	157	25,183	1.18	4.70	4.95	1.58	3.62	4.69	42.3 "	11.5
40 Udupi	..	..	151	14,640	1.12	5.26	5.70	..	3.12	5.82	18 K.W.	18.9†
41 East Rannad	..	..	..	..	..	..	..	..	..	..	..	..
42 Salur-Parvathipuram	..	..	..	..	..	..	..	..	..	..	..	..
43 Nekuppall	..	..	..	..	..	..	..	..	..	..	..	..

NOTE.—All figures are calculated on a uniform basis according to standard practice.

* Interim dividend.

† Includes reserve for income-tax and amounts written off.

‡ Supply commenced on 1st August 1938.

§ Supply commenced during 1939-40.

§ Supply commenced on 17th October 1938.

|| Supply commenced on 5th July 1938.

¶ Supply commenced on 1st October 1938.

APPENDIX D-2.

Table of electric supply costs and records—Local authority undertakings.

Serial number and name of undertaking.	(1)	(2)	(3)	(4)	(5)	Revenue.			(10)	(11)
						Year of accounts to which the figures refer.	Population of area of supply.	System and voltage of supply.		
									From electric supply.	From other sources.
									Rs.	Rs.
1 Bellary	12th	1938-39	47,573	{ DC 460/230 V.	3,99,283	91.38	7,354	79,197	19,545	+
2 Beavada	9th	1938-39	60,427	{ AC 400/230 V. 50 N.	6,10,608	1,60,019	4,900	1,25,347	39,572	+
3 Coacanda	10th	1938-39	65,552	Do	4,41,412	1,01,121	5,939	1,78,329	28,693	+
4 Hindupur	9th	1938-39	14,311	Do	1,39,115	19,352	1,571	21,309	445	+
5 Hospet	3rd	1937-38	21,673	{ DC 460/230 V.	1,14,239	13,396	1,975	18,975	4,533	+
6 Kurnool	9th	1938-39	35,324	{ AC 400/230 V. 50 C.	3,22,413	51,699	3,134	57,922	3,180	+
7 Masulipatam	9th	1938-39	56,328	Do	2,65,647	51,971	5,931	63,307	6,505	+
8 Tiruvallur	1st	1937-38	10,656	Do	1,08,223	5,445	3,340	10,290	4,545	+
9 Otacamanud	10th	1938-39	25,016	Do	6,85,041	1,53,619	3,811	1,15,906	41,524	+
10 Conjeevaram	8th	1938-39	65,238	Do	3,63,907	68,214	4,613	58,356	14,441	+
11 Coonoor	9th	1938-39	14,326	Do	1,91,588	55,656	3,034	47,036	11,594	+
12 Colimbatore	6th	1938-39	35,198	Do	6,43,774	2,40,025	9,231	1,55,432	98,804	+
13 Pollachi	6th	1938-39	22,112	Do	1,15,000	66,203	8,262	62,583	66,203	+
14 Dindigul	5th	1938-39	43,617	Do	2,77,165	61,710	3,223	52,824	12,609	+
15 Virudunagar	5th	1938-39	33,081	Do	2,34,688	90,795	2,943	73,053	22,176	+
16 Tiruppur	6th	1938-39	18,039	Do	1,10,097	34,951	14,411	2,62,875	1,01,097	+
17 Madurai	12th	1938-39	182,018	Do	3,48,326	24,214	1,091	1,23,028	44,336	+
18 Tanjore	11th	1938-39	66,689	Do	2,41,616	27,228	1,071	25,093	414	+
19 Udumalpet	4th	1938-39	18,899	Do	58,698	32,728	1,919	32,024	3,659	+
20 Palni	3rd	1937-38	19,850	Do	1,00,085	11,303	1,527	1,079	2,946	+
21 Karur	4th	1938-39	27,036	Do	49,944	16,918	712	20,719	3,246	+
22 Bodinayakkanur	4th	1938-39	23,064	Do	1,35,316	38,644	1,622	22,085	3,089	+
23 Periyakulam	5th	1938-39	33,127	Do	1,52,156	15,432	1,102	1,074	2,414	+
24 Sembem	5th	1937-38	10,500	Do	59,553	15,851	1,286	1,771	675	+
25 Tiruvottiyur	4th	1938-39	13,500	Do	61,891	14,551	711	1,530	565	+
26 Alandur	3rd	1938-39	18,299	Do	97,053	1,992	552	1,666	2,437	+
27 Tirupattur	3rd	1938-39	27,769	Do	84,017	1,499	2,52	17,898	5,436	+
28 Tiruvannamalai	3rd	1938-39	15,212	Do	32,051	3,613	215	5,647	1,716	+
29 Sivakasi	2nd	1937-38	6,350	Do	82,311	2,761	815	13,016	2,847	+
30 Villupattam	1st	1938-39	18,218	Do	1,30,104	2,160	916	12,016	2,849	+
31 Dharpuram	1st	1938-39	15,099	Do	1,26,502	2,520	265	11,165	5,383	+
32 Kodakanal	1st	1938-39	6,523	Do	Accounts not available.					+
33 Wellington Cantonment	1st	1938-39	6,523	Do						+

