

See
50
A 50(A) 57.



GOVERNMENT OF MADRAS

**ADMINISTRATION REPORT
OF THE ELECTRICITY
DEPARTMENT FOR
1938-39**

MADRAS
PRINTED BY THE SUPERINTENDENT
GOVERNMENT PRESS
1939
Price, Rs. 2



THE MADRAS GRID.

SCALE: 84 MILES = 1"

MAILED
Possible combined generating station
FOR ORISSA & MADRAS PROVINCES

CENTRAL PROVINCES
SILLERU
KOLAB
VIZAGAPATAN
COCANADA
RAJAHMUNDRY
CHATTIPET
BEWADA
MADRAS
TADPATRI
NANDYAL
PUNJABHADRA
MAYUR
PYNARA
THULIPUZHA
PERIYAR
PAPANASAM

Names of Power-Station	Maximum Effective Installed Capacity, KW.
Pykera.	45,000
Mettur.	72,000
Papanasam.	34,500
Vizagapatnam.	45,000
Bewada.	24,000
Cocanada.	2,250
	3,000
	9,000
	700
	1,000

* Capacities are based on 100 ft. gross head and will be reduced at lower heads and during the irrigation closure period.
† Under construction.

REFERENCE:

- Hydro-electric Power House.
- Thermo-electric " "
- Sub-Station.
- 110 KV. Transmission Line (Govt.)
- 66/110 KV. " " "
- 44 KV. " " "
- 33/66 KV. " " "
- 33 KV. " " "
- 22/33 KV. " " "
- 22 KV. " " "
- 11 KV. " " "
- Existing and sanctioned system.
- Future.

NOTE:

1. SINGLE AND DOUBLE LINES REPRESENT SINGLE AND DOUBLE CIRCUITS RESPECTIVELY.
2. UNIMPORTANT 11 AND 22 KV. LINES ARE NOT SHOWN AS ALSO LICENSEE'S LINES.
3. THIS PLAN IS SUBJECT TO MODIFICATION PERIODICALLY TO CONFORM TO LOAD DEVELOPMENT.

Chief Engineer

Drawn: K.R.	GOVT OF MADRAS.	MR G.I.R.
Traced: K.B.	ELECTRICITY DEPT.	MR D.I.
Checked: S.M.		Scale: 1:50,000
Approved: N.G.		Dated: 21-2-39
Director: S.M.		21-2-39

THE MADRAS GRID

SCALE:- 64 MILES = 1"



Chief Engineer.

Reference.	Drawing C.S. No.	GOVT. OF MADRAS. ELECTRICITY DEPT.	No. 51.24. D.S.
Revision of Drawing No. 51.55. D.S.	Traced A. B.		Scale. 1" = 64' N.Y.S.
Dated 17-5-39	Checked S.P. V.R. 4/4 Approved S.P. V.R. 4/4 S.P. V.R. 4/4	THE MADRAS GRID.	Dated 18-8-38



429

GOVERNMENT OF MADRAS

**ADMINISTRATION REPORT
OF THE ELECTRICITY
DEPARTMENT FOR
1938-39**

6027
S.E.

MADRAS
PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS

1939



R
C.B. 2111 Y N 38
N39

CONTENTS

	PAGE
SECTION I—GENERAL REVIEW—	
Introductory	1
Salient features of the year	1
Pykara Hydro-Electric System—	
General	2
Growth of load and revenue	2
Transmission lines and sub-stations	3
Connected load on the system	3
Textile mills	4
Cement works	4
Tea factories	4
Rural development	4
Conversion fund	5
Accidents	5
Financial results	5
Operating ratio	5
Mettur Hydro-Electric System—	
General	6
Financial results	7
Connected load	8
Industrial development	8
Agricultural and rural load	8
Conversion fund	8
Mettur workshop	9
Accidents	9
Papanasam Hydro-Electric Scheme	9
Thermal Schemes—	
Vizagapatam Thermal Scheme	10
Bezwada Thermal Scheme	10
Cocanada Thermal Scheme	11
Palacole oil engine scheme	12
Virudunagar, Dindigul and Theni oil engine stations	12
Thermal schemes in the Ceded districts	12
Investigations and designs	12
Government managed municipal undertakings	13
Licensed Electric Supply undertakings	14
The Indian Electricity and Cinematograph Acts and Rules	14
Electrification of public buildings	14
Organization	15
Programme for 1939-40	15
Tariffs	17
Electrical development	19
Hire purchase loans	19
Electricity board	20
Propaganda	20
Acknowledgments	20
SECTION II—DETAILED REPORT—	
Pykara Electricity System—	
Civil and Hydraulic works	21
Power station	21
Transmission lines and sub-stations	22
Thermal stations	23
Additions and improvements	23
Industrial load	24
Tea factories	24
Village distribution	25
Rural areas and panchayats	25
Construction Subdivision	25
Stores	25
Revenue assessment and collection	25
Commercial activities	26
Conversion fund	26
Meter and Relay testing	26
Administration and Accounts	27
Mettur Electricity System—	
Operation and maintenance	27
Additions and improvements	28
Industrial loads	29

SECTION II—DETAILED REPORT—cont.		PAGE
Mettur Electricity System—cont.		
Rural and agricultural load		29
Municipal undertakings		29
Meter and Relay section		30
Mettur workshops		30
Stores		31
Transport		31
Commercial		31
Construction		31
Licensees		31
Administration		31
Papanasam Hydro Thermal Electric Scheme—		32
Camps, roads, etc.		32
Dam		32
Diversion weir		33
Pipeline		33
Penstock and power-house		33
General		33
Thermal Schemes—		33
Vizagapatam Thermal Scheme—		
Power plant		33
Transmission lines		33
Bezwada Thermal Scheme—		34
Power plant		35
Transmission lines		35
Operation		36
Cocanada Thermal Scheme		36
Pykara plant extensions		37
Mukurti dam		38
Transmission line construction		38
Designs and estimates		39
Wood poles and their treatment		40
Reinforced concrete construction		42
Audits and inspections by the Accountant-General		42
Administration of the Indian Electricity and Cinematograph Acts and Rules—		42
Electricity Act and Rules		43
Cinematograph Act and Rules		44
Madras Local Authorities undertakings		44
Laboratory		45
Expenditure and revenue		45
Accidents		46
Electrical installations in Government buildings		46
Staff		47

APPENDICES

	PAGE
A Construction works undertaken with expenditure to end of 1938-39.	51
B Budget provision for capital works in 1939-40	52
C Establishment charges of the department and fees earned during 1938-39 and estimated for 1939-40	54
D Table of electric supply costs and records of licensees—	
(1) Companies	56
(2) Local Authorities	62
E Capacity of plants installed of electric supply undertakings in service.	65
F 1 Electric supply undertakings in service	66
2 New licences granted	66
3 New applications for licences received	66
4 Licensed undertakings put into service during the year	67
5 Licensees who reduced their tariffs	67
6 Licensees who charged more than 6 annas per unit for lighting and fans	67
G List of villages and townships supplied with electrical energy	68
H List of Textile mills, etc.	70
I List of Tea Factories (Electrified)	70
J Load and Revenue results of Government managed municipal undertakings	71

LIST OF ILLUSTRATIONS

THE MADRAS GRID	Frontispiece
BEZWADA POWER-STATION	Facing page 10
PYKARA POWER-HOUSE SHOWING EXTENSIONS	38
VIRUDUNAGAR-KOILPATTI 66 K.V. LINE R.C.C. POLE	39
SIVAGANGA-MANAMADURA 22 K.V. TRANSMISSION LINE	40
MADURA SUB-STATION	41
CONJEEVERAM SUB-STATION R.C. STRUCTURES	42

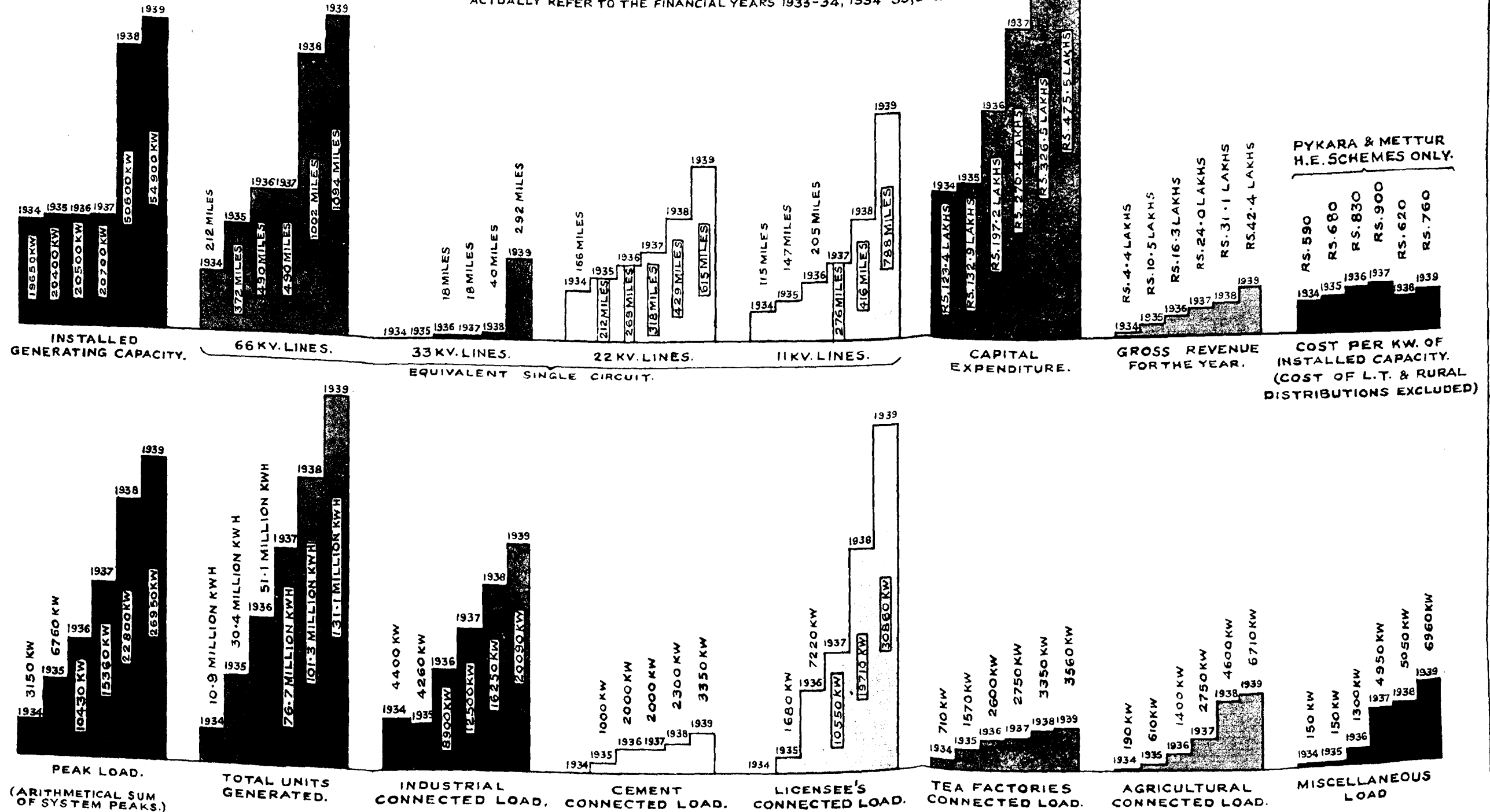
CHARTS.

Chart 1.—PROGRESS OF THE ELECTRICITY DEPARTMENT	Facing page
Chart 2.—(a) PEAK LOADS	2
(b) ENERGY GENERATED	3
(c) ENERGY DISTRIBUTED	4
(d) REVENUE ASSESSED	5
Chart 3.—ORGANIZATION OF THE SUPERIOR STAFF OF THE DEPARTMENT	15

CHART. 1. PROGRESS OF THE ELECTRICITY DEPARTMENT

NOTE:—

THE DATA SHOWN AGAINST THE YEARS 1934, 1935, ETC.,
ACTUALLY REFER TO THE FINANCIAL YEARS 1933-34, 1934-35, ETC.



ADMINISTRATION REPORT OF THE ELECTRICITY DEPARTMENT FOR 1938-39

SECTION I—GENERAL.

INTRODUCTORY.

The progress during the year under review may be considered as satisfactory. The construction programme, in general, was behind schedule but, in the case of the Papanasam works, most of the lost time has now been made up. The delays at Pykara were mainly due to late deliveries of machinery. Chart No. I facing page 1 shows, at a glance, the progress made since the commencement of the operation of the Pykara Hydro-Electric Scheme. Charts 2 a, b, c and d indicate the detailed growth of load, revenue, and units generated and distributed in respect of all the Government systems.

2. The following is a summary of the more important features of the year 1938-39.

(a) The aggregate of demands on the various systems was 26,950 K.W. and the total distribution was 114.57 million K.W.H., the corresponding revenue being Rs. 42.35 lakhs.

For the individual systems the results were as follows.

(b) The peak load of the Pykara system rose to 17,900 K.W. against 17,200 K.W. of the previous year. The Glen Morgan Plant had to supplement the Pykara to cope with the demand, which was in excess of the generating capacity of the main station. The system load further necessitated the purchase of energy from Mettur generating station. The working of the scheme during the sixth year of operation resulted in a net return of 7.4 per cent on the capital of Rs. 2,36,63,500.

(c) The Mettur scheme completed the second year of operation satisfactorily, except for an unfortunate breakdown of the power station which resulted in its closure for about a month. The system load was, however, transferred to Pykara immediately and there was practically no loss of revenue. The total output of the station during the year was over 44 million units with a normal peak load of 7,700 K.W. The net return for the year is 2.3 per cent on a total capital of Rs. 1,54,87,300.

(d) The Vizagapatam Thermal Station which commenced commercial operation in March 1938 generated during the year under review 1,783,631 units with a peak load of 820 K.W. Anakapalle, Bimlipatam, Bobbili, the Manganese Mines at Kodur and Garbham were given supply during the year.

The Bezwada Thermal Scheme came into operation during the last week of March 1939.

(e) The Thermal Stations at Virudunagar, Dindigul and Theni were closed down, and the loads transferred to Pykara system.

(f) Construction works, which involved an expenditure of over Rs. 70 lakhs, were undertaken during the year the more important being—

- (i) The Pykara plant extensions.
- (ii) A number of 66, 33 and 11 K.V. transmission lines.
- (iii) Vizagapatam power station.
- (iv) Bezwada power station.
- (v) Preliminary work in connexion with Papanasam Hydro-Electric Scheme.
- (vi) The West Coast line surveys.

(g) The administration of the Indian Electricity and Cinematograph Acts and Rules was satisfactory. Seven new licensees commenced supply while 65 new cinemas came into existence during the year under review.

PYKARA HYDRO-ELECTRIC SYSTEM.

3. *General.*—The year under review was the sixth year of operation of the Pykara system. The development of load was satisfactory and the good progress of the preceding years was maintained. All available generating capacity at Pykara, Mettur and Glen Morgan was, however, in operation over the system peak loads from the end of January, due to the delay in getting the additional generating units at Pykara into service. This has naturally created a certain amount of anxiety, but the plant and equipment has withstood the strain satisfactorily and no serious restriction of the service resulted.

4. The peak load of the system reached 17,900 K.W. which is above the generating capacity of the Pykara station. The Glen Morgan plant and Mettur power station supplied the deficiency. The following table shows the growth of demand on the generating station and also the revenue returns :—

Year.	Peak demand.		Energy output.	Gross revenue including miscellaneous receipts.
	K.W.	UNITS.		
1933-34	3,150	10.9 millions.		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
	+ 700			
	at Glen Morgan.			
1938-39	17,000	84.3 "		31.0
	+ 900			
	at Glen Morgan.	17.4 from Mettur.		

Pykara plant capacity being inadequate, to meet system demand, energy had to be purchased from Mettur for practically the whole of the year.

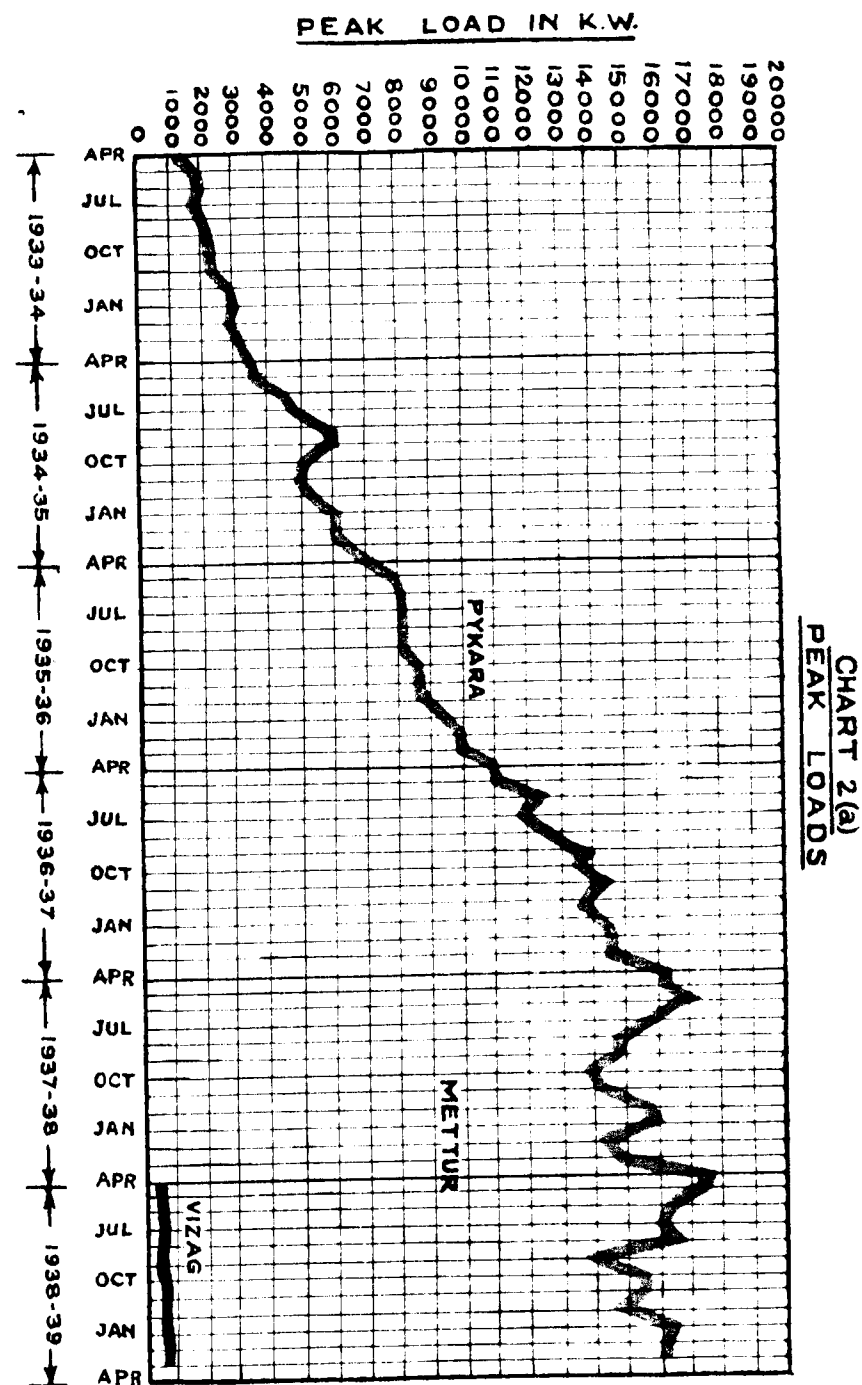
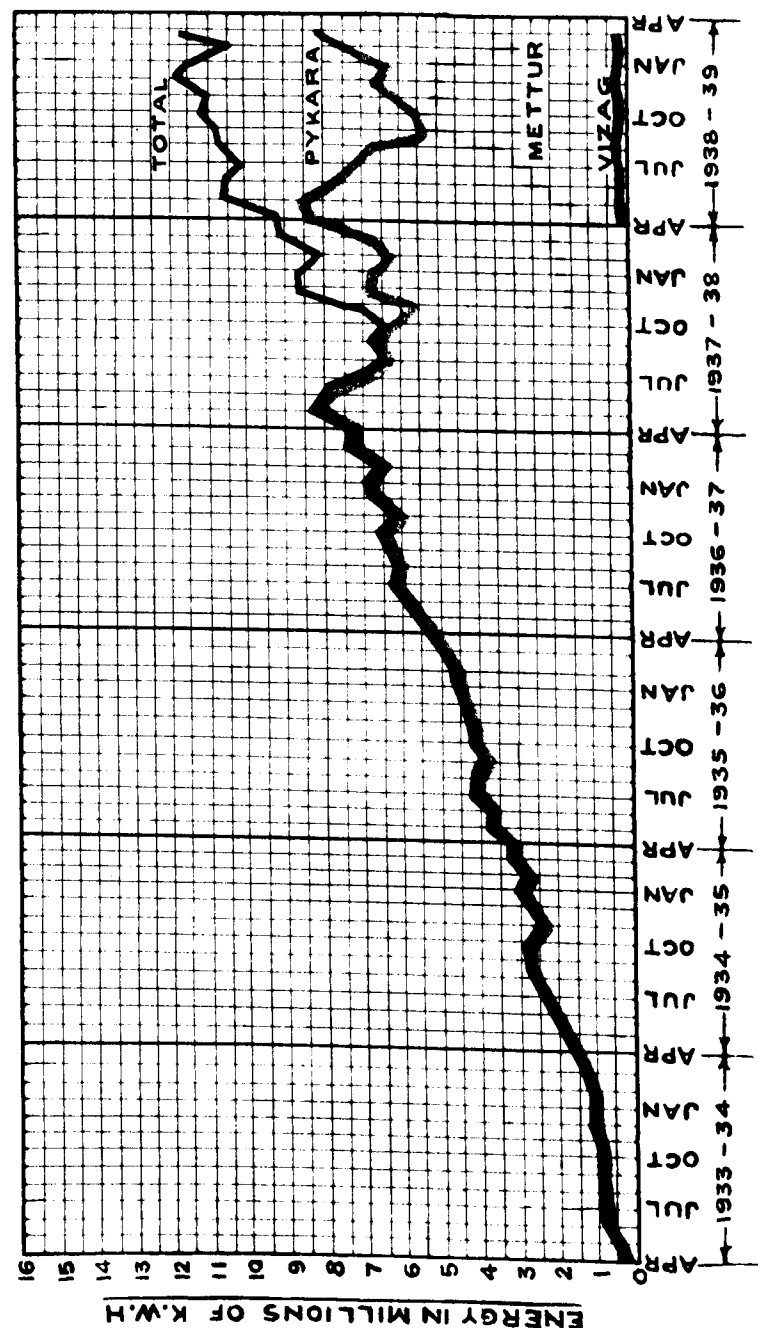


CHART 2 (b)
ENERGY GENERATED



5. From the above it will be seen that the development has been satisfactory. When the additional generating plant, which is under erection, is ready, it will no longer be necessary for the Pykara station to indent on Mettur or Glen Morgan for additional power. The effective installed capacity will be 45,000 K.W. which should be sufficient, in emergencies, to meet the requirements of both Pykara and Mettur systems for the next three or four years.