Serial number and name of undertaking.

Table of electric supply costs and records—Local authority undertakings—cont.

Serial number and name of undertaking.	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	Amount provided for interest and loan repayments.	Number of consumers.	Number of units sold.	Per unit generated or purchased.	Overall working cost per unit sold.	From lights and fans.	Power.	Public lighting.	Total supply.	Units sold per head of population.	Maximum load on undertaking.	Underlying load factor.
	Rs.			AS.	AS.	AS.	AS.	AS.	AS.			PER CENT.
1 Bellary	26,890	736	362,432	1.10	3.50	3.55	2.02	3.91	4.36	7.65	200	20.6
2 Beavada	54,360	911	987,361	0.64	2.03	3.58	1.50	4.47	2.70	16.35	410	31
3 Coacanda	32,148	653	560,924	0.62	2.24	3.60	1.66	2.86	3.06	8.5	250	25.6
4 Hindupur	9,490	298	67,153	1.43	5.12	7.20	2.77	3.50	5.25	4.72	35.55	21.6
5 Hospet	24,316	149	48,535	1.65	2.94	6.73	3.04	4.10	5.30	2.01	57	8.7
6 Kurnool	21,685	478	314,603	0.99	2.94	6.73	1.25	3.75	2.79	14.3	175	20.5
7 Masulipatam	51,831	499	275,821	0.81	3.70	5.20	1.36	3.05	3.31	4.84	142	22.1
8 Tiruvallur	3,302	113	115,024	1.60	3.95	5.60	1.35	4.12	4.65	1.85	30	7.5
9 Otacamanud	32,364	1,133	1,145,024	0.73	1.99	3.33	1.51	2.03	2.16	45.5	656	20.2
10 Conjeevaram	25,100	724	397,104	0.75	2.35	5.97	1.79	2.35	2.94	6.1	215	21
11 Coonoor	11,886	536	397,104	0.93	2.70	4.23	1.00	2.35	3.36	19.5	174.73	22.8
12 Colimbatore	42,246	2,909	1,630,907	0.58	1.95	3.28	1.00	1.72	2.17	19.3	768	27.4
13 Pollachi	12,997	775	424,170	0.70	1.54	4.43	0.98	2.04	2.17	29.5	309.2	24.1
14 Dindigul	11,876	757	454,907	0.75	1.73	4.04	0.98	2.04	2.22	10.8	204	33
15 Virudunagar	12,894	615	584,571	0.81	1.98	4.45	0.88	2.18	1.68	17.7	252	26.5
16 Tiruppur	13,203	707	1,089,571	0.81	1.98	3.58	0.93	2.00	1.42	60.1	470	26.3
17 Madurai	31,365	913	2,681,352	0.85	1.98	3.72	0.93	2.06	2.18	14.6	1,105	30.5
18 Tanjore	5,338	309	620,332	0.74	1.49	4.50	0.98	1.96	2.36	9.4	235	27.4
19 Udumalpet	4,492	430	210,595	0.75	1.49	4.50	0.98	2.19	1.87	17.8	173	17.5
20 Palni	4,527	210	231,824	0.73	1.49	4.42	0.92	2.12	1.96	12.15	94	35.2
21 Karur	5,328	230	241,487	0.74	1.49	5.31	1.46	2.30	2.30	12.15	94	35.2
22 Bodinayakkanur	7,442	171	203,977	1.00	3.65	5.75	1.54	2.30	2.30	12.15	94	35.2
23 Periyakulam	6,829	101	105,154	1.11	2.51	4.32	0.82	2.00	2.41	5.4	80	18.2
24 Sembem	3,999	293	99,106	0.94	2.51	4.32	0.82	2.00	2.41	5.4	80	18.2
25 Tiruvottiyur	2,244	214	33,286	0.75	3.38	5.45	0.94	2.07	2.21	5.55	23	10.7
26 Tiruvannamalai	4,228	155	84,517	0.64	3.25	4.60	0.82	2.07	2.21	5.55	23	10.7
27 Sivakasi	7,242	155	16,575	1.32	3.45	4.60	0.94	2.07	2.21	5.55	23	10.7
28 Villupattam	1,759	45	6,944	0.72	3.21	4.60	0.97	2.00	2.50	3.56	32	23.2
29 Dharpuram	5,840	191	18,945	0.72	3.21	4.60	0.97	2.00	2.50	3.56	32	23.2
30 Anantapur	7,566	109	17,495	2.04	10.65	5.70	2.40	2.59	3.09	1.16	40	18.3*
31 Kodakanal	6,878	48	10,920	2.40	16.40	4.60	NH.	3.37	4.08	1.67	23	18.1†

* Commenced supply on 28th November 1938.

† Commenced supply on 1st November 1938.

ADMINISTRATION REPORT OF THE

APPENDIX E.

Total capacity of plants installed of electric supply undertakings in service.

Serial number and name of undertaking.	Total installed capacity of plant in generating stations.	Details of plant installed.
(1)	(2)	(3)
<i>A. Company undertakings—Generating.</i>		
1 Malras	53,750 K.V.A.	3 × 1,875; 1 × 6,250; 1 × 7,500; 1 × 15,025; 1 × 18,750.
2 British Cochin	138.6 "	3 × 46.2 K.V.A.
3 Calicut	1,035 "	1 × 125; 1 × 150; 2 × 250; 1 × 280 K.V.A.
4 Mangalore	750 K.W.	3 × 250 K.W.
5 Tianevelly-Tuticorin	1,995 K.V.A.	1 × 800; 1 × 820; 1 × 375 K.V.A.
6 Nellore	490 "	1 × 64; 2 × 133; 1 × 160 K.V.A.
7 Proddatur	120 "	2 × 60 K.V.A.
8 Rajahmundry	500 "	2 × 133; 1 × 294 K.V.A.
9 Cuddapah	350 "	2 × 50; 1 × 250 K.V.A.
10 Narasaraopet	170 K.W.	2 × 75 K.W.; 1 × 20 K.W.
11 Ongole	150 "	1 × 100; 1 × 50 K.W.
12 Chingleput	150 K.V.A.	1 × 50; 1 × 100 K.V.A.
13 Tellicherry-Cannanore	455 K.V.A.	1 × 216 K.W.; 3 × 135 K.V.A.
14 Adoni	380 K.V.A.	1 × 59 K.V.A.
15 Chicacole	242.75 "	2 × 190 K.V.A.
16 Udupi	343 "	2 × 112; 1 × 18.75 K.V.A.
		2 × 144; 1 × 55 K.V.A.

B. Local authority undertakings—Generating.

1 Bellary	218 K.W.	1 × 55; 1 × 67; 1 × 96 K.W.
2 Hindupur	60 "	2 × 25; 1 × 10 K.W.
3 Hospet	133 K.V.A.	2 × 54; 1 × 25 K.V.A.
4 Kurnool	485 K.W.	1 × 40; 1 × 60; 1 × 135; 1 × 250 K.W.
5 Tiruvallur	100 "	2 × 40; 1 × 20 K.W.
6 Anantapur	125 "	2 × 50; 1 × 25 K.W.
7 Kodaikanal	40 "	2 × 20 K.W.

C. Government.

1 Pykara	48,430 K.V.A.	3 × 7,810 K.V.A. plus 2 × 12,500 K.V.A.	87,749 K.V.A.
2 Glen Morgan	1,125 "	3 × 375 K.V.A.	
3 Mettur	37,500 "	3 × 12,500 K.V.A.	
4 Papanasam (Construction Power-house).	604 "	2 × 222 K.V.A. plus 2 × 125 K.V.A.	7,447.5
5 Vizagapatam	2,810 "	1,500/8 K.V.A. plus 750/8 K.V.A.	
6 Bezwada	3,750 "	2 × 1,500/8 K.V.A.	
7 Cocanada	887.5 "	2 × 87/8 plus 250/8 plus 300/8 K.V.A.	