6. During the breakdown of the Mettur power station in April-May 1938 the whole of that system load was taken over by the Pykara plant.

7. 201 miles of 11 K.V., 69 miles of 22 K.V., 28 miles of 33 K.V. and 24 miles of 66 K.V. transmission and distribution lines have been added to the system during the year. Pykara supply has been extended as far south as Virudunagar and Rajapalayam. The aggregate transmission mileage for the various systems is as follows :—

		Double circuit.	Single circuit.
110 K.V. }		49 *	..
66 K.V. }		plus 392	212
33 K.V. ..		..	292
22 K.V. ..		97	421
11 K.V. ..		29	73)

* Changed over to 110 K.V. in May 1939.

8. Arrangements were already in progress for raising the operating voltage of the Pykara-Coimbatore section from 66 K.V. to 110 K.V. which is necessary for the improvement of the voltage regulation with the increased demands on the system.

9. Two additional 5,800 K.V.A. 110-66/22-11 K.V. transformers have been ordered for Coimbatore to supply the increased demand on the 11 and 22 K.V. sections of the sub-stations.

10. Madura sub-station came into operation in April 1938. The synchronous condensers were continuously in operation to control the voltage and power factor of the system. Major and minor extensions costing about Rs. 9.0 lakhs were completed during the year under review.

11. *Connected load on the system.*—The connected load on the system under different categories is tabulated below :—

Number and description.	Connected load on	
	31st March 1938.	31st March 1939.
1 Textile industry	15,400	19,606
2 Cement works	2,300	3,352
3 Licensees	6,400	12,401 *
4 Tea factories	3,350	3,561
5 Agricultural and miscellaneous	7,600	11,181
Total ..	35,050	49,501

* Final figures for Madura and Dindigul are not included as these are not available yet.

12. *Textile mills.*—Four new mills, two at Coimbatore, one at Tiruppur, and one at Rajapalayam—took supply during the year, making the total number of mills on the system 31. Arrangements were almost complete for supplying five more mills—three at Madura, one at Dindigul and another at Coimbatore.

13. There has been some increase in the connected load of the existing mills during the year. Unless weaving operations are started in addition to spinning, there does not appear to be much scope for increase of load in those mills.

14. The labour situation at Coimbatore and Tiruppur was not altogether satisfactory. There were more strikes and lock-outs than in any previous operating year and the revenue of the department was correspondingly affected.

15. A list of textile mills is given in Appendix H.

16. *Cement works.*—The demand on the cement company rose from 1,150 K.V.A. to 1,900 K.V.A. This company continues to be the biggest individual consumer on the system, and has added additional plant bringing the total connected load from 2,300 to 3,352 K.W. Due to competition in the market with the advent of other makes of cement, the production of this factory has been restricted and increase of demand by the company did not reach the anticipated level.

17. *Tea factories.*—Five new tea factories were given supply during the year in the Nilgiris and Anamalais. Also arrangements have nearly been completed for supplying three more factories in the Nilgiris and another in the Anamalais. A list of tea factories is given in Appendix I.

18. *Rural development.*—Rural extensions and urban electrification by the department showed good progress. A number of small towns and important villages received supply in addition to thirteen rural areas. In all, electricity was made available during the year to 40 additional villages making the total of such villages 163. Thirty-three panchayats were supplied with street lighting, the total number of street lights being 2,619.

19. By the end of 1938-39, 1,429 agricultural pumps with a connected load of 8,574 horse-power were supplied against the previous year's figures of 970 numbers and 5,927 horse-power respectively. Also there were 109 industrial services and 2,216 domestic services connected up in rural areas at the end of the year.

20. *Licensees.*—Pykara power was made available to the following licensees :—

- (1) Dharapuram municipality.
- (2) Dindigul municipality.
- (3) Virudunagar municipality.
- (4) Bodinayakanur municipality.
- (5) Periyakulam municipality.
- (6) Sivakasi municipality.
- (7) West Ramnad Licensee (Rajapalayam).

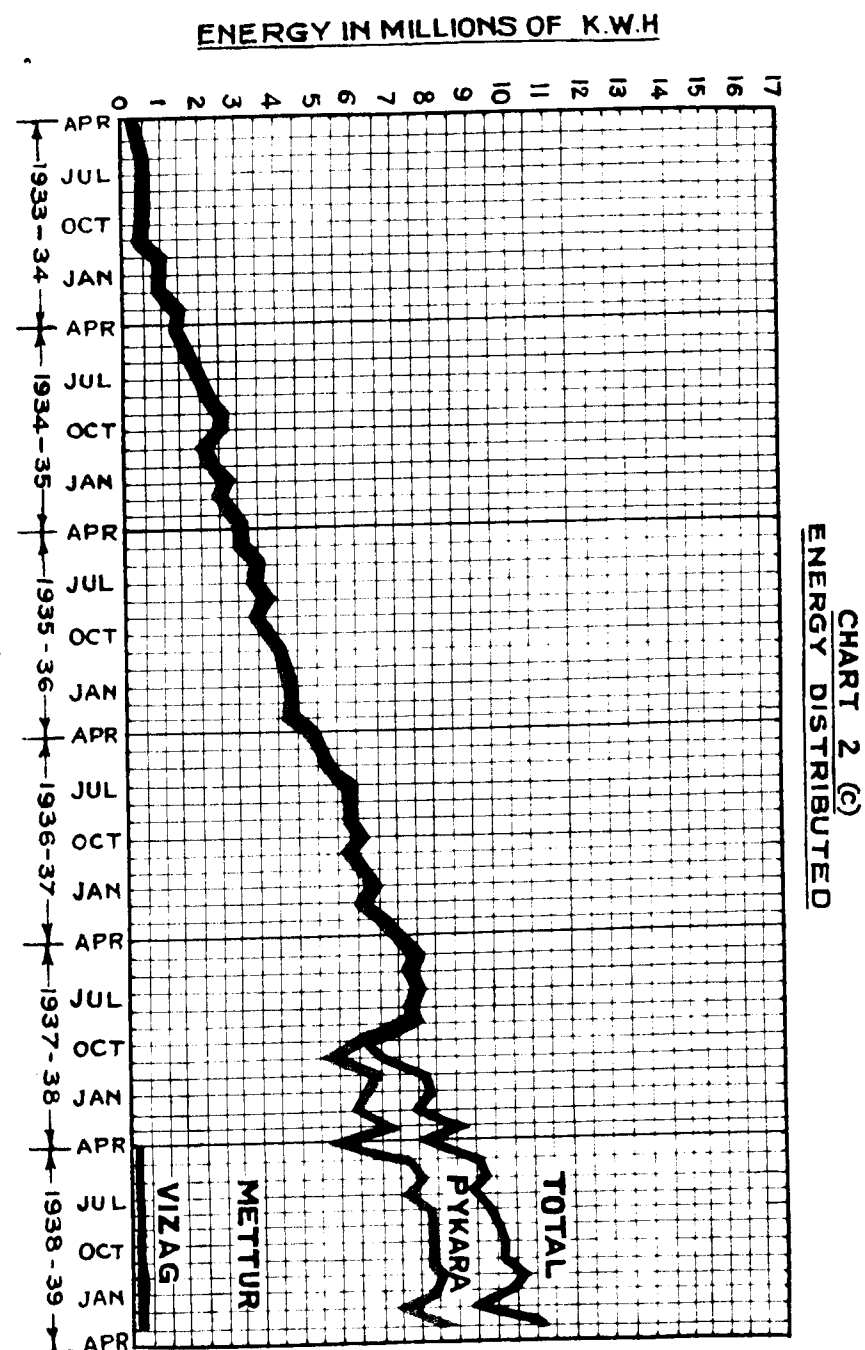
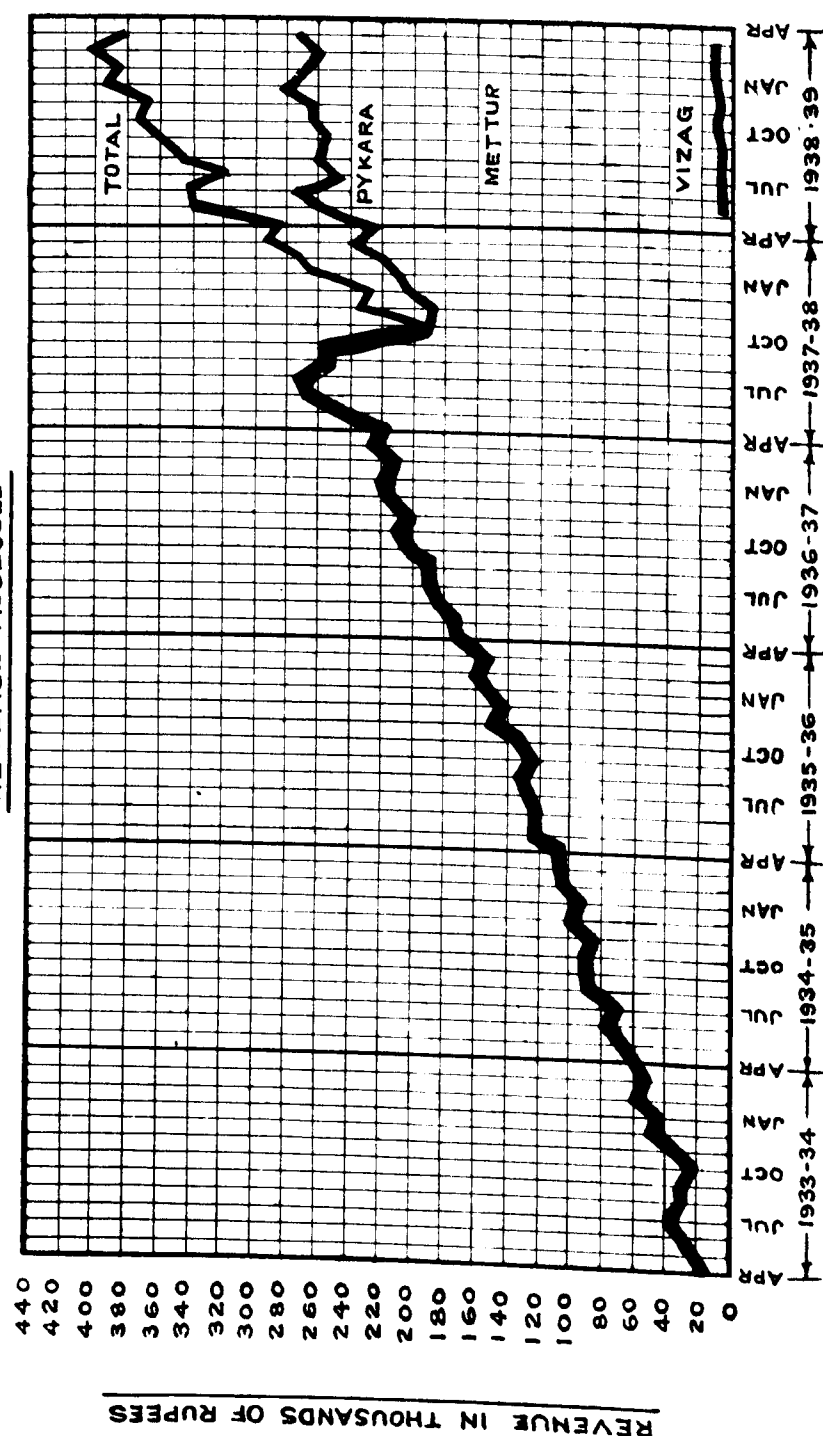


CHART 2 (d)
REVENUE ASSESSED



Holio-Zlaco, Survey Office, Madras. 1

5

There are 16 licensees in the system and they are in general working satisfactorily. Of the seven licensees mentioned above items 1, 4, 5 and 6 are managed by the department on behalf of the licensees.

21. *Conversion fund.*—Government have discontinued the concession of advancing loans to large textile mills in the Coimbatore district with effect from 20th May 1937. Mills for which loans were already granted availed of them during the year as also the mills in other districts.

22. The amount advanced during the year was Rs. 2,25,756 making a total of Rs. 11,50,024 since operation commenced. Of that total Rs. 5,89,799 have been repaid and there have been no defaults of any importance to date.

23. *Accidents.*—There were 49 accidents during the year of which eleven were departmental. There were eleven fatal accidents in all, mainly in rural areas, and all of them were non-departmental. Efforts were made for giving greater publicity and to educate the people in the risks of interfering with electric lines.

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

	RS.
(i) Capital outlay including arrears of interest ...	2,36,63,544
(ii) Gross revenue ...	31,00,584
(iii) Operation and maintenance ...	6,36,824
(iv) Depreciation fund ...	5,09,489
(v) Special reserve fund ...	2,03,796
(vi) Total expenses ...	13,50,109
(vii) Net revenue ...	17,50,475
(viii) Net return on capital outlay ...	7.4 per cent.

NOTE.—Capital outlay is inclusive of arrears of interest (Rs. 14,14,245) and excludes schemes not brought into operation, viz., Pykara Plant Extensions, Virudunagar-Koilpatti Extensions and Theni-Bodinayakanur-Periyakulam energised only late in the year.

25. The net return on the investment is 7.4 per cent as against 8.5 per cent in 1937-38, and is likely to be slightly less at the end of the present year. This is due to the heavy capital expenditure on the Madura extension and the additional plant at Pykara. The latter is not yet in operation, and there has been a deficiency in the generating capacity necessitating the purchase of energy from Mettur. Those two works, together with the proposal to extend the transmission system to the West Coast, may be considered as one development scheme forming the second stage of the Pykara project. As soon as the additional plant is in operation the ratio of the investment in the transmission system to the value of the generating capacity will be reduced, more normal financial conditions restored, and the earning capacity of the system materially increased.

26. The operating ratio of the system, that is the ratio of operating expenses (including depreciation) to gross revenue is now 36 per cent and, once the additional plant at Pykara is in

service, this ratio ought to progressively decrease to a figure below 30 per cent. There appears to be no reason to anticipate an increase in the ratio unless operating expenses become unreasonably high, tariffs too low, or unremunerative expenditure is incurred.

The accumulated reserves to date are—

	RS.
Depreciation	9,18,500
Special	3,67,400

27. A special study was made recently to reduce the operating expenses by a reorganization of the staff and more economical utilization of material.

It was not found practicable to reduce the Provincial or ministerial staff—in fact there is some justification for an increase—but a number of the work-charged establishment was retrenched and it is hoped that relative economy in tools and plant will be possible in future.

28. *Extension to West Coast.*—Proposals for extending the Pykara power to the West Coast have been submitted to Government and negotiations with the Calicut and other licensees in the area are in progress. The scheme is estimated to cost Rs. 29.49 lakhs initially rising to Rs. 31.14 lakhs within eight years. This is the last major extension of the Pykara transmission system which is likely to be necessary for some years. It is hoped that the scheme will be sanctioned by Government as it is important to extend hydro-electric power to the West Coast and to get additional load for the Pykara power station.

METTUR HYDRO-ELECTRIC SYSTEM.

29. *General.*—The Mettur power station generated during the year 44 million units with a normal peak load of 7,700 K.W. against 5,300 K.W. in the previous year. This peak went up to 17,300 K.W. for a day when the whole of the Pykara load was taken by the Mettur power house, to enable Pykara to connect up its new penstock.

30. As already stated the operation was satisfactory except for the unfortunate breakdown on 9th April 1938. A 18-inch drain valve burst resulting in the flooding of the power house to a depth of about 10 feet and the consequent closure of the station. Immediately the whole load was transferred to Pykara and the reconditioning work on the submerged machinery and switchgear was commenced. Emergency provisions, whereby the textile mill industry reduced their total demand by staggering the weekly holiday, were brought into operation. Very little revenue was lost and the emergency was met in a most creditable manner by the staff of the department. Special acknowledgment is due to the Associated Electrical Industries, Limited, whose Engineer was mainly responsible for rehabilitating the plant, which was brought into commission in May 1938. The department is also grateful to the consumers for their co-operation during the trouble.

The accident was due, indirectly, to the inadvertent stressing of the valve beyond its rated capacity and directly, to the effect on the overstressed valve of surges in the penstock pipe caused by a heavy lightning storm. There were two other minor shutdowns of station lasting only a few minutes due to flashover in the 11 K.V. switchgear. The defects were rectified immediately.

31. The level in the Mettur reservoir dropped rapidly from December due to failure of monsoon, and caused much anxiety. All the three existing machines had to run for long periods in addition to the help received from Pykara. Since the closure of the irrigation draw off at the end of January, the level has remained steady with a slight tendency to rise.

32. In view of the inadequacy of the generating capacity of the station at low water levels, it has been decided to install the fourth and final generating set at Mettur. Also, in order to increase the primary output of the station and consequently its earning capacity, the question of linking Mettur with Madras steam station has been taken up for investigation.

33. The 33 K.V. lines to Arkonam, Conjeeveram, Polur, Arni and the 66 K.V. transmission line from Singarapet to Villupuram came into operation. Fifty-two extension schemes were sanctioned during the year at an estimated cost of about Rs. 22 lakhs. Some were completed, some are under construction, but many have yet to be started.

34. *Financial results.*—The financial position of the system at the end of 1938–39, i.e., just after the completion of the first year of operation is summarized below :—

	RS.
(i) Total capital expenditure including arrears of interest up to the end of the year ..	1,54,87,261 *
(ii) Gross revenue	11,03,685
(iii) Operation and maintenance expenses (including suspense balances)	5,56,894
(iv) Contribution to depreciation	1,34,500
(v) Contribution to special reserve fund	53,800
(vi) Total expenses	7,45,194
(vii) Net revenue	3,58,491
(viii) Net return on capital expenditure ..	2.3 per cent.

* The figure does not include the cost of Singarapet-Tiruvannamalai-Villupuram—66K.V. line, Singarapet-Dharmapuri-Karimangalam, Polur-Arni extension, etc., which were recently brought into operation as the capital cost in respect of the same has not yet been transferred to the main scheme.

The net return of 2.3 per cent may be considered quite satisfactory after the first year of operation.

35. *Connected load.*—The total connected load under the different categories is given below :—

	K.W.
Licensees	18,110
Railways	1,340
Industrial	1,090
Agricultural	280
Domestic	480
Street lighting	60
Total ...	21,360

36. *Industrial development.*—Industrial development in the Mettur area has, so far, not been encouraging. The Mettur industries is the only textile mill supplied by the department. The Mettur chemicals is still under construction. A list of textile and other mills in the whole system including licensees' area is given in Appendix H. The Dalmia cement works near Trichinopoly, the steel furnaces at Negapatam, and the Chemical industries at Mettur will, when they commence operation, add to the load appreciably.

37. *Agricultural and rural load.*—Agricultural pumping has great possibilities in this area. As new rural lines are being brought into commission, there is every likelihood of considerable increase in this kind of load. But the development of agricultural pumping load in licensees' area is not as satisfactory as anticipated. It is unfortunate that some of the licensees do not appear particularly eager to develop rural loads.

The total number of pumping loads at the end of 1938-39 was 64 against 19 in 1937-38. It is expected that there will be rapid increase in the number of agricultural pumps, as a large number of rural extensions have been brought into commission this year.

38. Along with agricultural rural load, energy is supplied to street lighting, domestic and other small industrial loads. Sixteen villages and towns were added to the system during the year.

39. *Municipal undertakings.*—Three municipal undertakings have been under the management of the department, viz., Karur, Tiruppattur and Tiruvannamalai, of which Karur has been ordered to be transferred to the municipality as it had just reached the profit earning stage. The working of the undertakings was satisfactory.

40. *Conversion fund.*—The number of applications for hire-purchase loans is very much less than expected. An active propaganda work is being carried on by the departmental staff in all the areas where power is available and also where power is likely to be extended. The advantages of this kind of loans are being realized only of late by the agriculturists. About Rs. 1,100 was disbursed during the year and 56 applications, mostly from Chittoor and North Arcot districts, amounting to Rs. 24,000 were

received at the end of the year. These are expected to materialize during the coming year, when all the distribution schemes, already sanctioned, will start operation.

41. *Mettur workshop.*—The Mettur workshop completed its fourth year of working under the management of the department and continued to be very busy. The average daily attendance was 182. The total value of work done during the year was Rs. 2.92 lakhs against Rs. 2.19 lakhs in 1937-38 and Rs. 1.48 lakhs in 1936-37. The financial results were satisfactory.

42. *Accidents.*—Twenty-eight electrical accidents occurred during the year of which 15 were fatal; only two cases were departmental.

PAPANASAM HYDRO-ELECTRIC SCHEME.

43. The Papanasam Hydro-Electric Scheme was sanctioned with an initial estimate of Rs. 1.79 crores. One Construction division was started in April 1938 with headquarters at Madras to prepare detailed plans and specifications for the camps, roads, power and water-supply, and to place the necessary contracts therefor. After the preliminary work had been completed and some buildings constructed at the camp sites, the Construction division was transferred to Papanasam. Protected water supplies were made available to both the camps at the dam site, and near the power station site. A construction power station with oil-engines, transferred from Virudunagar, together with the necessary feeder and distribution lines was completed and electricity supplied in the beginning of December 1938.

The existing roads were widened and culverts strengthened where necessary. A bridge over Tambraparni 360 feet long was completed in December.

Foundation excavation for the dam which is to be about 1,160 feet long at crest and 173 feet high was begun in August 1938, and progress during the year has been satisfactory in spite of interference by rain. The mid stream coffer dam was completed in February 1939. Excavation on the left flank of the river was begun in August 1938 and two suspension bridges were constructed. The excavation work for the pipe line was three-fourths complete by the end of March 1939.

Preliminary grading of penstock and exploration of power house foundations were undertaken.

Acquisition proceedings for lands submerged have been notified.

A scheme for enlarging the construction power-house and giving a preliminary supply of electricity to Tenkasi, Ambasamudram, Kallidaikurichi and Shermadevi was sanctioned in February 1939 and surveys for the transmission system were in progress.

The average labour force since October 1938 up to the end of the year was about 3,500 with a total population of 4,500 in both camps. The total expenditure during the year was only Rs. 10.52 lakhs, but will be considerably more in the coming year.

THERMAL SCHEMES.

44. *Vizagapatam Thermal Scheme.*—The scheme which was sanctioned in July 1936 at an estimated cost of Rs. 18.7 lakhs came into preliminary commercial operation at the end of March 1938, but the construction work on the 1,500 K.W. turbo-set and the 22,000 lb./hr. boiler were completed only during 1938-39. For the above reason the period under review was treated as part of the construction period; operation accounts were proposed to be started from 1st April 1939.

45. The station supplied—

- (a) Harbour load at Vizagapatam.
- (b) Vizagapatam.
- (c) Anakapalle.
- (d) Bobbili town.
- (e) Bimlipatam.
- (f) Mines at Kodur and Garbham.

The station generated 1.78 million units with a maximum peak of 820 K.W.

46. Trouble was experienced due to the corrosive action of sea water on the condenser tubes, many of which were replaced by zincless tubes as an experimental measure. Other minor troubles arose which have either been or will shortly be rectified by the contractors.

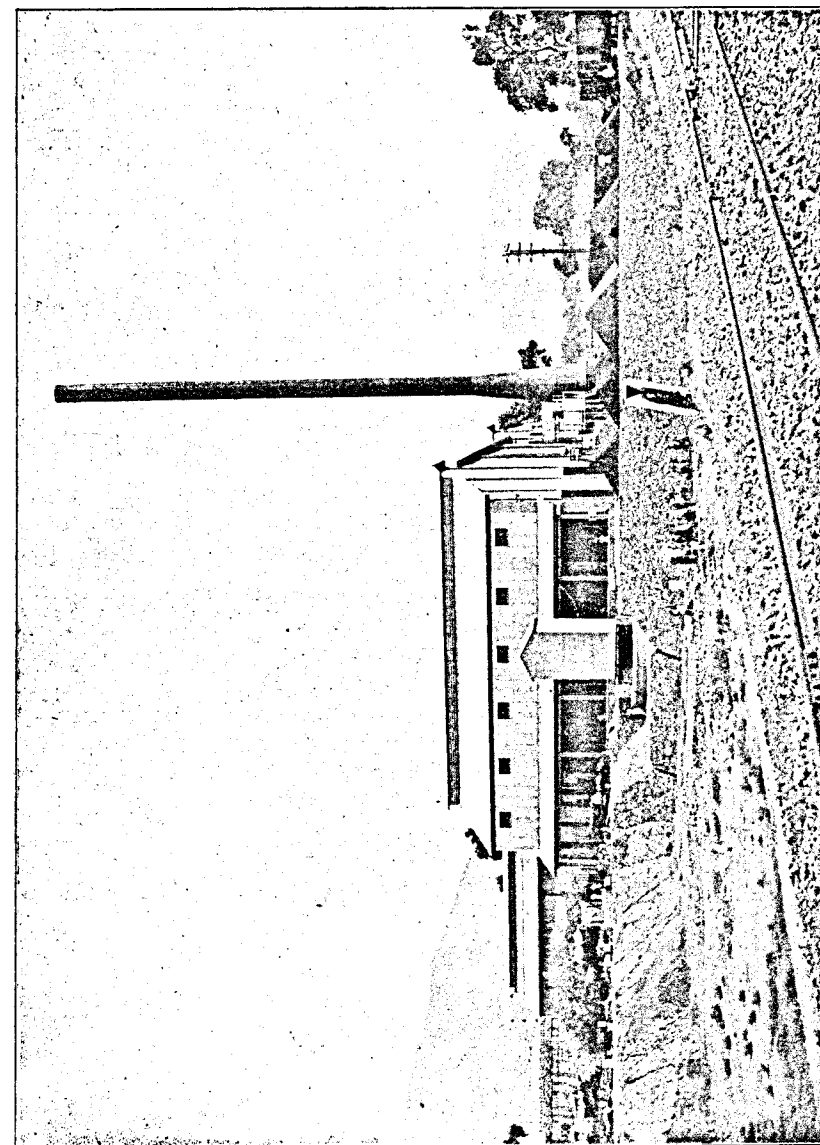
47. Ninety-four miles of single circuit and eight miles of double circuit lines with an operating voltage of 11 and 33 K.V. have been completed during the year.

48. The total capital expenditure to the end of the year was Rs. 19.74 lakhs of which about Rs. 5.1 lakhs were spent during the year under review. A revenue of Rs. 85,000 was earned but this was credited to the capital account as the operation accounts were opened only on 1st April 1939.

49. The load situation is such that additional generating plant will be necessary in the near future. Estimates are under preparation for the installation of a third unit of 1,500 K.W. capacity.

50. *Bezwada Thermal Scheme.*—The scheme was sanctioned by Government in September 1936 at an estimated initial cost of Rs. 17.35 lakhs. It came into operation in March 1939, eight months later than scheduled. The delay was mainly due to the late delivery of materials as well as some mistakes in the casting of pipes on the part of a sub-contractor for the work. The delay was, however, beyond the reasonable control of the contractor or of the department.

51. The plant as erected consists of 2—1,500 K.W. turbo-sets with two 22,000 lb. boilers and a 180 feet self-supporting steel chimney. A photograph of the power station faces page 10. The boilers are burning Singareni slack coal. The station commenced operation with a peak load of 530 K.W. generating about 6,000 units a day.



BEZWADA POWER STATION

The existing municipal oil-engine station which was giving a limited supply to Ellore and Gudivada was closed down from 25th March 1939.

52. The station was supplying Bezwada, Gudivada, Masulipatam, Nuzvid and Ellore.

53. The construction of the 33 K.V. line to Tenali, sanctioned subsequent to the main scheme was commenced in September 1938 and practically completed in March 1939. A 11 K.V. line to Andhra Cement Factory was nearly completed and it was expected to take power from 15th May 1939. A 13-mile 11 K.V. feeder line to Nuzvid and distribution system within the town were nearly completed before the end of March 1939 and have been energized on 5th May 1939.

54. When the Guntur licensee and the Andhra Cement Works commence taking supply it is expected that the demand will nearly reach the capacity of one 1,500 K.W. set. Estimates for installing a third generating set of 3,000 K.W. capacity are under preparation.

55. The total expenditure till the end of March 1939 is Rs. 17.76 lakhs, the expenditure during the year under review being Rs. 8.64 lakhs.

56. Rural development is somewhat handicapped by the higher cost of production of electricity from thermal stations but the unit cost should progressively decrease as the load increases. Efforts are being made now to extend electric power to the villages close to the main transmission lines. Extensions to four villages costing about Rs. 55,000 have already been sanctioned while the possibility of extending to Patameta, Telepolu, Veeravalli are under investigation.

57. A number of momentary interruptions to the service, due to grounds, have occurred on the Bezwada-Masulipatam lines. Some of these have been caused by birds but the main source of the trouble is still under investigation.

It has been decided to extend the use of fog type insulators on the Masulipatam Branch and install a Peterson Coil at Bezwada. Other measures will be taken if found necessary.

58. *Cocanada Thermal Scheme.*—Government sanctioned in March 1938 the taking over of the Municipal oil-engine station at Cocanada, to install additional plant, to sell power in bulk to the municipality, and extend lines to Samalkota, Ramachandrapuram and other places. Government have subsequently decided, in accordance with their latest policy, to undertake the distribution at Samalkota, Peddapuram, Pithapuram, Ramachandrapuram and Mandapeta. The initial estimated costs of the schemes of generation and distribution were 3.71 and 3.51 lakhs of rupees respectively.

59. Work in connexion with extension of the power-house has already commenced, while the distribution system will be constructed during the ensuing year.

60. The station will have an effective installed capacity of 700 K.W. to start with rising to 1,000 K.W. within five years. The station is expected to be ultimately linked to the future Thermal Stations at Rajahmundry as indicated in the Madras Grid Map.

PALACOLE OIL-ENGINE SCHEME.

61. A proposal for generation of power by Government at Palacole and selling in bulk to distribution licensee was submitted to Government. Subsequently a revised scheme with the generating station near Tanuku was suggested by Government for investigation. This station, when it comes into operation, will serve a portion of the West Godavari district and be ultimately closed down when the future Rajahmundry Central Steam Station and the Chettipet Canal Scheme, shown in the Grid Map—GR-3—come into existence.

VIRUDUNAGAR, DINDIGUL AND THENI OIL-ENGINE STATIONS.

62. As already stated these stations were closed down during the year and Pykara power made available to the areas. The Dindigul engines have been sold, while the Virudunagar engines were transferred to the Papanasam Construction power house. The Theni engines will also be erected at Papanasam for giving preliminary supply to the near by villages.

THERMAL SCHEMES IN CEDED DISTRICTS.

63. Proposals were submitted to Government (and were duly sanctioned) for the generation and distribution of power by the department at Nandyal, Tadpatri and Madanapalle. Second-hand oil-engines released in the hydro-electric and other thermal areas are proposed to be used at the above places.

64. The investigation of a scheme for purchasing the Bellary municipal station and extending the line to Guntakal was started.

65. As already pointed out in last year's administration report, it is not economically possible to project the construction of large central stations in the Ceded districts as in the Northern Circars. But the small stations proposed above for construction together with other private undertakings will meet the needs of those districts in the near future, and serve to develop the load. Ultimately it is hoped that all the stations will be linked up and connected with the future Tungabhadra Hydro-Electric Project.

HYDRO-METRIC STUDIES AND INVESTIGATION.

66. (a) *Hydro-metric records*.—Hydro-metric observations of rainfall and river flow were continued in all catchments which had previously been under measurement and likely to be developed.

(b) *Lammasingi Hydro-Electric Scheme*.—From the observations of rainfall and river flow made since January 1937, it was found that the yield from the catchment was poor being only about

half of what had been anticipated, and the scheme has therefore been recorded uneconomical. Further observations were discontinued.

(c) *Cauvery Pumping Scheme*.—A preliminary report on a promising scheme to irrigate 2,000 acres in the head reaches of Rajan voikkal in Namakkal taluk of the Salem district has been prepared and forwarded to the Collector of Salem for his views.

Bore-wells in Ceded districts.—Investigation of the possibility of sinking bore-wells in the Ceded districts was started in 1936-37. The first experimental bore-well sunk in near Cuddapah was successful yielding about 83 gallons per minute. It was handed over to the Public Works Department after installing an oil-engine for demonstration and use. The second bore-well in Buggalapalli, south of Cuddapah, was taken to 368 feet below ground level. As there were great difficulties in boring and no deep seated springs were met with, work was stopped and further investigation abandoned as prospects were not encouraging.

MUNICIPAL UNDERTAKINGS UNDER THE MANAGEMENT OF THE GOVERNMENT.

67. The following municipal undertakings were under the management of the department during the year:—

<i>Pykara System</i> —	<i>Mettur System</i> —
1 Udamalpet.	1 Karur.
2 Dharapuram.	2 Tiruppattur.
3 Palni.	3 Tiruvannamalai.
4 Bodinayakanur.	
5 Periyakulam.	
6 Sivakasi.	

Of the above distribution schemes, those at Palni and Karur were handed over to the respective municipalities at the end of the year as they reached the profit earning stage. Tiruvannamalai was energized in October 1938 while supply to Sivakasi commenced on 1st April 1938.

68. Slow but steady development in each scheme continued. Hydro-power is now available to all the above municipal undertakings and it is expected that with the low hydro-electric rates in force there would be marked development in load in the newly supplied areas of Sivakasi, Bodinayakanur, Periyakulam and Tiruvannamalai.

69. Figures of load revenue and other data for all the municipal undertakings are given in Appendix J.

70. The policy of Government management of municipal undertakings until the profit earning stage is reached has resulted in uniformity and efficiency, difficult to achieve otherwise.

LICENSED ELECTRIC SUPPLY UNDERTAKINGS.

71. The following table gives the total number of licensees, new licensees, etc., prior to the formation of the department in April 1932 and for the last two years, viz., 1937-38 and 1938-39 :—

	Prior to 1st April 1932.	1937-38.	1938-39.
Total number of licensees	24	66	74
Number of local bodies	11	30	34
Number of private companies	13	36	40

The total number of licensees since the formation of the Electricity department is nearly treble the number prior to the formation and indicates the increasing interest in electrical development.

72. The total installed capacity in service in the whole Province amounted approximately to 134,860 K.V.A. and the total energy generated was 203.18 million units made up as follows :—

	Installed capacity. K.V.A.	Energy output during the year. K.W. HOURS IN MILLIONS.
Government Hydro-Electric stations	62,050	128.62
Government Thermal stations	6,560	2.52
Madras Electric Supply Corporation	53,750	58.19
Other generating licensees	12,500	13.85
Total ..	134,860	203.18

THE INDIAN ELECTRICITY AND CINEMATOGRAPH ACTS AND RULES.

73. The work in this division has increased four times since 1932 yet the staff has not been even doubled. The organization is thus inadequate to deal efficiently with the work.

Proposals have been submitted to Government for additional staff.

74. Three hundred and eighty-five inspections of licensees' and non-licensees' works were undertaken during the year. Sixty-three accounts of various private licensees and local authorities were checked. The total number of accidents during the year including those in licensees' and Government areas was 138 of which 49 were fatal. Many were cases of suicide. Certain amendments to the Indian Electricity Rules of 1937 were studied. A detailed report of the activities under this head are given in Section II.

ELECTRIFICATION OF PUBLIC BUILDINGS.

75. During the year new works costing Rs. 1.81 lakhs were carried out on Government buildings bringing the total cost up to the end of the year to Rs. 49.11 lakhs. The cost of operation and maintenance was Rs. 1.53 lakhs or 3.12 per cent, while Rs. 2.3 lakhs were paid as current consumption charges.

76. The Electrical Engineer's (General) Division in charge of the work was very busy. The staff being inadequate for the large amount of work, proposals have been formulated for additional staff.

ORGANIZATION.

77. The frame work of the organization of the department during 1938-39 is shown in Chart 3 which is generally the same as that of the previous year except for the following :—

- (a) Due to the numerous extensions in the northern area of Mettur system, the Divisional Engineer at Trichinopoly could not exercise satisfactory control over both the northern and southern areas and it was found necessary to open a new division with headquarters at Vellore.
- (b) The Executive Engineer who had been in charge of the Mukurti Works was transferred to Papanasam scheme on the completion of the works at the former place.
- (c) The Executive Engineer (Electrical), Bezwada, who worked under the Superintending Engineer, Construction Branch, for the greater part of the year was given separate charge on 1st January 1939, of operation as well as construction in the Thermal Areas, as the work was too great for the efficient control by the Superintending Engineer, Construction Branch.
- (d) During the absence of the Chief Engineer on leave from 1st March 1938 to 1st December 1938 the department was in charge of Lieut.-Col. M. G. Platts, the Superintending Engineer, Construction Branch, and the Deputy Chief Engineer was made the Electrical Inspector to Government in addition to his normal duties.

78. *General.*—The work of the department continues to expand and during the past year it was found that the staff was inadequate for the services required, particularly in the offices of the Electrical Inspector and Electrical Engineer (General). The work in the Central Office increased correspondingly and there were considerable arrears at the end of the year.

79. The functions of the Electrical Inspector have grown so wide and important that adequate and efficient control in future by the Chief Engineer's Office is not considered feasible. Experience during the year indicated the desirability of separating the Electrical Inspector from the control of the Chief Engineer.

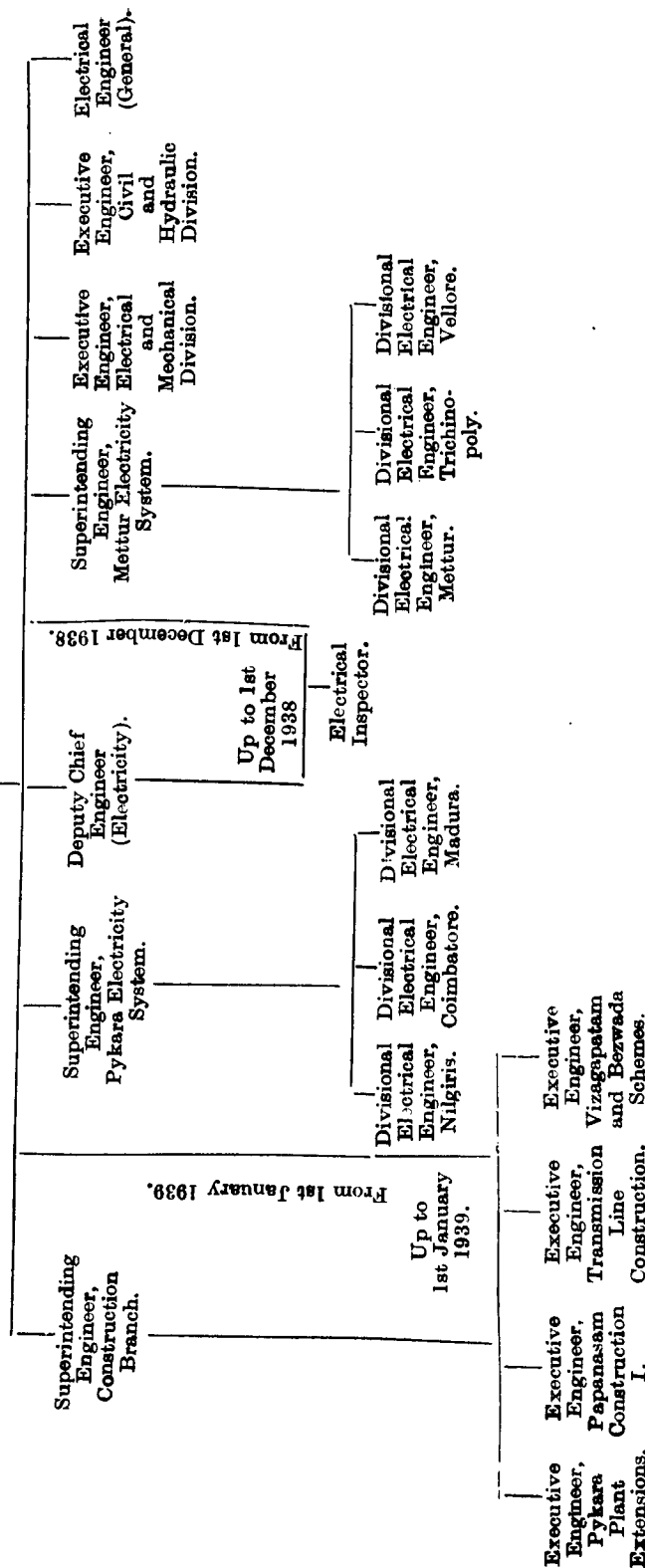
80. A scheme for the reorganization of the department was submitted to Government to take effect on the retirement of the present Chief Engineer.