Total 95,196.5 or 95,200
K.V.A.

APPENDIX F-1.

Electric supply undertakings in service.

Local authorities.	Companies.
1 Anantapur.	1 Adoni.
2 Alandur.	2 Ambur-Vaniyambadi.
3 Bellary.	3 Anakapalle.
4 Bezwada.	4 British Cochin.
5 Bodinayakkanur.	5 Bobbili.
6 Cocanada.	6 Calicut.
7 Coimbatore.	7 Chittoor.
8 Conjeeveram.	8 Chingleput.
9 Coonoor.	9 Cuddapah.
10 Dindigul.	10 Chicacole.
11 Dharapuram.	11 Devakottai.
12 Hospet.	12 Ellore.
13 Hindupur.	13 East Ramnad.
14 Karur.	14 Guntur.
15 Kurnool.	15 Gudiyattam.
16 Kodaikanal.	16 Gudivada.
17 Masulipatam.	17 Kanadukathan.
18 Madura.	18 Karaikudi.
19 Ootacamund.	19 Kumbakonam.
20 Palni.	20 Madras.
21 Pollachi.	21 Mangalore.
22 Periyakulam.	22 Mayavaram-Mannargudi-Tiruvarur.
23 Sembiam.	23 Nattarasankottai.
24 Sivakasi.	24 Nellore.
25 Tiruppur.	25 Narasaraopet.
26 Tanjore.	26 Negapatam.
27 Tiruvottiyur.	27 *Neikuppai.
28 Tiruvallur.	28 Okkur.
29 Tiruvannamalai.	29 Ongole.
30 Tirupattur.	30 Palghat.
31 Udamalpet.	31 Proddatur.
32 Virudunagar.	32 Rajahmundry.
33 Villivakkam.	33 South Arcot.
34 Wellington Cantonment.	34 Salem-Erode.
	35 Srivilliputtur.
	36 * Salur-Parvathipuram.
	37 Trichinopoly-Srirangam.
	38 Tirumalai-Tirupati.
	39 Tinnevely-Tuticorin-Palamcottah.
	40 Tellicherry-Cannanore.
	41 Udupi.
	42 Vizagapatam.
	43 Vellore.

* Compulsory works not fully completed, Commenced operation in a portion of the area.

APPENDIX F-2.

Licences under construction.

1 Salur-Parvathipuram.	3 Kollegal.
2 Neikuppai.	4 Ponnani.

APPENDIX F-3.

New applications for licence received.

1 Ichapur.

APPENDIX F-4.

*Licensed undertakings put into service during the year.*1 East Ramnad.
2 Salur-Parvathipuram.

3 Neikuppai.

APPENDIX F-5.

Licensees who reduced their tariffs in 1939-40.

Local authority undertakings.

1 Udamalpet.
2 Sivakasi.
3 Bodinayakanur.
4 Periyakulam.
5 Dharapuram.
6 Villivakkam.
7 Tiruvottiyur.
8 Coimbatore.
9 Sembiam.
10 Kurnool.
11 Tanjore.
12 Tirupattur.
13 Tiruvannamalai.
14 Cocanada.
15 Hindupur.
16 Tiruppur.

Companies.

1 Rajahmundry.
2 Devakottai.
3 Tirupati-Tirumalai.
4 Palghat.
5 Vizagapatam.
6 West Ramnad.
7 Gudivada.
8 East Tanjore.
9 Salem-Erode.
10 Trichinopoly-Srirangam.
11 Madras.
12 Nellore.
13 Karsikudi.
14 Kanadukathan.
15 Chittoor.
16 Chingleput.
17 Kumbakonam.

APPENDIX F-6.

Licensees who charge more than six annas per unit for light and fans.

Local authority undertakings.

1 Kodaikanal.

Company undertakings.

1 Cuddapah.
2 Chingleput.
3 *South Arcot.
4 Nattarasankottai.

* Lights only.

APPENDIX G.

List of villages and townships supplied with electrical energy in Government Power Systems.

Pykara System.