PROGRAMME FOR 1939-40.

81. The following is the programme of the more important work for 1939-40 :—

- (a) *Pykara Plant Extensions.*—These extensions should have been completed by the end of 1938-39 but for late deliveries of plant. It is expected that the work of placing the additional plant into commercial use will be completed before September 1939.

CHART 3.
ORGANIZATION CHART—HIGHER STAFF.
CHIEF ENGINEER.



- (b) *Fourth unit installation at Mettur.*—Tenders will be invited in June of 1939-40 and orders placed by about the end of the year. Preliminary work at the power house is expected to be completed by the end of 1939-40.
- (c) *Additional generating plant at Bezwada and Vizagapatam Power Stations.*—Reports and estimates will be submitted to Government by the end of July 1939 and it is proposed to place orders as soon as Government sanction is obtained.
- (d) *Cocanada Thermal Scheme.*—Work on the power station has been started but the completion of the job, the construction of the transmission lines and East Godavari Distribution Systems will depend upon the staff that will be sanctioned for the purpose.
- (e) *Thermal Schemes at Nandyal, Tadpatri and Madanapalle.*—It is expected to invite tenders and place orders for the materials in August, but the commencement of the field work will depend upon the staff available.
- (f) *Thermal Scheme in West Godavari.*—If the oil-engine scheme proposed at Palacole or Tanuku is sanctioned in the near future, it should be possible to complete the preparation of specifications before the end of the year.
- (g) *Papanasam Scheme.*—The work on the dam will be in progress while the work on roads, culverts, bridges, is scheduled to be completed before the middle of 1939-40. Orders for pipes, penstocks, gates, generating plant, switch-gear and the main 66 K.V. transmission lines are expected to be placed during 1939-40. Surveys, acquisition of lands, right of way, and pegging out of tower sites for transmission lines and sub-stations, should be completed during the year and a start made on the construction of the buildings.
- Preliminary supply to Ambasamudram, Tenkasi and other places from the Construction Power House is expected to be given before October 1939.
- (h) *West Coast extensions.*—If the scheme submitted to Government is sanctioned early in the year 1939-40, it might be possible to prepare specifications and invite tenders before the end of the year.
- (i) *Extension to Madras.*—Surveys will be completed during the year 1939-40 and a report and estimate will be prepared on the economic merits of the scheme.
- (j) *Extensions to existing transformer stations.*—Due to the increasing load some of the existing stations are likely to be overloaded within the next two years. A study has been made of the situation and additional transformer capacity and extensions recommended where considered necessary.

82. *Other investigations.*—Certain other investigations have also to be taken up within the next two years in order to determine their economic value, as additional generating capacity will probably be needed about 1944, viz.—

- (i) The detailed investigation of the Moyar scheme.
- (ii) The location of a new dam site for the Pykara scheme.
- (iii) Investigation of the Thalipuzha Hydro-Electric Scheme.
- (iv) Investigation of the Silent Valley, Bhavani, and Kundah Projects.

83. As regards hydro-electric development in general, it has to be carefully noted that there is no cheap hydro power in this Presidency such as exists in Norway, Canada, etc. The economic State hydro-power resources are very limited and, with normal industrial development, may only meet Provincial requirements for another 25 years or so. Hence nebulous Electro-Chemical or Electro-Metallurgical Schemes, involving the utilization of large blocks of electrical energy at unprofitable rates, are of very doubtful economic value. Furthermore the necessary raw materials are in most cases, not easily available. It would seem prudent to leave the large scale of manufacture of fertilizers, chemicals, and the electric smelting of ores, to other parts of the country. There can, however, be no reasonable objection to the limited manufacture of chemicals for local industrial needs such as contemplated at Mettur or the restricted use of electric furnaces for the melting of pig and scrap iron and particularly for the production of high class alloys, but the general use of electric energy for such purposes should, in my opinion, be limited in this Province.

TARIFFS.

84. Tariffs present an important problem and if not formulated with broad technical and commercial judgment, might result in financial difficulties to an electrical undertaking, however efficiently and economically administered in other respects. Considerable attention and care have been and are being devoted to adjust the tariff structure from time to time, so as to pass on all possible benefit of reduction in tariffs to the deserving consumer, consistent with the financial stability of the undertaking. New tariffs are being devised to meet the requirements of special loads and also to attract new classes of consumers. Below is given a brief description of the tariff structure in force during 1938-39 in the areas supplied direct by the Government.

85. The tariff may be divided into two main classes :—

- (a) High tension two part tariff for connected loads above 75 horse-power at 11 or 22 K.V. applicable to bulk supplies to towns, industries, railways, water-works, tea factories and similar loads. There are two grades under the H.T. tariff, one applicable to the hydro-electric areas and the other to the thermal areas. The demand charge is low and in three steps varying with the amount. It is

either on a K.W. or K.V.A. basis but, due to a small discount allowed for K.V.A. metering, the majority of the consumers now elect to be billed on a K.V.A. basis. This has led to high system power factor with its corresponding advantages. The consumption charge is also on the step system.

- (b) Low tension tariff for loads below 75 horse-power of connected load at 230 volts single phase or 400 volts 3 phase is applicable to domestic, small industrial and agricultural consumers, supplied by the department. The general domestic L.T. tariffs are usually a combination of the step and block systems in order to overcome local objections to a demand charge. The L.T. tariff is again subdivided into four grades, which are in force in different areas as noted below :—

AA—Pykara Hydro-Electric system.

A—Mettur Hydro-Electric system.

B—Municipal undertakings managed by Government which have not reached the profit-earning stage.

Thermal—Vizagapatam and Bezwada areas.

The tariffs in each area have been fixed with reference to the cost of generation and transmission, the general financial position of the undertaking, and also the cost of power from competitive sources. In the Pykara area, the rates are the lowest, as the scheme has reached a remunerative stage.

It is of the utmost importance to realize that there is no particular merit in having the lowest tariffs in the country, unless such tariffs are economically justifiable.

86. There is also a special H.T. tariff, viz., a fixed amount per K.W. or K.V.A. per year of operation. This tariff is particularly favourable to large consumers with high load factor, viz., the cement factories at Coimbatore, Trichinopoly and Bezwada.

87. In the case of Mettur station where power output is very variable, due to the varying head in the Mettur reservoir, it has been found advantageous to classify the power into three categories, viz., primary, secondary and tertiary powers.

The latter two classes of power would be available only for a portion of the year and are charged very much less than the primary power for which the normal tariffs are applicable. The Negapatam Rolling Mills, Limited, and the Mettur Chemical Industries, Limited, are examples of consumers who have taken advantage of the cheaper rates for secondary and tertiary powers.

88. Meter rents have been radically reduced. The policy of the department is to abolish such rents and reduce domestic connexion charges to a nominal amount, as soon as financial conditions permit.

89. A revised book entitled *Conditions and Rates of Supply* was printed during the year under review, incorporating all the latest modifications sanctioned by Government. All new licensees are asked to adopt the conditions and rates standardized by Government while the old licensees are being persuaded to fall in line with Government tariffs as far as practicable.

90. Some local authority and private licensees have reduced their tariffs during the year. Towards the end of the year it became increasingly difficult to persuade the licensees to reduce the tariffs on account of various adverse circumstances.

ELECTRICAL DEVELOPMENT IN GENERAL.

91. The electrical development during the year under review has been generally satisfactory both in Government and licensees' areas. But recently certain factors have arisen which are likely to tend to retard the natural development particularly in the licensees' areas.

Amongst the impediments the following important ones need mention :—

- (a) Widespread and, often, unreasonable agitation for reduction of rates particularly street lighting.
- (b) Instances of discouragement of village lighting by attempting to relegate it to the very last place among the amenities of village life.
- (c) Resolutions of local authorities, in some cases, against the use of small motors for industrial purposes, combined with a reluctance to grant licences for the same.
- (d) Difficulties in getting electric drive for public water works.
- (e) Inability of some of the licensees, particularly the new and small concerns, to raise additional share capital, or loans at reasonable rates of interest, for extending the lines.
- (f) Unwillingness on the part of some licensees to develop the rural areas.

The department has been making every effort to formulate proposals to remove the obstacles in such matters as lie within its scope.

92. *Hire-purchase loans.*—The system of hire-purchase loans to industrialists and agriculturists has worked satisfactorily in the areas served directly by Government; the desirability or otherwise of extending the facilities, subject to certain restrictions, to licensees' areas taking Government supply has been under consideration. Alternatively Government might decide it to be more appropriate that the Industries department should undertake the work instead of this department.

93. *Extension of lines in licensees' areas.*—In order to help the licensee to develop loads in their areas, Government offered to construct lines at their cost on a guarantee of 12½ per cent return annually. Although some licensees availed of this offer, it has not been sufficiently attractive on account of the difficulty of guaranteeing 12½ per cent, particularly in the case of the less remunerative rural areas. A possible solution of the difficulty under consideration is to waive all guarantee and to treat the cost of lines erected by Government as loan to the licensee to be repaid with interest in instalments and proposals have been submitted to Government.

94. *Electricity Board.*—I have been advocating for some years the formation of an Electricity Board or Commission and I hope that Government will decide in the near future to accept the proposal, bearing in mind the economic and administrative difficulties inherent in the present system of control of the electrical undertakings.

Proposals for the regulation of private licensees, as in many other countries, are to be submitted to Government.

95. *Propaganda.*—The department has carried on considerable propaganda by way of educating various types of consumers with the help of posters, hand bills and pamphlets, and also by placing the technical knowledge of the department freely at the disposal of the interested public. During the year under review, some of the pamphlets were translated in the languages of the various areas and distributed among the public. The department took an active part in the exhibition held at Calicut in December 1938.

96. Proposals for a model rural mill for experimental demonstration were investigated. The mill is to convert raw produce in the neighbouring villages into finished or semi-finished articles fetching better prices to the producer. The proposal will be put up to Government as a Part II Scheme for 1940–41.

97. The need for more energetic and intensive propaganda has already been stressed in the previous year's report, but this is possible only if a commercial division is formed to organize exhibitions and demonstrations in a systematic manner and the necessary expenditure authorized. The existing staff is inadequate to undertake the work.

ACKNOWLEDGMENTS.

98. The Chief Engineer wishes to acknowledge the assistance received from the India Store Department, London, and the efficient and thorough manner in which the numerous inspections and tests were carried out by that department in England and on the Continent. The Chief Engineer also wishes to place on record his appreciation of the excellent work done during the year by the whole staff of the department and, in particular, the manner in which the difficulties, due to the Mettur breakdown, were overcome with no appreciable loss in revenue.

99. A more detailed report of the work in various branches of this department is given in section II.

SECTION II—DETAILED REPORT.

PYKARA ELECTRICITY SYSTEM.

100. *Civil and hydraulic works.*—All civil and hydraulic works in the Pykara system were maintained in good condition. The forebay level was satisfactorily maintained throughout except during the short periods when effecting certain improvements to the main flume channel and when evacuating the forebay to facilitate connecting the third penstock to the main header pipe.

The Mukurti dam and allied works were taken over from the Construction Branch in June 1938. The reservoir storage reached 1,346.23 million cubic feet at the end of 1938 as against 842 million cubic feet at the end of 1937. The rainfall, however, was less this year, compared to last year :—

						Rainfall in inches.	
						1937.	1938.
Mukurti	..	..	..	..	..	85.78	66.09
Glen Morgan	..	..	..	..	..	82.25	47.69

With regard to headworks there were no slips of importance on the main flume channel or on the penstock slopes. The evacuation of the forebay in connexion with the work of connecting new pipe, as mentioned above, was done on 27th November 1938 and was utilized to carry out a thorough inspection of headworks, bunds, etc. The following repairs after inspection, were carried out :—

- (i) Repairs to dry stone pitching of water side of the headworks, lower bund and upper bund, wherever found necessary.
- (ii) Repairs to the wooden shoot at the end of the Glen Morgan flume—This was found badly damaged due to continuous immersion in the water.
- (iii) Scraping and painting the steel grills in front of the intake gate were done. The scour drain gate was operated.
- (iv) Cleaning, painting and oiling the main intake gate was done.
- (v) The lower bund scour valves were operated and found to work satisfactorily.
- (vi) Cleaning and painting of all the butterfly valves, surge tower interior and joints on the main header pipe were carried out.

101. *Pykara Power Station.*—The peak demand on the station was 17,900 K.W. in May 1938 and energy output was 84.3 million units for the year.

Between 10th April and 9th May 1938, when Mettur Generating Station was disabled and was being rehabilitated the Pykara plant supplied the whole of Pykara and Mettur system loads. The Glen Morgan plant was also supplementing the Pykara station. During this period, certain amount of adjustment of working hours

of the textile mill and cement works load was necessary and this was effected with the co-operation of the industrialists at Coimbatore, Tiruppur and Udamalpet. The units were worked to their capacity and the anxious period was tided over with but a slight mishap on 22nd April 1938 when No. 3 Generator flashed over to ground on one of the phases. The coils were repaired and retaped and the machine put on commercial load on 26th April 1938.

Right through the year the Tiruppur load continued to be fed from Mettur. From August 1938 part of Coimbatore load—the 22 KV. load—was transferred to Mettur system to facilitate construction work on the tail race channel at Pykara. A reduced discharge of water over the tail race was necessary to carry out concreting work. Even after the construction work was over, the 22 KV load was being supplied for some time from Mettur so that Pykara peak load may be restricted to safe carrying capacity of the machines. A retransfer of this 22 KV load to Pykara was, however, effected in January 1939 as low reservoir level at Mettur necessitated this. During the peak load periods of the day, however, the two systems were run in parallel.

On four light load days (27th November 1938, 15th, 22nd and 29th January 1939) the Pykara plant was completely shut down to enable construction work (in connexion with the installation of new units) to proceed apace. These shut-downs were fully utilized to examine the station apparatus and structure in detail and carry out necessary overhauls and repairs.

The Pelton wheel buckets of the Pykara machines showed slight wear, both on the front and rear of the cups. The makers were addressed for advice and necessary welding materials for polishing the buckets are on order.

Thyrite type arresters have been provided on the outgoing 66 KV feeders at Pykara and the Oxide film arresters removed for use elsewhere in the system.

102. *Transmission lines and sub-stations.*—The power lines and communication circuits were maintained in good condition. The station equipments received careful attention towards their upkeep and the high standard of their maintenance was kept up.

The Madura-Virudhunagar 66 KV line was completed in July 1938 and regular operation commenced, initially at 11 KV and subsequently at 66 KV (from November 1938).

Virudhunagar-Rajapalayam section commenced 33 KV operation from January 1939.

The Coimbatore-Pykara line was tested tower by tower with live line insulator testing equipment and defective strings of insulators were replaced.

At Coimbatore receiving station another 3,000 KVA transformer was replaced by a 5,000 KVA transformer. Some of the 11 KV kiosks were replaced by single feeder kiosks of more robust

pattern. This work would be complete before July 1939. A portion of the Ericsson telephone equipment was replaced by one of Siemen's make, provided with "Repeater" arrangement.

At Madura sub-station the control house and cubicles were taken over by the operation branch in April 1938. The 2-3,000 KVA synchronous condensers were tested and put into regular operation in September 1938 and have been in continuous and satisfactory service since then.

103. *Thermal stations.*—The Dindigul thermal station was shut down on 25th May 1938 and the municipal load changed over to Pykara supply. The oil-engines have been sold to Messrs. India Gold Prospecting and Mining Syndicate, Limited, and would be removed shortly.

The Virudhunagar thermal station was also similarly shut down and the engines transferred to Papanasam Hydro-Electric Construction Works. Pykara power has been made available in this area.

The Theni generating station was shut down on 22nd February 1939. This was just in time as the ginning season commenced immediately thereafter. It would have been very difficult to continue this thermal station any longer as the maximum capacity of the installed plant had already been reached. The engines at this station will be transferred shortly to the Papanasam works.

104. *Additions and improvements.*—At Pykara and Coimbatore suitable modifications to the station gear have been completed to enable 110 KV operation being commenced in the immediate future.

Construction of the 11 KV rural feeder at Coimbatore is nearing completion. This is a ring feeder to cater to the agricultural loads as distinct from the mill loads which are served by separate ring feeders.

The Periyanaickenpalayam line was duplicated and insulation raised to 22 KV. This line would shortly feed Karamadai and Mettupalayam area and would enable the Nellithorai station to be shut down consequent to the 110 KV changeover.

Suitable modifications at Pollachi sub-station were carried out to make use of the boosters even when supply was taken from Udamalpet sub-station. The regulator at Iyerpadi has consequently been removed and installed at Theni.

Damages due to conductor vibration were noticed on several towers on the Coimbatore-Erode 66 KV line. Jumper type dampers were provided at all affected locations. Stock-bridge dampers are proposed to be used for tension points, as these are expected to obviate trouble of this type.

An additional sectionalising point has been provided on the Madura-Virudhunagar line by converting suspension tower No. 92 into a tension point.

105. The statement below gives the length of transmission lines constructed and installed transformer capacities brought into operation during the year. The present total length of high tension lines in the system is 1,221 miles or 1,524 miles of equivalent single circuit :—

Total length of transmission lines and installed capacity of transformers.

Voltage.	Constructed during the year.				Total in service.			
	Single circuit.	Double circuit.	Equivalent single circuit.	Installed capacity of transformers.	Single circuit.	Double circuit.	Equivalent single circuit.	Installed capacity of transformers.
	MILES.	MILES.	MILES.	KVA.	MILES.	MILES.	MILES.	KVA.
66,000	24	..	24	5,000	24	228	480	58,430
33,000	28	..	28	..	28	..	28	..
22,000	69	..	69	775	355	61	477	6,475
11,000	201	..	201	2,260	511	14	539	2,260
Total	322	..	322	8,035	918	303	1,524	67,165

106. *Industrial load.*—The following new mills took supply during the year :—

Kothari textiles	Coimbatore.
Kasthuri mills	Do.
Asher textiles	Tiruppur.
Rajapalayam mills	Rajapalayam.

Thirty-one mills are now connected to the Pykara system.

Arrangements were almost complete to supply the following mills and they would all be connected to the system during the first half of 1939-40 :—

Meenakshi mills	Madura.
Pandyan mills	Do.
Mahalakshmi mills	Do.
Sundararaja mills	Dindigul.
Kumaran mills	Coimbatore.

107. *Tea factories.*—Supply to the following tea factories was commenced during the year :—

Burnside	Nilgiris.
Rousdenmullai	Do.
Kinsale	Do.
Kilmulfort	Do.
Mount Stuart factory	Anamalais.

The following factories are expected to take supply shortly and necessary arrangements for this purpose were nearing completion :—

Dunsandle	Nilgiris.
Terramia	Do.
Thiashola	Do.
Pannernade	Anamalais (Standby supply).

108. *Village distribution.*—The following small towns and important villages received hydro-electric supply during the year :—

Coimbatore district.	Madura district.
Palladam.	Aruppukkottai.
Gobichettipalayam.	Theni.
Chengapalli.	Batlagundu.
Perundurai.	
Uthukuli.	
Ingur.	
Anamalai-Vettakaranpudur.	
Chettipalayam.	

109. *Rural areas.*—The following rural areas were electrified during the year :—

Aravankadu (Jagathala)	Nilgiris
Konakarai	Do.
Kalligudi	Madura.
Kallapalayam	Coimbatore.
Appanaickenpatti	Do.
Sravanampatti	Do.
Lakshmanapuram	Do.
Adivalli	Do.
Keeranatham	Do.
Pukulam	Do.
Guruvappanaickanur	Do.
Sundakkampalayam	Do.
Nallampalli	Do.

110. *Panchayats.*—The following new panchayats took power during the year making the total number of panchayats 33 :—

Jagathala.	Chettipalayam.
Thudiyalur.	Gobichettipalayam.
Kurichi.	Batlagundu.
Palladam.	Kusavapalayam.
Anamalai.	Aruppukkottai.
Vettakaranpudur.	

111. *Construction subdivision.*—This subdivision which was formed as a separate unit in January 1938 has been executing all the major schemes sanctioned during the year. Schemes totalling a capital outlay of Rs. 9,95,690 have been completed and handed over for operation and maintenance. Extensions costing about Rs. 7,41,700 are under execution and would be completed early in the following year.

112. *Stores.*—The stores increased from 9 to 21 places in the system and the stock at several places was found to be inadequate to meet the requirements of the extensions. The Government sanctioned increases in the reserve limit of stock from Rs. 5.5 lakhs to Rs. 10 lakhs. Stores valued at Rs. 20.7 lakhs were received and items valued at Rs. 20.1 lakhs were issued during the year.

113. *Revenue assessment and collection.*—The revenue assessed during the year amounted to Rs. 31 lakhs of which about Rs. 29 lakhs were collected. The balance represents current accounts. About Rs. 4 lakhs were collected by the bill collecting staff by visiting 130 villages from 3,786 consumers (1,593 domestic, 1,428 agricultural, 109 industrial, 623 weekly bazaar rates and 33 panchayat boards). No heavy deposits were taken from the consumers and the collections were efficient. Bad debts are negligible

and only 142 services were disconnected due to default and other causes. The disconnexions in agricultural services were mostly due to exceptional drought experienced this year.

The revenue from the textile mills has, however, been slightly affected due to labour strikes in Coimbatore and Tiruppur. Rebates to the extent of Rs. 11,200 were allowed to the mills owing to strikes and the accommodation rendered by the mills during the breakdown of Mettur plant.

114. *Commercial activities.*—The Commercial Branch was active during the year and about 109 proposals for extensions were submitted for sanction. Nearly 80 of them were sanctioned and the work taken up. Sanction for the remaining proposals are awaited. The following are the more important of the schemes sanctioned during the year :—

	RS.
(1) Chengapalli-Ingur-Perundurai extensions	1,34,000
(2) Koilpalayam-Annur scheme	1,21,600
(3) Kolumam-Komaralingam-Utharapalayam extensions ..	31,000
(4) Periyapatti-Periyakumarapalayam extensions	57,950
(5) Extensions at Koilpatti and Sattur	79,460
(6) Amarpooondi extensions	66,560
(7) Pasumalai-Thiruparankundram-Thirumangalam scheme ..	1,09,177
(8) Theni-Chinnammanur-Uthamapalayam-Cumbum extensions	1,95,500

115. *Conversion fund.*—The following statement gives the details of advances and repayments since 1933-34 :—

Year.	Advances.	Re-payments.	Fully closed during the year.
	RS.	RS.	
1933-34	2,01,295	17,805	..
1934-35	1,03,861	55,003	..
1935-36	2,53,487	52,739	1
1936-37	2,72,626	1,18,194	1
1937-38	89,999	1,84,697	6
1938-39	2,25,756	1,61,101	4
Total	11,50,024	5,89,799	12

116. *Meter and relay testing.*—With the increased area of supply, the work of the testing branch has also been increasing. Tests on the meters and relays in the Vizagapatam power house and in the sub-stations of the Vizagapatam Thermal Scheme were also carried out. Till the end of 1938, poly-phase H.T. and L.T. meters of the Mettur system were also being tested in the Coimbatore laboratory.

Improvements to the testing tables in the laboratory were effected to obtain greater degree of accuracy in testing. A comparison method of testing C.Ts. with rotating sub-standards was tried and found very satisfactory in determining phase angle and ratio errors. Standard equipments for testing current transformers are also on order.

A testing van was purchased during the year and experience has shown that this greatly facilitates safe and quick transport of testing gear for *in situ* tests.

117. *Administration and accounts.*—The Central Office continued to be busy and functioned efficiently during the year. Considerable expansion had taken place in all branches of work since 1935 and additional staff was found necessary to cope with the increased work. Proposals for the additional staff were made and were partly sanctioned by Government in the year and the Central Office has since been reorganized. A travelling cashier was appointed to make payments to labourers as this constituted the bulk of the expenditure directly incurred by the department. Payments aggregating to Rs. 23,02,733 were made during the year in the system. The control of expenditure on the various items of budgets is being satisfactorily carried out.

Economies and retrenchments in staff were also effected where possible and the office and technical procedure in many cases standardized.

The Government sanctioned the employment of an Accountant during the year to assist in the compilation of a Departmental Code. The draft Departmental Code was nearly completed.

The need for a suitable building to accommodate the Central Office, Coimbatore, was being keenly felt and the offices moved in November 1938 to new rented premises on the Avanashi Road. While these would do for the time being, it was felt that the time had arrived to have our own office building at Coimbatore and proposals on this behalf were submitted to Government.

The accounts both of the municipal schemes and the Pykara scheme were audited during the year and the results were satisfactory.

METTUR ELECTRICITY SYSTEM.

118. *Operation and maintenance.*—Except for the major breakdown of the power-station in April-May 1938 the working of the system was generally satisfactory. On 8th January 1939 there was a shut down lasting about 15 minutes due to the accidental contact by Sri N. R. Narasimhamurthi with live terminal of 11 K.V. gear. On 19th January 1939 there was another shut down lasting only five minutes due to a flash over in the 11 K.V. switchgear.

119. The transmission lines and telephone circuits were regularly patrolled and kept in good condition. The sub-station equipments at various places were periodically inspected and the routine maintenance work carried out satisfactorily.

120. During the breakdown in April 1938 the entire staff worked night and day under the able direction of an Engineer from Messrs. Associated Electrical Industries (India), Limited. No. 1 and No. 3 machines were put into service in May 1938 while No. 2 machine which required extensive overhauling was brought into commission in August 1938.

121. The Vellore-Conjeeveram-Polur-Arni 33 K.V. lines and the Singarappet-Villupuram 66 K.V. line were completed and energized during the year.

The Mettur station was supplying the districts of Salem, North Arcot, South Arcot, Chittoor, Chingleput, Trichinopoly and Tanjore.

122. The Mettur station worked satisfactorily in parallel with Pykara station and also the synchronous condensers at Trichinopoly and Madura indicating the stability of the machines and the inter-connected network. Experience, however, indicated the desirability of modernizing some of the older type of relays and regulators at Pykara. The work is now on hand.

44.3 million units were generated at a normal peak load of 7,700 K.W. while the units distributed were about 40 millions including 17.4 millions exported to Pykara system. A gross revenue of Rs. 11.03 lakhs was earned by the system. The Mettur generating station was very helpful in taking over the Pykara loads when the latter plant had to be shut down for repairs and for installing new plant.

123. *Additions and improvements.*—Improvements in the station equipment were effected by replacing the squirrel cage rotors of the exciter motors by wound rotors with starting resistances and contactors.

Pending the installation of a third 500 K.V.A. station transformer similar to the existing ones, a 250 K.V.A. transformer has been installed and is fed from the spare kiosk provided in the 11 K.V. industrial feeder bus for supplying the station auxiliaries, as it was considered desirable to keep the two main 500 K.V.A. station transformers for supplying the exciters only, independent of other station auxiliaries.

Orders have been placed for remote controlled electrically operated emergency lowering and hoisting gear for the main gates in the dam and are expected to be installed in the course of a few months.

Additional bearing oil circulating pumps driven by D.C. motors have been received to provide emergency oil supply to the bearings in case of failure of A.C. supply and will be installed shortly.

With a view to meet additional demands it was decided to install a fourth generator unit and a third 11/66 K.V. step-up transformer.

In order to meet the demand of the Negapatam Indian Steel Rolling Mills, the two existing transformers of 1,000 K.V.A. each were replaced by three of 2,500 K.V.A. capacity each and a duplicate 11 K.V. line to serve this mill direct from the Government sub-station was erected and temporarily energized. The erection of machinery in the mills is still incomplete and is programmed to be completed in the first half of 1939-40. The progress of load development at this place has not so far been satisfactory, but it is expected that the situation will improve shortly.

The load development of the East Tanjore Electric Supply Corporation has been rapid and hence one of the 1,000 K.V.A. transformer released from Negapatam was stationed at Tiruvarur to meet this demand.

A 11 K.V. voltage regulator has been received and is kept at Tiruvarur to meet possible voltage regulation trouble when the Negapatam mills start full working.

Two additional 2,000 K.V.A. transformers along with necessary control equipment were ordered for Trichinopoly sub-station to meet the demand of the Dalmia Cement Works for which two independent 22 K.V. lines are under construction.

124. The table below gives the length of H.T. transmission lines constructed and brought to operation during the year as also the capacity of the transformers in service :—

Total lengths of transmission lines and installed capacity of transformers.

Voltage.	Constructed during the year 1938-39.				Total in service.			
	Single circuit.	Double circuit.	Equivalent single circuit.	Installed capacity of station transformers.	Single circuit.	Double circuit.	Equivalent single circuit.	Installed capacity of station transformers.
	MILES.	MILES.	MILES.	K.V.A.	MILES.	MILES.	MILES.	K.V.A.
66,000 ..	68	..	68	10,750	188	213	614	28,660
33,000 ..	105	..	105	1,200	143	..	143	2,700
22,000 ..	5	..	5	100	66	36	138	2,055
11,000 ..	58	..	58	450	160	7	174	3,147
Total ..	236	..	236	12,500	557	256	1,069	36,562

The total length of the high tension line in service is about 810 miles or 1,070 miles of equivalent single circuit.

125. *Industrial loads.*—Appendix H gives a list of the important loads connected and which are likely to be connected in the near future. The Dalmia Cement Factory, the Mettur Chemical Corporation and the Negapatam Steel Rolling Mills will be the biggest consumers in the Mettur system. A new textile mill is in the course of construction near Gudiyattam.

126. *Rural and agricultural load.*—The following villages and towns were electrified by Government during the year :—

- | | |
|-------------------|-----------------------------|
| 1 Kaveripauk. | 9 Christukula Ashram at |
| 2 Neringipet. | Tiruppattur. |
| 3 Pullampatti. | 10 Jalarpet. |
| 4 Kesarimangalam. | 11 Arkonam railway station. |
| 5 Valasu. | 12 Karimangalam. |
| 6 Thengalpalayam. | 13 Polur. |
| 7 Namakkal. | 14 Arni. |
| 8 Dharmapuri. | 15 Pernambattu. |
| | 16 Valluvambakkam. |

127. *Municipal undertakings.*—There were three municipal undertakings, viz., Karur, Tiruppattur and Tiruvannamalai under the management of this department.

Orders were passed by the Government to transfer the Karur undertaking to the management of the Karur Municipality. A Municipal Electrical Engineer was appointed with necessary staff and the scheme has been handed over to the municipality at the close of the year under report.

The Tiruppattur scheme has been in operation for a year and is progressing satisfactorily but the revenue is still inadequate to meet the operation and maintenance expenses.

Construction of the Tiruvannamalai distribution scheme was completed and supply given in October 1938. During the short period of six months there was rapid development of load.

A survey of the operation results of the above three Government-managed municipal distribution schemes is given in Appendix J.

128. *Meter and Relay Section.*—The Meter and Relay Testing Section was formed in July 1938 and has been functioning satisfactorily since then. The staff at present consists of one Junior Engineer, two testers and one helper.

The equipment in the section consists of three test benches, one each for testing single phase L.T., 3 phase L.T. and 3 phase H.T. meters. A portable relay testing kit, a portable meter testing set suitable for H.T. meters in addition to a quadruplex testing and a D.C. testing set are provided. Six rotating sub-standards are also provided.

The total number of meters and relays tested during the year was about 950.

129. *Mettur workshops.*—A list of standard and non-standard articles manufactured in the Mettur workshops is given below:—

<i>Mechanical.</i>	<i>Mechanical—cont.</i>
1 Crossarms.	10 Street light fixtures.
2 Insulator fittings.	11 Cable sockets.
3 Clamps for tubular and rail poles.	12 Distribution and meter boxes.
4 Guy sets.	13 M. S. cleats for rail bases.
5 Packing pieces.	
6 Earth pipes.	
7 Knobs.	
8 Clamps—Single and double arms.	1 11 and 22 K.V. gang switches.
9 Transformer structures.	2 11 and 22 K.V. fuse sets.

Electrical.

On account of want of accommodation both for working and for stocking materials separate sheds were erected for the manufacture of windows and distribution boxes.

During the year the following machines were added to the workshops:—

(i) Lathe	...	...	...	...	1 No.
(ii) Screwing machine	...	...	...	...	1 No.
(iii) Hacksaw	...	...	...	...	1 No.
(iv) Hacksaw 14 inches by 9 inches (manufactured in the workshop)	...	...	...	...	1 No.
(v) Punching machine	...	...	...	...	1 No.
(vi) Plate splitting shears	...	...	...	...	1 No.

The average daily attendance of the labourers was 182 and the total number of jobs opened was 1,500.

Work to the value of nearly Rs. 3 lakhs was done during the year.

Certain equipment which was formerly obtained from abroad and private shops is now being regularly produced in bulk but not in sufficient quantity to meet the full requirements of the department or in the variety originally contemplated. Important mechanical repairs are now undertaken but the shops are not extensive

or properly equipped for important electrical repairs. If the workshop is to meet fully the requirements of the department, considerable extension to buildings and equipment are necessary and would need the services of an experienced Executive Engineer in addition to other staff.

130. *Stores.*—During the year under report there were one main store at Mettur and four sub-stores, viz., Karur, Tiruppattur, Tiruvannamalai and Rasipuram in this system and on the transfer of Karur municipal scheme to municipal management at the close of the year, the Karur stores were transferred to the municipality. With a view to purchase a large quantity of raw materials at cheaper rates and convert them into finished products in the Mettur workshops for departmental construction works both for Pykara and Mettur systems, proposals for the revision of the reserve stock limit were forwarded to Government for sanction.

131. *Transport.*—The total quantity of materials transported by the Transport section was as follows:—

	TONS.
Inwards	2,383
Outwards	1,026

132. *Commercial.*—The activities of the Commercial subdivision were continued and a number of profitable schemes were put forward.

This department took part in the All-India Exhibition held at Chittoor in April 1938 and various articles of electrical appliances were exhibited which was appreciated by the public.

133. *Construction.*—During the year under report nearly 52 extension schemes costing over Rs. 22 lakhs had been sanctioned by the Government and were awaiting execution. In order to cope with this large work, a number of small schemes were entrusted for execution to the territorial Assistant Engineers. The Construction subdivision was strengthened by temporarily deputing the Commercial Assistant Engineer and his staff for attending to the construction of extensions sanctioned in the southern area, with headquarters at Mettur; and the headquarters of the Assistant Engineer, Construction, were shifted to Vellore so that he could concentrate on works in that area. Work is now well in hand and all the works are expected to be completed before the end of 1939. Eighteen schemes costing Rs. 3.5 lakhs were completed and brought into operation during the year.

134. *Licensees.*—There are now 15 licensees in the Mettur system of which five are municipal licensees. The names of the licensees are given below:—

- 1 Messrs. Trichinopoly-Srirangam Electric Supply Corporation, Limited.
- 2 Messrs. East Tanjore Electric Supply Corporation, Limited.
- 3 Messrs. Kumbakonam Electric Supply Corporation, Limited.
- 4 Messrs. Negapatam Electric Supply Corporation, Limited.

- 5 Messrs. Salem-Erode Electricity Distribution Company, Limited.
- 6 Messrs. North Arcot Electric Supply Corporation, Limited.
- 7 Messrs. Carnatic Electric Supply Corporation, Limited.
- 8 Messrs. Vellore Electric Corporation, Limited.
- 9 Messrs. Chittoor Electric Supply Corporation, Limited.
- 10 Messrs. South Arcot Electricity Distribution Company, Limited.
- 11 Tanjore municipality.
- 12 Conjeeveram municipality.
- 13 Tiruppattur municipality.
- 14 Tiruvannamalai municipality.
- 15 Karur municipality.

135. *Administration*.—Due to a number of extensions in the northern area, it was found that the Divisional Electrical Engineer, Trichinopoly, could not exercise satisfactory control over the northern area and therefore it was found necessary to open a new division with headquarters at Vellore and subdivision at Tiruvannamalai.

PAPANASAM HYDRO-THERMAL SCHEME.

136. *Camps, roads, etc.*—The Papanasam Hydro-Electric Development was sanctioned by Government for Rs. 1,79,00,000 on 1st April 1938. The Construction division was formed during April with headquarters at Madras in the first instance to prepare detailed plans and specifications for the camps, roads, power and water-supply, etc., and to arrange contracts for the works. It had one field subdivision for investigation and making preliminary arrangements for work at site. Jungle on the camp and work sites was cleared during May and June 1938 and construction of roads and buildings begun at the end of the latter month. The labour strength steadily increased and was about 1,600 by the end of July. The work then became too much for the one subdivision and a second Assistant Engineer was posted for the Dam camp works. The division headquarters were moved to Papanasam in August and a third Civil subdivision and an Electrical subdivision were formed.

The first buildings were completed and occupied by October and both the Dam and Papanasam camps were to a large extent finished by the end of March 1939. Protected water-supplies were made and the Construction Power Plant and various transmission lines erected, current being available at the beginning of December. Both camps are provided with water borne sewage systems and particular attention was paid to sanitation and anti-malarial measures from the beginning.

The existing roads were widened, improved and culverts strengthened. Necessary road diversions round areas to be submerged were made and new roads formed in camps. The bridge over the Thambraparni 360 feet long was begun in August and

completed in December. The bridge over the Servalar was begun in February and was making good progress at the end of the year. It was expected to be completed by June 1939.

137. *Dam*.—Foundation excavation was begun in July and the midstream Cofferdam wall in August. This work was continuously interfered with by rain there not being a continuous interval of ten days of dry weather from August to mid February. The Cofferdam was, however, completed in February and excavation in the left half river bed section begun. It had made good progress by the end of March and preparations were then nearly ready for drilling grout holes. The foundation excavation on both flanks and for the spillway was carried on continuously from July to the end of the year and progressed according to the schedule. The compressors, drills, stone crushers and mortar mixers were also erected during this period.

138. *Diversion weir*.—Excavation on the left flank was begun in August and two suspension bridges over the arms of the river were constructed by the end of September. Excavation on the island was also begun in August and a sufficiently large volume of fissured rock had been removed by December to enable this portion of the work to be designed. Drilling and grouting for a length of about 130 feet in the left river bed section was completed by the end of February and masonry begun on March the 2nd. In spite of the handicaps of the weather this work made excellent progress and is a month ahead of the schedule.

139. *Pipeline*.—Excavation for this was also begun in August and carried on intermittently as labour was available. The work was about three-fourths completed by the end of March. Work on this is also well in advance of programme.

140. *Penstock and power house*.—Preliminary grading of the penstock and further exploration for power house foundations were done during the latter part of the year. As a result of this the anchor positions and power house site were fixed.

141. *General*.—The system of paying departmental labour weekly and up to the time of payment, instead of fortnightly and after considerable audit delay was inaugurated at the end of the year. There are still difficulties to be overcome but it is hoped to make it an established future practice on the works.

The total expenditure during the year was Rs. 10,52,300.

THERMAL SCHEMES.

Vizagapatam Thermal Scheme.

142. *Power plant*.—At the end of the last year, the steam turbine plant had just been put in commission, with the 750 K.W. set, 2—11,000 lb. evaporation boilers and major part of the indoor switchgear completely erected. The load of the Vizagapatam Electric Supply Corporation and the Vizagapatam Harbour was

being supplied. The 1,500 K.W. set was nearly erected and 22,000 lb. evaporation boiler material received and ready for erection as soon as one of the old boiler units could be dismantled.

The 1,500 K.W. set was put in regular operation in the first week in April 1938. Work on larger boiler erection was started in May 1938, and the boiler put on bank fires in August 1938. The erection was completed in November 1938.

The erection of the outdoor switchgear and transformers was completed in April 1938 excepting outdoor current transformers which were wrongly supplied in the first instance. They were replaced in March 1939.

Local as well as outstation load was supplied from one or the other of the machines throughout the year.

Considerable trouble was experienced with 750 K.W. set principally but also to a certain extent with 1,500 K.W. set, owing to the lubricating oil frothing and overflowing at the high pressure steam end. After much investigation additional vent pipes were installed by the suppliers, Messrs. B.T.H. Co., Ltd., on the oil settling tank.

Owing to the effect of unexpectedly bad sea water, condenser tubes which are made of admiralty brass became corroded at the inlet and some were punctured. As an experimental measure some tubes of zincless metals are being tried and a settling tank with screens is proposed to be constructed.

The conditions of operation are therefore not yet standardized although the year's experience has indicated the directions in which adjustments need to be made.

The normal peak was around 500 K.W. while the momentary peak when the harbour cranes worked was 820 K.W. The daily generation was about 6,000 units, the total generation during the year being 1.783 million units.

143. *Transmission lines.*—All the transmission lines were tested and energized in July and August 1938.

The major part of the structures, sub-station switchgear and buildings were completed in June 1938 except the 33 K.V. O.C.B. at Vizianagram which was completed in August 1938.