1 Achchipatti.	59 Iyerpadi.
2 Adivalli.	60 Jakkarpalaiyam.
3 Agrahara Samakulam.	61 Jagathala.
4 Allinagaram.	62 Jellipatti.
5 Amrappundi.	63 Kalapatti.
6 Andipalayam.	64 Kalbhavi.
7 Angalakurichi.	65 Kaliapuram.
8 Angeripalaiyam.	66 Kallapalaiyam.
9 Annur.	67 Kallipalaiyam.
10 Anthiyur.	68 Kallimadai.
11 Anuppupalaiyam.	69 Kalligudi.
12 Appanaickenpatti.	70 Kalingarayanpalaiyam.
13 Arasur.	71 Kallar.
14 Aravankadu.	72 Kaniyur Karatholuvu.
15 Arugampalaiyam.	73 Kantia Goundanchavadi.
16 Aruppukkottai.	74 Kangikode.
17 Athapagundenpalaiyam.	75 Kaniyur.
18 Athappagoundanpudur.	76 Kannampalaiyam.
19 Athipalaiyam.	77 Kannarpalaiyam.
20 Attur.	78 Karadibhavi.
21 Avanashi.	79 Karamadai.
22 Avanashipalaiyam.	80 Karavelli.
23 Ayakudi.	81 Kariamangalam.
24 Avanashilingampalaiyam.	82 Karumampalaiyam.
25 Batlagundu.	83 Kattabettu.
26 Bodinathan.	84 Kattampatti.
27 Bodipalaiyam.	85 Kiranatham.
28 Bodipatti.	86 Kilkotagiri.
29 Bommaigundenpatti.	87 Koilpalaiyam.
30 Chandrakavi.	88 Koilpatti.
31 Chennimalai.	89 Kolathur.
32 Chettipalaiyam.	90 Kolumam.
33 Chikkadasampalaiyam.	91 Konakkara.
34 Chikkarampalaiyam.	92 Kondayampalaiyam.
35 Chinna Kalyanamuthur.	93 Kotagiri.
36 Chinna Kumarapalaiyam.	94 Kottampatti.
37 Chinnallipalaiyam.	95 Kottur.
38 Chinnaputhur.	96 Krishnarayapuram.
39 Chinna Valavadi.	97 Kunnathur.
40 Chitrachavadi.	98 Kunniemuthur.
41 Chittoor.	99 Kuppepalaiyam.
42 Chocklingapuram.	100 Kurichi.
43 Dalavaypatnam.	101 Kurudampalaiyam.
44 Dasampalaiyam.	102 Kusavapalaiyam.
45 Devarashola.	103 Lakshmanapuram.
46 Dhali.	104 Machampalaiyam.
47 Erasampatti.	105 Madukkarai.
48 Erisanampatti.	106 Madathupalaiyam.
49 Ganapathi.	107 Mailampatti.
50 Glen Morgan.	108 Makkinaickenpatti.
51 Gobichettipalaiyam.	109 Malayandipatnam.
52 Gomangalam Pudur.	110 Mangalam Vangipalaiyam.
53 Govindanaickenpalaiyam.	111 Mangalagaraputhur.
54 Gudalur.	112 Maniakarampalaiyam.
55 Guruvappanaikanur.	113 Mettupalaiyam.
56 Idigarai.	114 Muthanampalaiyam.
57 Ingur.	115 Muthur.
58 Irugur.	116 Narasimbanaickenpalaiyam.

APPENDIX G—cont.

List of villages and townships supplied with electrical energy in Government Power Systems—cont.

Pykara System—cont.