Below are given the particulars of the lines constructed and in service :—

Voltage.	Constructed in the year				Total in service.			
	Single circuit.	Double circuit.	Equivalent single circuit.	Installed capacity of transformers.	Single circuit.	Double circuit.	Equivalent single circuit.	Installed capacity of transformers.
	MILES.	MILES.	MILES.	K.V.A.	MILES.	MILES.	MILES.	K.V.A.
33,000	48.0		48.0	3,500	48.0		48.0	3,500
11,000	46.0	8	62.0		46.0	8	62.0	

144. Outside loads were connected up as they became available as follows :—

- Supply to Anakapalle Electric Supply Corporation on 5th July 1938.

Supply to Garbham Mines on 14th July 1938.

Supply to Kodur Mines on 5th October 1938.

Supply to Bobbili Electric Supply Corporation on 17th October 1938.

Supply to Bimlipatam Distribution Scheme on 3rd February 1939.

The mining load at Kodur is more than was anticipated. On the other hand, Vizagapatam Port has not been very busy and the consumption is much less than expected either by the Port authorities or by the department.

Anakapalle and Bobbili loads were also comparatively slow in development.

145. The Municipal Councils of Vizianagram and Bimlipatam having declined the offer of licences for distribution of electrical energy under the Indian Electricity Act, Government decided to undertake the distribution themselves.

The contract for supply and erection of material for Bimlipatam and Vizianagram Distribution was awarded to Messrs. Kameen & Co. The work at Bimlipatam was taken in hand in July 1938 and completed in January 1939. Supply was commenced on 1st February 1939. The Hon'ble the Minister for Local Administration switched on the street lights on 15th February 1939. The distribution at Vizianagram was nearly completed during the year.

Bezwada Thermal Scheme.

146. *Power plant.*—Construction work was in progress spasmodically throughout the year; the plant was put in commission and the power supply commenced on 25th March 1939. The photograph facing page 10 gives a view of the completed station.

At the end of last year, work in foundations had been completed, steel work was being erected and other civil works in the power house being regulated to suit.

Major parts of one machine arrived just after the steel work was erected and before the roofing was up. Erection work had therefore to be adjusted. Some time was lost owing to outbreak of a fire on work-site in one of the contractor's sheds. Several instruments and a quantity of asbestos sheeting material were destroyed and took time in replacing.

The steel work and roofing were completed in July 1938.

The cooling water tank was completed in June 1938 and the well excavation and other civil works completed in August 1938.

The boiler, switchgear and machine erection was in progress simultaneously from April 1938.

A series of delays occurred on the circulating water pipes which the contractors took a lot of time in providing. Tee off pipes and the Template pipes were wrongly cast. Eventually the erection was completed and the machines were dried out and made ready for test on 10th March 1939. The acceptance tests on the machines and boilers were conducted from 16th to 24th March and the plant put in commercial service on 25th March 1939.

The plant at present erected consists of 2—1,500 K.W. sets of Messrs. Parson's manufacture, 2 Babcock Wilcox water tube boilers each of 22,000 lb. per hour evaporation capacity and switchgear of Messrs. English Electric Company's manufacture.

147. *Transmission lines*.—The 33 K.V. lines to Ellore and Masulipatam were energized last year at 11 K.V. and preliminary and partial supply given to Ellore and Gudivada from the Municipal oil-engine station at Bezwada. The changeover to steam power was made in the last week of March 1939.

Government sanctioned in G.O. Ms. No. 1845, P.W. (Electricity), dated 11th September 1937, at an estimated cost of Rs. 1,97,200 construction of 33 K.V. line to Tenali to supply power to the Guntur Power and Light, Limited.

The crossing of the Kistna river was a problem. After a study of various alternatives it was finally decided (with the concurrence of the Irrigation Department) to construct a 33 K.V. double circuit line on the downstream side of the anicut. Special double pole structures with heavy R.C. foundations were erected at intervals of about 350 feet.

The construction of the Tenali line was commenced in September 1938 and practically completed in March 1939.

The Andhra Cement Factory management having signed an agreement for taking power from the Bezwada station, a separate 11 K.V. line has been sanctioned and is under construction.

Government decided to undertake departmentally the distribution of electrical energy in Nuzvid Town. The contract for the 11 K.V. line from Nuzvid Sub-station to Nuzvid town was awarded to Messrs. Cromptons at an estimated cost of Rs. 46,000 and for Nuzvid town distribution to Messrs. Henleys at an estimated cost of Rs. 76,500.

Messrs. Cromptons commenced work in January 1939 and Messrs. Henleys in December 1938. Both works were practically completed at the end of the year.

148. The statement below gives the lines and transformer capacities in service and installed during the year:—

Voltage.	Constructed in the year.				Total in service.			
	Single circuit.	Double circuit.	Equivalent single circuit.	Installed capacity of transformers.	Single circuit.	Double circuit.	Equivalent single circuit.	Installed capacity of transformers.
	MILES.	MILES.	MILES.	K.V.A.	MILES.	MILES.	MILES.	K.V.A.
33,000	..	..	13.0	100	73.0	..	73.0	3,950
11,000	13.0	..	13.0	100	13.0	..	13.0	

149. *Operation*.—Supply to Gudivada and Ellore from the Bezwada municipal power house continued till 25th March 1939 when the Government power house came into operation.

On 25/26th November 1938 a cyclone in Kistna district affected the transmission lines appreciably. Fifty-seven poles with earth foundations were leaning and were set right. The roof of the staff quarters at Masulipatam was blown off. There was no stoppage of power owing to trouble in our lines although there was some due to fault in licensee's lines.

Cocanada Thermal Scheme.

150. The scheme was sanctioned by Government in G.O. Ms. No. 679, P.W. (Electricity), dated 31st March 1938, at an estimated cost of Rs. 3,71,000 initially (and Rs. 4,45,000 in five years). It provided for—

- The purchase of the existing plant and buildings of the Cocanada Municipal Council, extensions of the buildings by two bays and installation of one 300 K.W. set purchased from Bezwada Municipal Council now and provision for a second set later.
- Construction of 24 miles of 11 K.V. lines to Samalcot and Ramachandrapuram and supply in bulk to Cocanada Municipal Council at Cocanada and two licensees at Samalcot and Ramachandrapuram.

The Government subsequently decided to undertake departmentally low tension distribution in the townships proposed to be supplied from the Cocanada scheme.

The power house building extension contract was awarded and work commenced in February 1939.

Order for the material and equipment was placed with Messrs. General Electric Company and Messrs. Cromptons. Owing to the preoccupation of the European firms with re-armament, the delivery dates are long and commencement of supply from Cocanada power station is not expected to be earlier than December 1939.

151. *Accidents*.—There were 18 accidents, all to non-departmental persons during the year. Fifteen of these occurred in Vizagapatam area, four of which were fatal and three occurred in Bezwada area of which one was fatal.

OTHER CONSTRUCTIONS AND SURVEYS.

Pykara Plant Extensions.

152. (a) *Penstock.*—The fifth and last consignment of pipes weighing about 1,200 tons including the high pressure valve arrived in June 1938. Anchor and pier construction and pipe erection proceeded continuously until completion down to anchor No. 1 by the end of November. A shut-down of the whole plant was arranged for on 27th November 1938 to connect the new pipe at the Surge Tower. The new penstock was tested down to anchor No. 1 to 25 per cent over static head on the 4th and 5th of January 1939. Some recaulking of joints and rivets was found necessary and the pipe was subsequently made satisfactorily tight. Nos. 4 and 5 distribution pipes were erected and No. 4 terminal anchor completed by the end of March but No. 5 terminal bend and anchor had to be delayed due to No. 5 machine not having been lined up.

(b) *Power house.*—The extension to the power house to accommodate the two new 12,500 K.V.A. units was completed in all respects except for minor items of flooring, etc., round the new machines still under erection. A new circulating waterpump-house was built and completed.

The photograph facing page 38 shows the interior of the power house with the new machinery in the background.

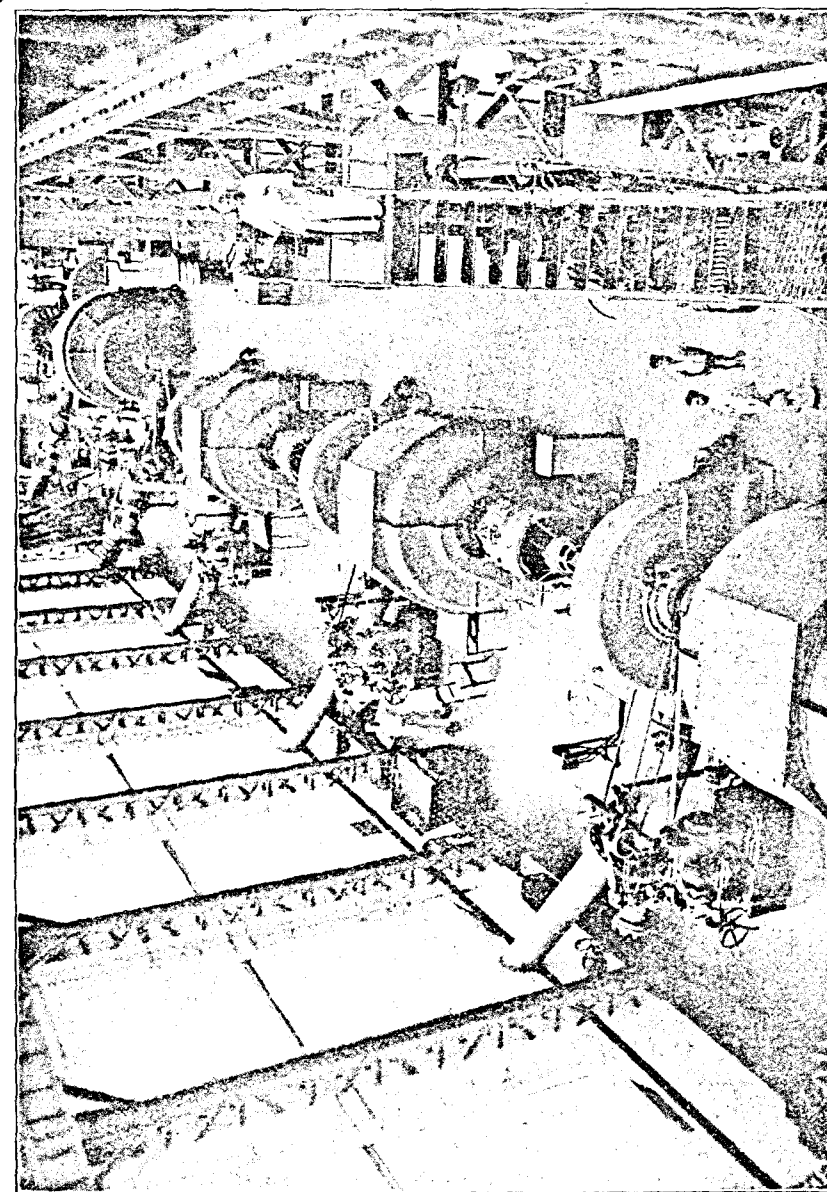
(c) *Generating machinery and outdoor equipment.*—The new 110 K.V. oil circuit breakers and the other transformer yard equipment were received in April 1938 and erection begun. The first consignment of machinery parts arrived in July 1938 but deliveries were only completed by March 1939. Owing to delays in these deliveries the erection work was greatly impeded. No. 4 unit was completed except for cabling and voltage regulators, by the end of February 1939 when it was put on heat-run but it had not been put into operation by the end of March. No. 4 transformer had been got ready for service. No. 5 transformer and No. 5 machine were still being erected at the end of March. It is expected that the outstanding work would be completed before September 1939.

The expenditure incurred during the year was Rs. 22.59 lakhs.

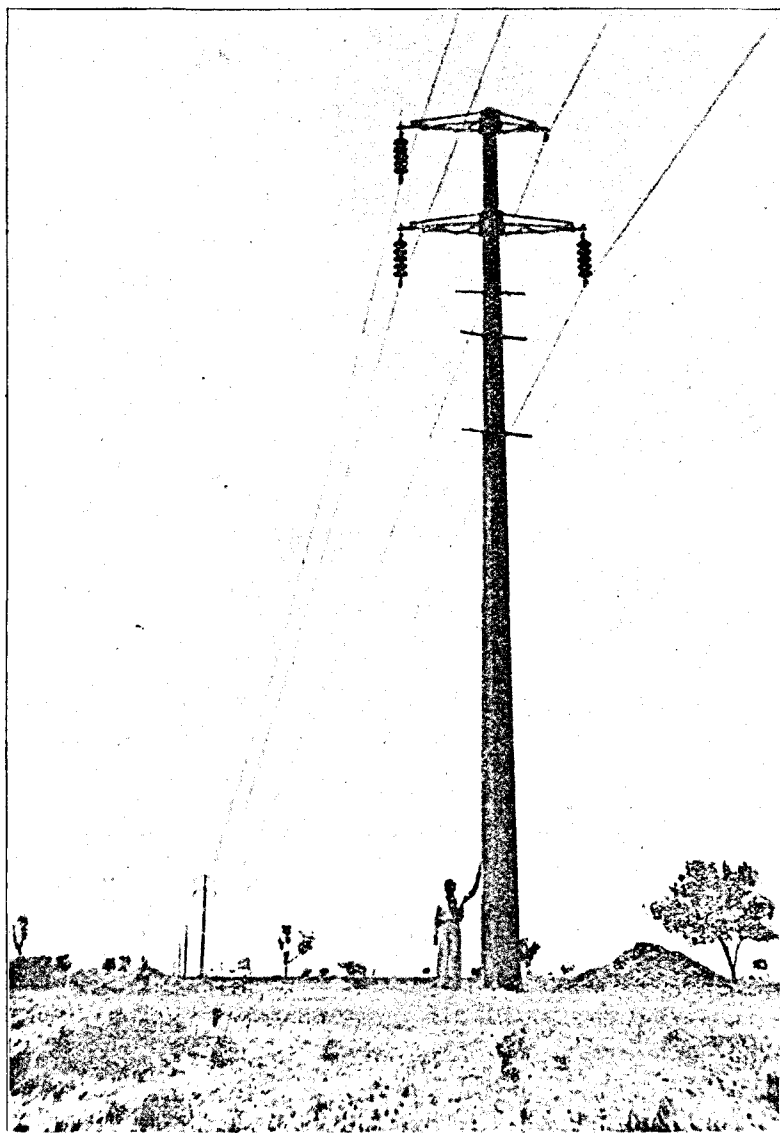
153. *Mukurti Dam.*—The uncompleted works in connexion with the dam were taken over by the Construction Branch and finished by the end of May. The dam was formally declared open by His Excellency the Governor of Madras on 24th June 1938.

An attempt was made to dispose of the temporary camp buildings by public auction but as satisfactory bids were not forthcoming most of the buildings were dismantled departmentally and the useful materials transferred to the Papanasam works. All construction plant was utilized by transfer to either the Pykara Plant Extensions or the Papanasam works.

The accounts were finally closed on 31st March 1939 with a total expenditure of Rs. 14,90,774 against the estimate of Rs. 21,25,000.



PYKARA POWER HOUSE SHOWING EXTENSIONS



VIRUDUNAGAR-KOILPATTI 66 K.V. LINE R.C.C. POLE

154. *Transmission Line Construction.*—The following principal works were under construction during the year :—

- (1) *Singarapet-Tiruvannamalai-Villupuram 66 K.V. line*—*Estimate amount Rs. 13,14,900.*—The transmission line to Villupuram was completed by the middle of August 1938 and temporary connexions made at Villupuram sub-station to enable supply to the South Arcot Licensees to be given in October. The sub-stations at Vettavalam and Villupuram, the work on which was greatly delayed by the contractors, were practically completed by the end of March.
- (2) *Vellore-Conjeeveram 33 K.V. extensions*—*Estimate amount Rs. 4,29,000.*—The transmission line was completed in July 1938 but due to contractors' delays the sub-stations were not ready by March 1939. A partial supply was however given to Conjeeveram and Ranipet in the latter part of 1938.
- (3) *Kaveripauk-Arkonam 33 K.V. line*—*Estimate amount Rs. 2,02,800.*—This work was taken up in September 1938 and practically completed by March 1939.
- (4) *Tiruvannamalai-Polur-Arni 33/66 K.V. line*—*Estimate amount Rs. 3,46,800.*—The line was completed by September 1938 and sub-stations were nearing completion by the end of March. Supplies were given to Tiruvannamalai and Polur in December 1938.
- (5) *Singarapet-Karimangalam-Dharmapuri-Krishnagiri extension*—*Estimate amount Rs. 4,62,400.*—The work was commenced in June 1938 and practically completed by March 1939, supplies being given to Karimangalam and Dharmapuri.
- (6) *Villipuram-Edapalayam 22 K.V. line*—*Estimate amount Rs. 1,20,500.*—This work was taken up at the end of 1938 and was about two-thirds completed by the end of March.
- (7) *Chittoor-Pakala-Chandragiri extensions*—*Estimate amount Rs. 2,70,000.*—Materials were just beginning to arrive and construction begun at the end of the period. The work is expected to be completed by November 1939.
- (8) *Madura-Virudunagar 66 K.V. line*—*Estimate amount Rs. 6,11,400.*—This was completed by June 1938, the Virudunagar Thermal station being closed down and Pykara power supplied to Rajapalayam, etc., by temporary connexions. The Virudunagar sub-station was not completed until the end of the year.
- (9) *Virudunagar-Koilpatti 66 K.V. line*—*Estimate amount Rs. 5,44,900.*—In order to use indigenous materials as far as possible, reinforced concrete pole construction was adopted for this line. Neither the contract nor the construction has, however, been satisfactory. The work was begun in June 1938 but the line had not been finally

completed by the end of the financial year. It is expected to be finished and supply given to the Koilpatti mill in May 1939.

The photograph facing page 39 gives an idea of the reinforced concrete pole line.

(10) *Virudunagar-Arupukotai Extension and Arupukottai Distribution*—Estimated amount Rs. 1,59,500.—These works were completed in the latter part of the year and supply given in October 1938.

(11) *Madura-Sivaganga-Karaikudi-Manamadura-Okkur extensions*—Estimated amount, Rs. 5,29,000.—This work was begun in October 1938 and was about two-thirds finished by the end of March. It is expected to be completed by July 1939. The poles used on these lines are also of reinforced concrete but manufactured in sections by the Marriot process and assembled at site. These poles are very satisfactory. Facing page 40 is a photograph of the reinforced concrete pole line.

The sub-station structures for practically all of the above lines have been constructed in reinforced concrete instead of fabricated steel. The results are satisfactory.

(12) *Madura Receiving Station*—Expenditure incurred Rupees 1,85,729.—The Control and Synchronous Condenser House was completed, Synchronous Condensers erected and put into service, remaining transformers and other equipment completed and Divisional Electrical Engineer's quarters built. Facing page 41 is a photo of the outdoor station at Madura.