117 Nallampalli.	160 Samakulam.
118 Nambipalaiyam.	161 Samuthur.
119 Nanjundapuram.	162 Samanthorai.
120 Neelikonampalaiyam.	163 Saravanampatti.
121 Neikarapatti.	164 Sattur.
122 Nilambur.	165 Sombamullur.
123 Nollithorai.	166 Sengalipalaiyam.
124 Odanthorai.	167 Sengodagoundenpalaiyam.
125 Oddarpalaiyam.	168 Sothumudai.
126 Ondiputhur.	169 Singanallur.
127 Onnipalaiyam.	170 Sinnavadampatti.
128 Othaiakamandapam.	171 Sircar Samakulam.
129 Palanganatham.	172 Sivakasi.
130 Palathorai.	173 Sowripalaiyam.
131 Palayampatti.	174 Sular.
132 Palladam.	175 Sundakampalaiyam.
133 Papanaiickenpalaiyam.	176 Thalapatti.
134 Pappampatti.	177 Thekkampatti.
135 Pasumalai.	178 Theni.
136 Peddampatti.	179 Thirumuruganpundi.
137 Peedampalli.	180 Thiruthangal.
138 Periakumarapalaiyam.	181 Thithipalaiyam.
139 Perianaickenpalaiyam.	182 Thottipalaiyam.
140 Peria Nagamam.	183 Tirumangalam.
141 Periapatti.	184 Tirupparankundram.
142 Peria Valavadi.	185 Tadiyalur.
143 Perumanallur.	186 Udamalpet.
144 Perundurai.	187 Uppilipalaiyam.
145 Perur.	188 Uthukuli.
146 Perursettipalaiyam.	189 Uthupalaiyam.
147 Pidampatti.	190 Vadamathurai.
148 Podanur.	191 Vadugapalaiyam.
149 Pookulam.	192 Valparai.
150 Pottayampalaiyam.	193 Vanniyampalaiyam.
151 Pudunatham.	194 Vellalur.
152 Pudupalayam.	195 Vellakinar.
153 Puthur.	196 Vellamada.
154 Raghambhavi.	197 Venasampatti.
155 Rakkipalaiyam.	198 Vettakaranpudur.
156 Rangayyapalaiyam Pudur.	199 Virapandi.
157 Rasipalaiyam.	200 Virakaralam.
158 Ravathur.	201 Viyampalaiyam.
159 Reddipalaiyam.	

Mettur System.

1 Adaiyur.	16 Erode.
2 Ammapettai.	17 Ganapathipalaiyam.
3 Andiyur.	18 Ganapathipuram.
4 Annandampatti.	19 Jalakantapuram.
5 Arigalvadi.	20 Jalarpet.
6 Arkonam.	21 Kodapuri.
7 Arni.	22 Kalambur.
8 Belkurichi.	23 Kalbhavi.
9 Bhavani.	24 Kalkurichi.
10 Chittodu.	25 Kalroadpalli.
11 Christukula Ashram.	26 Kariamangalam.
12 Devanandal.	27 Kaveripatnam.
13 Dharmapuri.	28 Kaveripauk.
14 Edayarpalaiyam.	29 Kesarimangalam.
15 Ellampalli.	30 Koilpalaiyam.

APPENDIX G—cont.

List of villages and townships supplied with electrical energy in Government Power Systems—cont.

Mettur System—cont.

31 Komarapalaiyam.	56 Reddipalaiyam.
32 Krishnagiri.	57 Sholingur.
33 Kunnathur.	58 Singalandapuram.
34 Laddivadi.	59 Singampatti.
35 Macdonald's Choultry.	60 Singarappet.
36 Madathupalaiyam.	61 Sumaithangi.
37 Malayampatti.	62 Takkolam.
38 Mallur.	63 Taramangalam.
39 Mohanur.	64 Tellur.
40 Nagari.	65 Thalapalaiyam.
41 Namagripet.	66 Thengalapalaiyam.
42 Namakkal.	67 Tirukkoyilur.
43 Nangavalli.	68 Tiruttani.
44 Neringipet.	69 Tiruvettipuram.
45 Ocheri.	70 Uppidamangalam.
46 Omalur.	71 Uttangarai.
47 Omareddiyur.	72 Valasur.
48 Pachanampatti.	73 Valluvambakkam.
49 Pakala.	74 Veerappanchatram.
50 Panapakkam.	75 Vellalapatti.
51 Polur.	76 Vattavalam.
52 Puliamangalam.	77 Viralikattur.
53 Pullampatti.	78 Virapandi.
54 Rakkipalaiyam.	79 Wandiwash.
55 Rasipuram.	80 Yercaud.

West Tinnevely Area.

- 1 Ambasamudram.
- 2 Kallidaikurichi.

Bezwada Thermal System.

- 1 Gollapalli.
- 2 Nuzvid.
- 3 Patamata.
- 4 Pedana.

Vizagapatam Thermal System.

- 1 Bimlipatam.
- 2 Donkinavalasa.
- 3 Vizianagram.

APPENDIX H.

List of textile and other important mills or industries in the various power systems.

Pykara System.

Mills electrified—

- 1 Coimbatore Spinning and Weaving Company, Limited.
- 2 Vasantha Mills, Coimbatore.
- 3 Cambodia Mills, Coimbatore.
- 4 Rajalakshmi Mills, Coimbatore.
- 5 Somasundara Mills, Coimbatore.
- 6 Kaleeswara Mills, Coimbatore.
- 7 Ranga Vilas Mills, Coimbatore.
- 8 Pankaja Mills, Coimbatore.
- 9 Lakshmi Mills, Coimbatore.
- 10 Coimbatore Cotton Mills.
- 11 Janardhana Mills.
- 12 Palamalai Ranganathar Mills.
- 13 Murugan Mills.
- 14 Saroja Mills.
- 15 Pioneer Mills.
- 16 Radhakrishna Mills.
- 17 Kamala Mills.
- 18 Gnanambika Mills.
- 19 Balasubramania Mills.
- 20 Kothari Textiles.
- 21 Buckingham and Carnatic Mills.
- 22 Kasthuri Mills.
- 23 Vysiyal Mills.
- 24 Sarada Mills.
- 25 Lotus Mills.

Mills electrified—cont.

- 26 Dhanalakshmi Mills, Tirupur.
- 27 Ramalinga Choodambika Mills.
- 28 Asher Textiles, Tirupur.
- 29 Palani Andavar Mills.
- 30 Sri Venkatesa Mills, Udumalpet.
- 31 Tirumurthi Mills.
- 32 A. T. Parangiri Nadar's Oil Mills, Virudhunagar.
- 33 Soundararaja Mills, Dindigul.
- 34 Kumaran Mills, Coimbatore.
- 35 Sri Meenakshi Mills, Madurai.
- 36 Pandyan Mills, Madurai.
- 37 Loyal Mills, Koilpatti.
- 38 Mahalakshmi Textile Mills, Pasumalai.
- 39 Madalai Nadar's Oil Mill, Virudhunagar.

Mills under construction—

- 1 Bagyalakshmi Mills.
- 2 Theni Mills.
- 3 Dwarka Mills.
- 4 Kothandaram Mills.

Factories—

- 1 The Cement Factory, Madukkarai.
- 2 The Cordite Factory, Aravankadu.

B. Mettur System.

Mills electrified—

- 1 * Trichinopoly Mills, Trichinopoly.
- 2 * Pullicar Mills, Tiruchengode.
- 3 * Rajendra Mills, Salem.
- 4 * Tirumagal Mills, Gudiyattam.
- 5 Mettur Industries Limited, Mettur.

Others—

- * Indian Steel Rolling Mills, Nega-patam.
- Erode Water-works, Erode.
- * Dalmia Cement Works.
- The Railway Workshops, Golden Rock.

* In licensee's area.

C. Andhra Power System.

Thermal System.

Bezwada—

The Andhra Cement Works, Bezwada.

Vizagapatam—

Mines at Garbham and Kodur.

APPENDIX I.

List of tea factories in the Pykara System.

- | | |
|----------------------------|-------------------------------|
| 1 Bengorm Estate. | 24 Dunsandle. |
| 2 Glen Morgan Estate. | 25 Rob Roy. |
| 3 Glendale Factory. | 26 Vellamalai Estate. |
| 4 Parkside Estate. | 27 Pachamalai Estate. |
| 5 Bhavani Estate. | 28 Akkamalai Estate. |
| 6 Nonsuch Estate. | 29 Kallayar Estate. |
| 7 Ibex Factory. | 30 Monica Factory. |
| 8 Prospect Estate. | 31 Iyerpadi Estate. |
| 9 Terrace Factory. | 32 Urlikkal Estate. |
| 10 Rock Wood Factory. | 33 Shekkalmudi Estate. |
| 11 Devershola Estate. | 34 Thonimudi Estate. |
| 12 Tuttupallam Estate. | 35 Anamalai Rope Way Company. |
| 13 Kilkotagiri. | 36 Injiparai Factory. |
| 14 Kateri. | 37 Stanmore Estate. |
| 15 Warwick. | 38 Nallakathu Factory. |
| 16 Havakkal. | 39 Srikundra Factory. |
| 17 Rousdon Mullai Factory. | 40 High Forest Estate. |
| 18 Kilmalfort Factory. | 41 Valparai Township. |
| 19 Kalliaro Factory. | 42 Karamalai Estate. |
| 20 Kinsale Factory. | 43 Kadalparai Estate. |
| 21 Burnside Estate. | 44 Mukkottumudi Factory. |
| 22 Terramia. | 45 Sellaliparai Estate. |
| 23 Thiashola. | 46 Mount Stuart Factory. |

APPENDIX J.