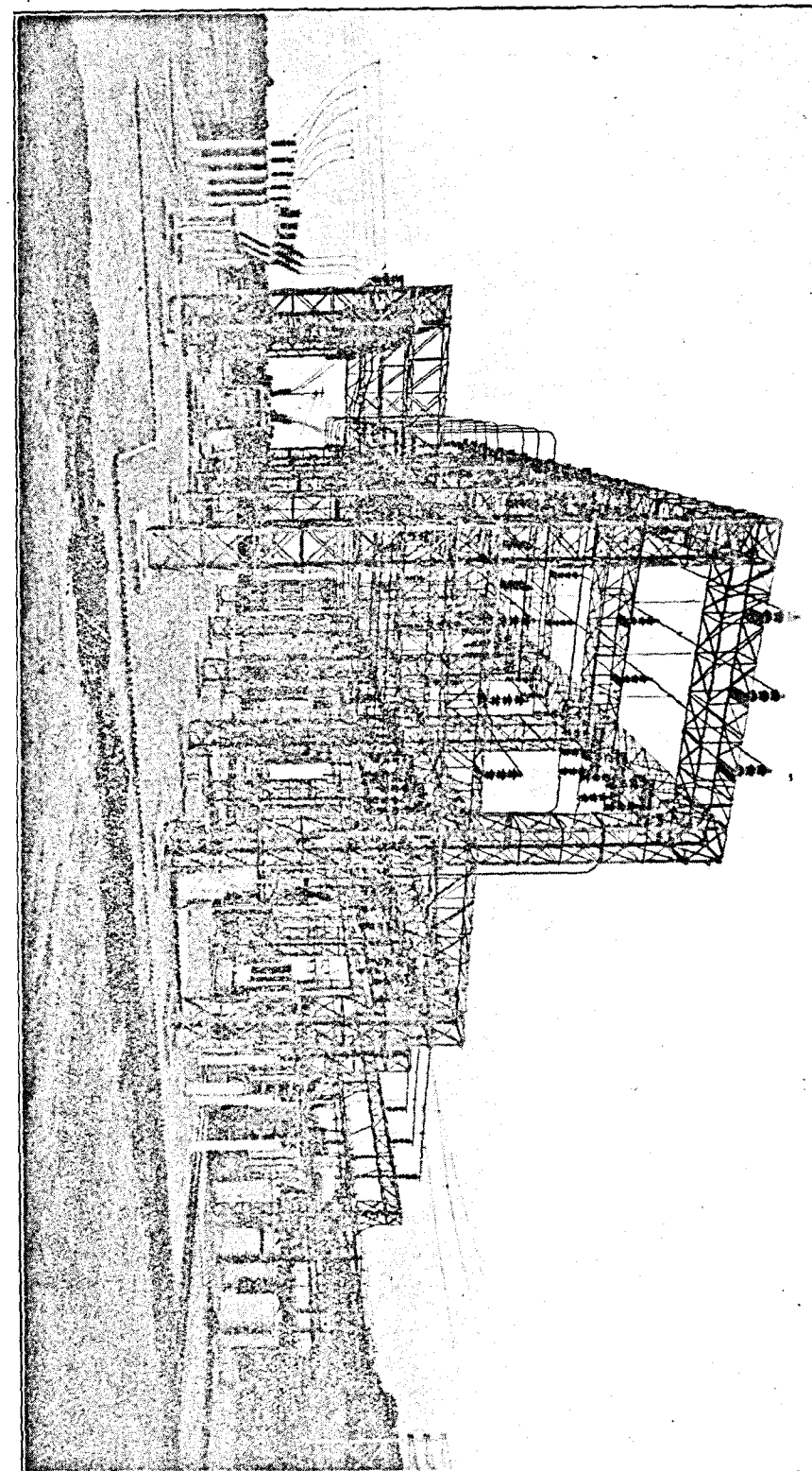
Pykara West Coast Transmission Line Construction Surveys—Estimate amount Rs. 25,000.—A subdivision was sanctioned for this and work started in September. The surveys are expected to be completed by May 1939. They provide for a double circuit 66 K.V. tower line from Singara to Meppadi and single circuit 66 K.V. pole lines branching from there to Calicut and Cannanore.

This subdivision will be continued during 1939-40 to survey the projected Singarappet-Madras 110 K.V. transmission line and investigate the Moyar Scheme.

OTHER ACTIVITIES OF THE DEPARTMENT.

155. *Designs and estimates.*—The headquarters technical divisions continued to be busy. Their work consisted mainly of (a) the preparation of reports for new schemes, (b) preparation of specifications for sanctioned schemes, scrutiny of tenders and award of contracts, (c) purchase of materials for stock and extensions and (d) miscellaneous technical work relating to all the branches of the department including detailed estimates for all sanctioned schemes.

MADURA SUBSTATION



(a) During the year under review, reports for the following important schemes and extensions were prepared:—

	Estimated cost in lakhs of Rs.
(1) Installation of fourth generating unit at Mettur	10.000
(2) Third step-up transformer installation at Mettur	1.640
(3) Extension of Pykara power to West Coast	30.590
(4) West Tinnevely extensions and four distribution schemes in the area ...	5.088

(b) Specifications were prepared and contracts awarded for a number of works with a total value of about Rs. 15.4 lakhs.

Approximate
contract value
in lakhs of
Rs.

Important among the works are—

(1) Nuzvid distribution scheme	.450
(2) Vizianagram distribution scheme ...	1.060
(3) Cocanada power station extensions ...	.507
(4) East Ramnad extensions	3.305
(5) Villupuram-Tindivanam 22 K.V. line. ...	.754
(6) 22 K.V. line to Dalmiapuram	2.006
(7) Trichinopoly sub-station extensions ...	1.255
(8) 66, 33 and 11 K.V. sub-stations at Singarappet, Arkonam and other places ...	1.830
(9) Chandragiri-Pakala extension lines and sub-stations	1.518
(10) 5,000 K.V.A. transformers for Coimbatore	1.500

Detailed estimates for 145 rural and other extensions were prepared during the year, the total estimated value being Rs. 32.928 lakhs.

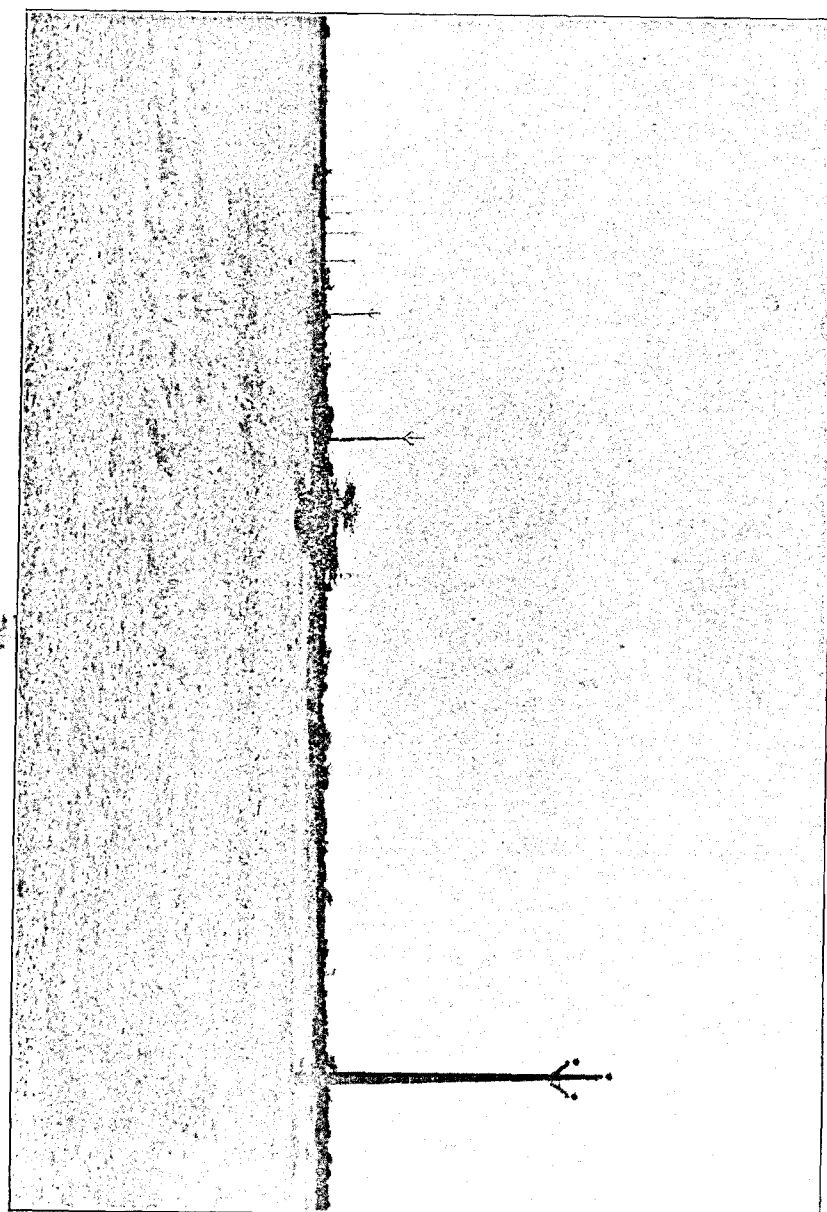
(c) The cost of materials purchased by the Electrical and Mechanical division during the year under review is given in the statement below:—

Serial number and description.	Indian. RS.	British. RS.	Foreign. RS.	Total. RS.
1 For operation and maintenance		56,500	14,900	71,400
2 For extensions	5,62,000	2,90,500	8,66,000	17,18,500
3 For new schemes	4,31,900	5,24,100	5,38,000	14,94,000
4 Extras for schemes for which contracts were awarded in 1936-37 and 1937-38 ..	40,300	81,100	6,000	1,27,400
Total ..	10,34,200	9,52,200	14,24,900	34,11,300
Proportion expressed in per cent	30.4 per cent.	28 per cent.	41.6 per cent.	100 per cent.

The above table does not include the spares for the Pykara and Mettur Hydro-Electric systems covered by English indents costing £2,337.

As usual, all purchases, except those of very small value, were made after inviting tenders. The services of the Indian Stores

SIVAGANGA-MANAMADURA 22 K.V. TRANSMISSION LINE



Department, Delhi, were availed of whenever convenient and advantageous. But it was found that direct purchase resulted in most cases in more economical supply. The department has prepared a set of standard specifications for the line materials, transformers and other gear required for the rural extensions.

156. *Wood poles and their treatment.*—With a view to effect economy in the cost of rural line construction, it was decided to use as far as possible wood poles available in the Presidency. An Ascu pressure treatment plant was made at Mettur Workshops and installed at Coimbatore in November 1938. During the year 606 poles were treated of which 402 were teak and the rest Pali. The teak poles have all been used in extensions while the Pali poles were found to develop serious cracks. Further treatment will be confined to teak and other hard-wood species like Irumbagam and Balagi. Most of the poles so far treated were supplied by the Government Forest department.

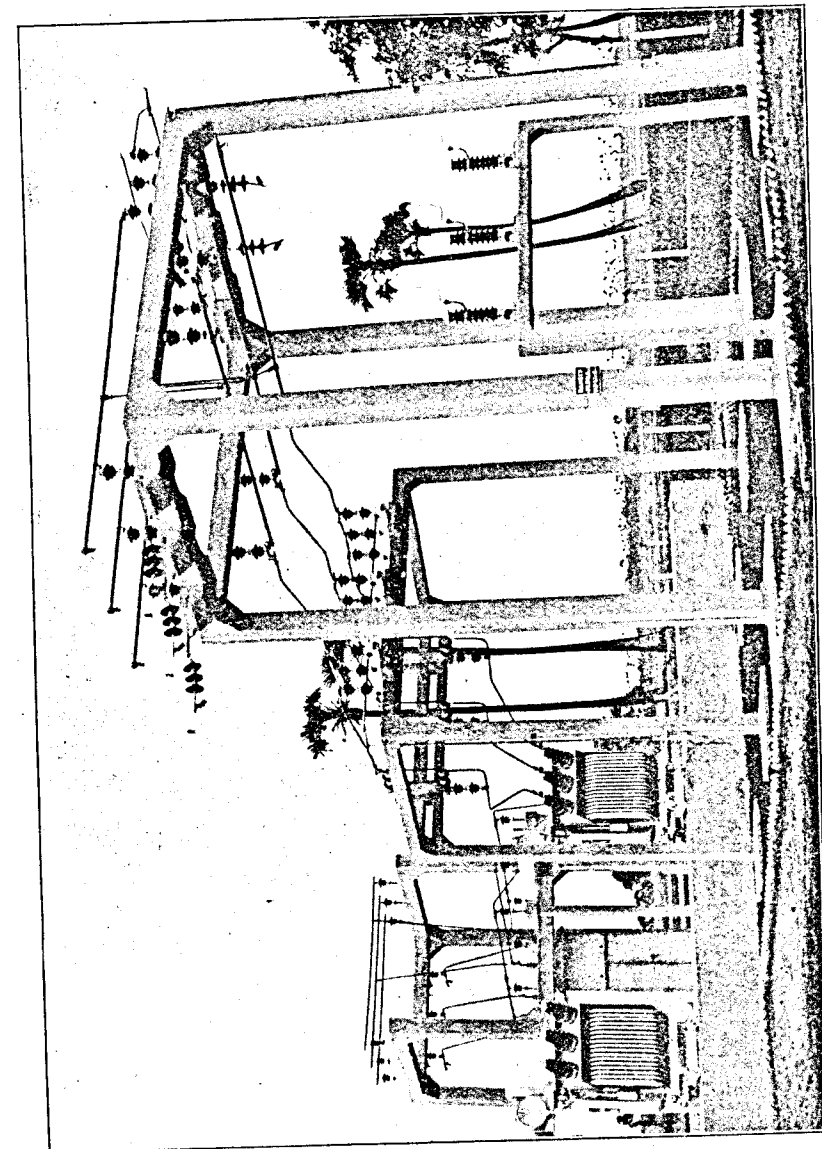
In view of the fact that the treatment of wood poles by the Ascu process has not been entirely satisfactory in the United Provinces, proposals are under consideration for adopting the well-tried process of Creosoting side by side with the Ascu treatment. This will enable a correct comparison of the effectiveness and the relative economies of the two methods.

157. *Reinforced concrete construction.*—For economy and with a view to use indigenous materials reinforced concrete construction has been extensively used during the year both for transmission lines and sub-stations. For the Virudunagar-Koilpatti 66 K.V. line and the 33 K.V. lines in the East Ramnad area reinforced concrete poles have been used and many of the 66, 33 and 22 K.V. sub-stations recently constructed at Villupuram, Koilpatti, Virudunagar, Conjeeveram and other places are of reinforced concrete. The photo facing page 42 gives a view of the 33 K.V. sub-station at Conjeeveram. While the reinforced concrete construction may be considered satisfactory for sub-stations, its economic utility for transmission line supports in this Province has, to-date, been disappointing.

158. *Audits and inspections by the Accountant-General.*—In pursuance of the orders of Government of India regarding the curtailment of expenditure in all Central departments, the Accountant-General suspended his annual local audits and inspections of the offices of the—

Superintending Engineer, Pykara Electricity System
Superintending Engineer, Mettur Electricity System
Superintending Engineer, Construction Branch
Electrical Engineer (General)
Executive Engineer (Electrical), Bezwada

during the year under report. A partial resumption of the local audits and inspections is expected in 1939-40 and the Accountant-General has already agreed to half-yearly inspections of the Papanasam Works during the construction period.



CONJEEVERAM SUBSTATION R.C. STRUCTURES

ADMINISTRATION OF THE INDIAN ELECTRICITY AND CINEMATOGRAPH
ACTS AND RULES.

159. *Electricity Act and Rules.*—The number of licensees giving supply in this Presidency is 74. Of these, 34 are local bodies and 40 are company undertakings. The statutory inspections of all the licensees' works have been carried out and fees claimed. Three licensees have not yet started supply and four applications for licences are under consideration. Appendices F-1, F-2, F-3 are enclosed giving details of these three items. During the year under review seven licensees commenced supply as per details in Appendix F-4. Statement E shows the total generating capacity of plants of all the electric supply undertakings amounting to approximately 135,900 K.V.A. of which the Madras Electric Supply Corporation owns 53,750 K.V.A. and the Madras Government's Pykara and Mettur Power stations comprise about 61,000 K.V.A.

Appendix F-5 gives the names of licensees who reduced their tariffs in the year 1938-39 while F-6 shows the names of licensees who charged more than 6 annas per unit.

The ban imposed on the Hindupur Municipal Electrical undertaking previously to connect further loads still continues.

The fourth generating set of the Kurnool Municipal undertaking was brought into beneficial use during the year under report.

160. During the year accounts of 38 private licensees and 25 local authorities were scrutinized and valuable suggestions offered. Besides these, three applications for the issue of debentures were also scrutinized. This took up the bulk of the time of the inspectorate and the want of additional staff for this work is being increasingly felt.

Electricity supply costs, records and other useful statistical data concerning licensed undertakings are given in Appendix D.

161. *Amendment of the Indian Electricity Act.*—A rough draft Bill to introduce certain amendments to sections 4 to 8, 30, 33, 40, 54 and clause VI of the Schedule to the Indian Electricity Act and the introduction of a new section 8-A was received from the Government of India for views of the Provincial Government. The views of this department have been communicated to Government for consideration.

162. *Amendment of the Indian Electricity Rules, 1937.*—Rules 26, 47, 60, 64, 70, 71, 73, 74, 79, 106 and 116 of the Indian Electricity Rules, 1937, were amended by the Central Electricity Board as certain classifications therein were found necessary to facilitate easy interpretation and efficient administration.

There had been a doubt as to the exact interpretation of rule 51 and it was expected to raise controversies. The Provincial Government have relaxed the provision of this till 1st October 1939, and the matter has been referred to the Central Electricity

Board for a definite enunciation of its intention. The Central Electricity Board has taken up this matter and the amendment of the rule is under consideration. The necessity for enforcing rule 48 in this Presidency is under consideration.

Linked switches have to be provided under rule 60 (i) (d) for all sub-stations. As this would involve unnecessary capital expenditure and also result in retarding the rural development, Government have relaxed the provisions of this rule in the case of some of the licensees.

163. *Cinematograph Act and Rules.*—The total number of working cinemas in the Presidency at the end of 31st March 1939 was 437 of which 190 are permanent and the rest touring. The following figures give a fairly accurate idea of the increase in the number of cinemas in the Province during the last ten years and shows the immense popularity of cinema industry :—

Year.	Permanent.	Touring.	Total.
31st March 1929	70	44	114
Do. 1930	83	66	149
Do. 1931	79	63	142
Do. 1932	84	44	128
Do. 1933	85	48	133
Do. 1934	104	61	165
Do. 1935	103	62	165
Do. 1936	125	100	225
Do. 1937	157	122	279
Do. 1938	189	183	372
Do. 1939	190	247	437

The rate of increase is being still maintained. The number of inspections carried out during the year was 463. Inspections of all the cinemas were carried out thoroughly and methodically.

During the year amendments to Cinematograph Rules were considered in some detail and proposal to amend rules 7, 12, 14, 21 and 22 have been submitted to Government for approval and orders are expected. A proposal for licensing the cinema operators was considered and dropped as the existing provision under rule 36 was considered adequate.

A start was made in the direction of bringing "studios" under the control of the Electrical Inspector. For the first time inspection of studios was undertaken by this division by classifying the studios as factories under paragraph 3 (a) (ii) and (iii) of G.O. No. 2400, P.W. (Electricity), dated 13th October 1936. Of the twelve studios in the Province only three were inspected during the year and hence it is premature to draw any conclusions from the findings of the same. There was a fire accident in the studio of Messrs. Motion Picture Combine, Limited, but the cause of the fire cannot be said to be faulty electrical installation though in an indirect way electricity was the cause of fire. The accident took place by the bursting of bulb and the red hot pieces coming in contact with raw films.

The demands made in the division by the producers and distributors of films in the province for a comprehensive list of cinemas were great and to comply with their request and to make such a list readily available to the public it was decided to print a list of touring and permanent cinemas for sale. Accordingly a list was compiled and it is now in the process of printing after obtaining the necessary Government sanction.

The rapid increase in the number of cinemas has considerably increased the work of the division and the need for entrusting the work of the section under the control of Gazetted Officer is keenly felt. It is hoped that the formation of separate subdivision with an Assistant Engineer in charge of the work in connexion with the Cinematograph Act will not be long postponed.

164. *The Madras Local Authorities' Electrical Undertakings.*—There were 16 municipal undertakings at the end of the previous year and Virudunagar, Dindigul and Pollachi were added to the list during the current year. The Assistant Engineer visited the Local authority undertakings and carried out a systematic inspection of the licensees' works as well as their accounts.

Specifications for additional engines for the Bellary power house and Hagari water works in addition to the electrification of Tanjore water works were drawn up. The matter of taking over the Bellary power house by the Government is yet under consideration.

165. *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 the licensees areas was made up as follows :—

Sub-standards	...	...	...	...	...	97
Meters and instruments	...	...	...	...	...	106
Oil tests	...	...	...	...	...	113
Voltage and earth	...	...	...	...	...	106
Fire extinguishers	...	...	...	...	...	172
Total	...	...	...	...	...	594

Of the 97 sub-standards 39 were from the (Government) Pykara and Mettur systems and the rest from the laboratory and other licensees. During the year, with the exception of 38 licensees the rest have sent their rotating sub-standard for test and adjustment.

During the year, the following extra high pressure lines were tested with the High Tension Double Circuit Testing Gear :—

1	Madura-Virudunagar	...	...	...	66 K.V. line
2	Virudunagar-Rajapalayam	...	...	...	33 K.V. line
3	Vellore-Conjeeveram	...	...	...	33 K.V. line
4	Singarapatti-Villupuram	...	...	...	66 K.V. line

A new sine wave alternator set and a battery charging set were erected in the western extension (machine room) in addition to the re-erection of the existing machines from the central hall of the laboratory and brought into beneficial use.

The new potentiometer and the current transformer testing gear were installed and brought into use.

166. *Expenditure and revenue.*—The expenditure of this division is roughly Rs. 57,600. The revenue to end of 31st March 1939 is Rs. 59,000 subject to any later adjustments.

167. *Accidents.*—There were 138 accidents in all of which 49 were fatal. The following table gives comparative figures for the last three years :—

	1936-37.	1937-38.	1938-39.
Total number of accidents	77	79	138
Number of fatal cases	32	36	49

The considerable increase in the number of accidents during 1938-39 over the previous years is partly due to the rapid expansion of transmission and distribution system.