Load and revenue results of municipal electricity undertakings managed by the department for the years 1938-39 and 1939-40.

[illegible]

• Total of items 11 and 12.



PUBLIC WORKS DEPARTMENT

(Electricity)

G.O. No. 2066, 28th September 1940

Electricity Department—Administration Report, 1939-40—
Recorded with remarks.

READ—the following paper :—

From the Chief Engineer for Electricity, dated 29th July 1940,
No. 722-G/40-8.

Order—No. 2066, Electricity, dated 28th September 1940.

Recorded.

2. The report contains as in previous years a record of satisfactory progress of electrical development in the Presidency. The Pykara and Mettur Hydro-Electric Systems and the Vizagapatam and Bezwada thermal systems in the north continued to work satisfactorily. The aggregate of demand under the Government systems during the year was 38,350 K.W. against 26,950 K.W. in 1938-39 and the total number of units generated 168.4 millions against 131.1 millions in the previous year. The net revenue received from the Pykara system was Rs. 21.65 lakhs against Rs. 17.5 lakhs in 1938-39 and that from the Mettur system was Rs. 8.83 lakhs against Rs. 3.6 lakhs in 1938-39. For accounting purposes this was the first year of operation for the Vizagapatam system though the station has been in service since March 1938. The Bezwada station commenced operation at the end of March 1939. The number of units generated at the Vizagapatam and Bezwada stations was 2.49 millions and 4.68 millions respectively and the gross revenue of the two systems was Rs. 1.36 lakhs and Rs. 1.89 lakhs. The Cocanada thermal scheme which was sanctioned in March 1938 was completed and put in service during the year.

3. The spread of electricity to rural areas is steadily increasing. Pykara power was extended to 43 villages and townships making a total of 203 up to the end of March 1940. In the Mettur system the number of villages and towns electrified rose from 30 in 1938-39 to 80 in 1939-40. Good progress has been maintained in agricultural development. In the Pykara system the total number of agricultural pump sets supplied with power was 1,810

with a connected load of 10,718 h.p. against 1,429 pump sets with a connected load of 8,574 h.p. in 1933-39. In the Mettur system the number of pump sets installed rose from 64 with a connected load of 374 h.p. in 1938-39 to 201 sets with a connected load of 1,071 h.p. in 1939-40. In the Bezwada thermal system 23 pump sets with a connected load of 82 h.p. were installed during the year. As regards industrial load in Coimbatore and its vicinity there were only eight textile mills at the commencement of the operation of the Pykara system, but by the end of March 1940 the number of mills and other industries electrified was 41. The number of mills and industries in the Mettur system rose to 9 during the year against 6 in 1938-39.

4. The Pykara plant extensions sanctioned at a cost of Rs. 45 lakhs were completed during the year. Owing to the need for economy due to war, there has been an all-round curtailment of expenditure. The Papanasani Hydro-Thermal scheme was sanctioned at an initial cost of Rs. 179 lakhs. Due to curtailment of expenditure a revised estimate for an initial expenditure of Rs. 139 lakhs has been prepared and is being tentatively worked to. Construction on the scheme during the year was largely on the two civil works—the Tambraparni Dam and the Diversion Weir.

5. The Government are pleased to place on record their appreciation of the continued good work done by the department during the year.

(By order of His Excellency the Governor)

K. RAMUNNI MENON,
Secretary to Government.

To the Chief Engineer for Electricity.

- „ Chief Engineer (General, Buildings and Roads).
- „ Chief Engineer for Irrigation.
- „ Development Department.
- „ Local Administration Department.
- „ Education and Public Health Department.
- „ Public (General) Department.
- „ Librarian, Madras Legislature.
- „ Secretary, Madras Public Service Commission (with C.L.).
- „ Principal, Agricultural College, Coimbatore.
- „ Inspector of Municipal Councils and Local Boards.
- „ Statistical Officer under the Director of Industries and Commerce.
- „ Accountant-General, Madras.

Press.



CB. 211 Y 139
1140

G.A.

R. 789