The details of fatal accidents during 1938-39 are further analysed below :—

Serial number and area.	Employee.	Non-employee.	Animal.	Total.
1 Government Hydro-Electric	..	27	1	28
2 Government Thermal	..	4	..	4
3 Licensees	..	15	..	17
Total	2	46	1	49

Serial number and cause.	66 K.V.	33 K.V.	22 K.V.	11 K.V.	230 L.T.	Total.
1 Climbing of poles and towers out of curiosity or intention to commit suicide	19	2	..	11	5	37
2 Climbing of poles in spite of warning	..	..	..	..	1	1
3 Faulty wiring	..	..	..	..	4	4
4 Snapping of conductors	..	..	..	1	3	4
5 Development of potential in poles, etc., due to faulty earthing	..	..	..	..	1	1
6 Accidental (other causes)	..	..	..	..	2	2
Total	19	2	..	12	16	49

It is generally observed that the accidents have been taking place mainly in the rural areas. Printed notices and pictorial posters to educate people on the risks of interfering with electric wires were widely distributed. With the co-operation of the village authorities and the Police department mischievous element tampering with electric lines can be brought to book but suicides cannot be checked; publicity and education about the dangers of touching electric lines may on the other hand encourage suicides.

ELECTRICAL INSTALLATIONS IN GOVERNMENT.

168. The following statement shows the progress during the last three years :—

	1936-37.	1937-38.	1938-39.
	RS.	RS.	RS.
	LAKHS.	LAKHS.	LAKHS.
Total cost of electrical installations to end of the year	44.87	47.30	49.11
New works done	1.71	2.43	1.81
Maintenance cost	1.62	1.77	1.53
Current consumption paid	2.33	2.4	2.3
Percentage cost of maintenance on capital cost	3.6	3.74	3.12

As the work has increased considerably beyond the capacity of the present staff of the Electrical Engineer's (General) divisions, proposals for suitable reinforcement have been submitted to Government.

STAFF.

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

Lieut.-Col. M. G. Platts continued to officiate as Chief Engineer for Electricity and Mr. E. J. B. Greenwood as Deputy Chief Engineer and Electrical Inspector to Government (Superintending Engineer's rank) until 1st December 1938 forenoon during the absence of Sir Henry Howard, Chief Engineer, on leave out of India and on deputation to Peshawar as adviser to the North-West Frontier Province Government on the Malakand Hydro-Electric Scheme. Sir Henry Howard resumed charge of the duties of the Chief Engineer (Electricity) and Electrical Inspector to Government on 1st December 1938 forenoon.

On relief by Sir Henry Howard of the duties of the Chief Engineer (Electricity) on 1st December 1938 forenoon, Lieut.-Col. M. G. Platts underwent military training at Ahmednagar. A temporary post of Superintending Engineer in the cadre of the Indian Service of Engineers for the period from 1st December 1938 to 23rd December 1938 (both days inclusive) was created to permit such training. On completion of military training, Lieut.-Col. M. G. Platts resumed charge of the post of Superintending Engineer, Construction Branch, relieving Mr. L. Henshaw on 24th December 1938 forenoon from which date, the latter availed of leave for seven months sanctioned to him.

During the abovementioned period of absence of Sir Henry Howard an extra post of Assistant Engineer (Electrical) was sanctioned for a period of three months for the office

of the Chief Engineer for Electricity to relieve the Deputy Chief Engineer of a portion of his work in order to cope with the additional work thrown upon him consequent on the assumption of the duties of Electrical Inspector to Government. The post was utilized from 16th September 1938 forenoon to 15th February 1939 afternoon, the original sanction having been extended by a further period of two months.

With effect from 1st December 1938 forenoon the rank of Deputy Chief Engineer for Electricity, Mr. E. J. B. Greenwood was reduced to that of an Executive Engineer consequent on the assumption of the duties of Electrical Inspector to Government by Sir Henry Howard. Mr. E. J. B. Greenwood continued as Deputy Chief Engineer until 28th February 1939 afternoon from which date he proceeded on leave for four months on relief by Sri G. Yoganandam.

Sri Rao Bahadur G. Sundaram continued as Superintending Engineer, Pykara Electricity System, during the year under report.

Sri P. V. Chari continued as Superintending Engineer, Mettur Electricity System, until 1st October 1938 afternoon from which date he proceeded on leave for four months, on relief by Mr. J. Kuriyan, Divisional Electrical Engineer, Pykara System, who was appointed as Superintending Engineer under the emergency rules and continued as such for the remainder of the year under report.

The headquarters of the Superintending Engineer, Construction's Central Office, were, with effect from 3rd January 1939 forenoon, shifted from Madras to the work site, i.e., Papanasam but the headquarters of the Superintending Engineer, Construction Branch, retained at Madras.

Sri T. J. Mirchandani continued as Executive Engineer (Electrical), Bezwada, during the whole of the year.

Sri M. Subramaniam continued as Electrical Inspector till 2nd February 1939 forenoon from which date he proceeded on leave and was relieved by Sri P. V. Chari who continued as Electrical Inspector during the rest of the year.

Mr. A. C. D. Rozario and Sri G. Krishnaswami Ayyar continued as Electrical Engineer (General) and Executive Engineer, Civil and Hydraulic Division, respectively, during the whole of this year.

Sri G. Yoganandam continued as Executive Engineer, Electrical and Mechanical Division, till 4th August 1938 afternoon from which date he availed of leave for five months and was relieved by Sri P. V. A. Narayanamurthi, Assistant Engineer, Electrical and Mechanical Division,

who was temporarily promoted as Executive Engineer, Electrical and Mechanical Division, during the above period and reverted as Assistant Engineer (Electrical) on return from leave of Sri G. Yoganandam. The latter continued as Executive Engineer, Electrical and Mechanical Division, till 28th February 1939 afternoon on which date he assumed charge of the post of the Deputy Chief Engineer in relief of Mr. E. J. B. Greenwood. Sri B. R. Somayajulu held the post of Executive Engineer, Electrical and Mechanical Division, from 28th February 1939 afternoon onwards.

Sri K. C. Thampan, Assistant Engineer (Electrical), Pykara System, was promoted as Divisional Electrical Engineer in that system on 27th August 1938 afternoon vice Mr. J. Kuriyan granted leave and continued as such throughout the year.

Sri B. R. Somayajulu, Divisional Electrical Engineer, Coimbatore, proceeded on leave for two months from 1st October 1938 forenoon and Sri K. Ramamurthi, Assistant Engineer (Electrical), was promoted as Divisional Electrical Engineer in the above leave vacancy.

The post of Divisional Electrical Engineer, Vellore, was filled with effect from 1st December 1938 forenoon and Sri V. K. Govinda Menon was promoted in the chain of transfers and promotions made in consequence.

Sri L. Ekambaram was promoted as Divisional Electrical Engineer, Coimbatore, with effect from 26th February 1939 in relief of Sri B. R. Somayajulu transferred as Executive Engineer, Electrical and Mechanical Division.

Sri Rao Sahib S. R. Krishnamurthi, Executive Engineer, Pykara Plant Extensions, Glen Morgan, was, with effect from 7th April 1938, transferred as Executive Engineer (Civil), Papanasam, with headquarters at Madras and Sri Rao Sahib N. Krishnamurthi, Personal Assistant to Superintending Engineer, Construction Branch, Madras, transferred to Glen Morgan as Executive Engineer, Pykara Plant Extensions, in place of the former.

Sri P. V. A. Narayanamurthi, Assistant Engineer, Electrical and Mechanical Division, was appointed as Technical Assistant, Electricity Circle, Public Works Department, North-West Frontier Province, and was relieved in this department on 28th February 1939 afternoon.

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

Class I, category 2—Executive Engineers—

- 1 Sri B. R. Somayajulu.
- 2 „ G. Yoganandam.

Class I, category 3—Assistant Engineers—

- 1 Sri T. Krishnaswami.
- 2 „ S. N. Ramachandra Rao.
- 3 „ V. P. Appadurai.
- 4 „ P. Venkataramiah.
- 5 „ P. R. Sundaram.
- 6 „ P. A. Krishnan.
- 7 „ B. V. Ananda Rao.
- 8 „ G. S. Rama Ayyar.

Class II—Assistant Engineer (Civil).

Sri M. Gopalan Nair.

The following appointments of Assistant Engineers were made during the year:—

Class I, category 3—

Sri T. R. Ramachandran.
 „ G. S. Ramaswami.
 „ L. M. Sundaram.
 „ N. B. Vasudevan.
 „ D. S. Prakasa Rao.
 „ P. Rajagopal Pillai.
 „ R. Ramachandran Pillai.
 Dr. A. G. Kantayya.

RETIREMENT.

Sri P. Natesa Ayyar, Executive Engineer, Civil and Hydraulic Division, retired from service on 1st July 1938, having completed 55th year by that date.

MADRAS,
 4th July 1939.

H. G. HOWARD,
 Chief Engineer for Electricity.

APPENDIX A.

List of constructions undertaken with effect from 1st July 1938 to end of 1938-39.

Name of schemes.	Expenditure during 1938-39.		Total expenditure end of 1938-39.
	(2)	(3)	
	RS.	RS.	
I. Government Schemes—			
(1) Pykara Hydro-Electric Project—			
79. I.A. (1) Pykara Hydro-Electric Scheme	5,05,482	2,39,529	
(2) Additional generating machinery at Pykara	22,59,122	8,69,246	
(3) Distribution of power in the Pykara System (Major and Minor Extensions)	8,01,590	43,09,860	
(4) Supply of power to Virudunagar and Rajapalayam	4,51,626	8,58,554	
(5) Mukurti Dam	— 8,088	14,94,795	
(6) Supply of electric power to Madura	3,14,833	30,61,056	
(7) Supply of electric power to Kovilpatti	4,60,548	4,61,402	
(8) Supply of electric power to Periyakulam, Theni and Bodinayakanur	2,11,432	2,11,432	
(9) Supply of electric power to Gobichettipalayam and five other villages	1,51,671	1,51,671	
(10) Supply of electric power to Ramanad district	2,62,903	2,62,903	
Total, Pykara System	55,11,129	2,68,48,449	
(2) Mettur Hydro-Electric Project—			
(1) Mettur Main Scheme	15,47,322	1,00,83,432	
(2) Erode-Trichinopoly Extension	681	11,80,871	
(3) Trichinopoly-Negapatam Extension	1,11,617	22,02,018	
(4) Karur Electric Supply Scheme		79,567	
(5) Extension of supply to Ranipet, Kaveripakkam and Conjeeveram	1,78,685	3,59,625	
(6) Extension of supply to Arkonam	1,70,873	1,71,618	
(7) Distribution of power in the Mettur System	6,49,868	8,35,133	
(8) Supply of electric power to Pakala and Tirupati	3,083	3,083	
(9) Cost of works transferred from Pykara System	156	9,80,513	
Total, Mettur System	26,62,285	1,58,95,860	
(3) Papanasam Hydro-Electric Project	10,52,300	10,52,300	
(4) Thermal Schemes—			
Vizagapatam Thermal Scheme—			
(1) Vizagapatam Thermal Station	3,76,712	17,72,287	
(2) Supply of electric power to Bobbili	29,008	95,217	
(3) Distribution of electric power in Vizianagram	1,06,173	1,06,173	
Total, Vizagapatam Thermal Scheme	5,11,893	19,73,677	

APPENDIX A—cont.

List of constructions undertaken with expenditure to end of
1938-39—cont.

Name of schemes. (1)	Expenditure during 1938-39. (2) RS.	Total expenditure to end of 1938-39. (3) RS.
I. Government Schemes—cont.		
(4) Thermal Schemes—cont.		
Bezawada Thermal Scheme—		
(1) Bezawada Thermal Station	7,42,205	16,53,726
(2) Extension to Tenali	1,22,321	1,22,321
Total, Bezawada Thermal Scheme ..	8,64,526	17,76,047
Cocanada Thermal Station	3,988	3,988
II. Municipal Schemes—		
Udamalpet	10,063	84,616
Palni	15,773	58,650
Bodinayakkanur	4,413	49,004
Periyakulam	3,129	65,582
Sivakesi	31,584	84,617
Dharapuram	47,634	81,629
Karur	14,037	1,14,123
Tiruppattur	56,246	1,10,573
Tiruvannamalai	47,200	1,05,500
III. 50. Civil Works—New Electrical Works ..	1,81,000	49,11,000

APPENDIX B.

Budget provision for capital works in 1939-40.

Capital expenditure.	1939-40 (Budget). RS.
I. Hydro-Electric Schemes—	
81. A. I.A. Pykara Hydro-Electric Scheme—	
Pykara Hydro-Electric Scheme	2,01,100
Additional generating machinery at Pykara ..	3,18,400
Distribution of power in the Pykara System ..	2,00,000
Supply of power to Virudunagar and Rajapalayam ..	1,000
Supply of electric power to Madura	21,200
Supply of power to Kovilpatti	33,100
Supply of electric power to Periyakulam, Theni and Bodinayakkanur	2,200
Supply of electric power to Gobichettipalayam and five other villages	24,600
Supply of electrical power to Ramnad district ..	66,000
Construction of transmission lines and other works for supply of power to intending consumers ..	5,50,000
Pension charges	8,500
Total, 81. A. I.A. Pykara Hydro-Electric Scheme ..	14,26,100

APPENDIX B—cont.

Budget provision for capital works in 1939-40—cont.

	1939-40 (Budget). RS.
81. A. I.B. Mettur Hydro-Electric Scheme—	
Mettur Main scheme	43,400
Erode-Trichinopoly Extension	1,100
Extension of supply to Ranipet, Kaverippakkam and Conjeevaram	1,100
Extension of supply to Arkonam	14,300
Distribution of power in the Mettur System	4,00,300
Supply of electric power to Pakala and Tirupati ..	2,16,900
Construction of transmission lines and other works for supply of power to intending consumers ..	4,00,000
Pension charges	4,400
Suspense	80,000
Total, 81. A. I.B. Mettur Hydro-Electric Scheme ..	10,01,500
81. A. I.C. Papanasam Hydro-Thermal Project—	
Papanasam Hydro-Thermal Project—	
Charged and Voted	29,43,800
Total, 81. A. I. Hydro-Electric Schemes ..	53,71,400
81. A. II.C. Vizagapatam Thermal Station—	
Vizagapatam Thermal Station	38,500
Supply of electric power to Bobbili	2,100
Distribution of electric power in Vizianagram ..	37,000
Distribution of power in the Vizagapatam Thermal area	1,00,000
Pension charges	800
Total, 81. A. II. C. ..	1,78,400
81. A. II.D. Bezawada Thermal Station—	
Bezawada Thermal Station	55,900
Extension to Tenali	26,300
Distribution of power in the Bezawada area	1,00,000
Pension charges	800
Total, 81. A. II.D. ..	1,83,000
81. A. II.E. Cocanada Thermal Station—	
Cocanada Thermal Station	3,29,300
81. A. II.F. Palacole Thermal Station—	
Palacole Thermal Station	93,200
81. A. II.G. Madanapalle Thermal Station—	
Madanapalle Thermal Station	1,07,000
81. A. II.H. Nandyal Thermal Station—	
Nandyal Thermal Station	1,79,800
81. A. II.J. Tadpatri Thermal Station—	
Tadpatri Thermal Station	1,61,800
Total, 81. A.II. Thermo-Electric Schemes ..	12,32,500
Grand Total, 81.A. ..	66,03,900
Deduct lump sum for probable savings ..	— 3,50,600
Total, 81. A.—Capital outlay on electric schemes (outside the Revenue Account) ..	62,53,300

APPENDIX C.

Details of establishment charges of the department and fees earned during 1938-39 and estimated for 1939-40.

	Expenditure in 1938-39 (Final modification).	1939-40 (Budget).
	RS.	RS.
Electrical Engineer (General)—		
Salaries, allowances, etc.	66,100	58,800
Revenue	..	..
Net cost ..	66,100	58,800
Electrical Inspector—		
Salaries, allowances, etc.	63,800	62,400
Revenue	51,500	52,500
Net cost ..	12,300	9,900
Revenue from water power—		
Royalty from Mysore Government	1,000	81,000
Receipts from the Electricity Duty, 1939 ..	..	3,75,000
Chief Engineer's Office including Technical Section—		
Salaries, allowances, works, etc.	1,88,800	1,84,600
Revenue (charges recoverable from Governments and departments)	— 2,26,200	— 1,90,200
Net salaries and allowances ..	— 33,400	— 5,600
Pykara Hydro-Electric System—		
Salaries, allowances, etc.	2,90,800	3,06,300
Less charges payable to or recoverable from Governments, departments and others ..	— 1,44,800	— 75,400
Net salaries and allowances	1,46,000	2,30,900
Operation and maintenance expenditure ..	17,42,500	11,60,500
Revenue	31,07,500	35,75,900
Net surplus ..	12,19,000	21,84,500
Mettur Hydro-Electric System—		
Salaries, allowances, etc.	1,83,400	1,70,800
Less charges payable to or recoverable from Government departments and others ..	— 51,700	— 17,300
Net salaries and allowances ..	1,31,700	1,53,500
Operation and maintenance expenditure ..	4,31,200	3,93,000
Revenue	10,44,900	13,85,500
Net surplus ..	4,82,000	8,39,000

APPENDIX C—cont.

Details of establishment charges of the department and fees earned during 1938-39 and estimated for 1939-40—cont.

	1939-40 (Budget).
	RS.
Vizagapatam Thermal Electric Scheme—	
Salaries, allowances, etc.	39,500
Charges payable to or recoverable from Government departments and others	6,200
Net salaries and allowances ..	45,700
Operation and maintenance expenditure	75,000
Revenue	1,41,800
Net surplus ..	21,100
Bezwada Thermal Electric Scheme—	
Salaries, allowances, etc.	43,400
Charges payable to or recoverable from Government departments and others	9,400
Net salaries and allowances ..	52,800
Operation and maintenance expenditure	1,23,800
Revenue	2,06,500
Net surplus ..	29,900
Cocanada Thermal Electric Scheme—	
Salaries, allowances, etc.	5,100
Charges payable to or recoverable from Government departments and others	1,400
Net salaries and allowances ..	6,500
Operation and maintenance expenditure	16,600
Revenue	28,200
Net surplus ..	5,100

APPENDIX D-1.

Table of electric supply costs and records—Companies.

Serial number and name of undertaking.	Year of operation.	Year of accounts to which the figures refer.	Population of the area of supply.	System and voltage of supply.	Capital—Total expenditure at the end of the year.	Revenue			Costs—Working costs (includes interest, income-tax and loan repayments).	Gross profit.	
						(6)	(7)	(8)		(10)	(11)
(1)	(2)	(3)	(4)	(5)	(6)	Rs.	£	Rs.	£	Rs.	PER CENT.
1 Madras	30th	1937	680,267	D.C. 450/225 V A.C. 440/250 V 50 cycles.	15,23,891	5,27,912	265,543	8,697	200,805	154,894	10.5
2 Kanadubathan	15th	1937-38	28,300	A.C. 400 V/280 V 50 cycles/D.C.	5,27,912	71,164	14,242	Rs.	66,711	45,061	8.94
3 Devakottai	14th	1937-38	20,378	A.C. 400/280 V 50 cycles/D.C.	2,87,688	52,176	7,808	7,808	54,569	24,058	8.52
4 Cochin	13th	1937-38	22,818	A.C. 400/230 V 50 cycles.	83,283	32,524	2,641	2,641	30,365	6,514	8.09
5 Trichinopoly-Srirangam ..	10th	1937-38	171,035	Do.	16,15,407	4,20,551	42,203	42,203	3,19,616	2,29,230	15.8
6 Rajamahendry	10th	1937-38	63,526	Do.	4,34,626	93,589	7,184	7,184	79,571	57,541	13.49
7 Calicut	9th	1937-38	94,273	Do.	10,38,554	1,53,774	7,785	7,785	1,09,826	82,191	8.1
8 Karaikudi	8th	1937-38	21,232	Do.	3,66,570	84,349	14,440	14,440	74,922	53,043	16.08
9 Vellore	8th	1937-38	61,173	Do.	2,84,297	1,09,527	10,624	10,624	1,06,379	56,142	18.9
10 Guntur	6th	1937-38	63,179	Do.	6,99,807	1,02,721	11,673	11,673	76,335	54,934	8.18
11 Kumbakonam	6th	1937-38	62,317	Do.	6,03,789	1,17,892	9,882	9,882	97,876	67,136	12.04
12 Nattarakottai	6th	1937-38	16,854	Do.	2,17,459	27,037	3,977	3,977	30,471	8,049	1.84
13 Nallem-Kode	6th	1937-38	185,661	Do.	7,36,475	2,53,509	23,870	23,870	2,41,519	90,475	12.9
14 Mangalore	5th	1937-38	49,100	Do.	7,78,939	1,32,182	10,688	10,688	1,47,689	50,193	6.55
15 Palghat	5th	1937-38	169,500	Do.	1,72,918	37,659	4,069	4,069	32,245	15,985	10.12
16 Timirvelly-Tuticorin ..	5th	1937-38	91,000	Do.	14,68,762	2,23,101	46,433	46,433	2,76,568	92,888	8.65
17 East Tanjore	4th	1937-38	91,000	Do.	12,99,400	1,88,310	46,888	46,888	1,64,211	1,19,569	10.3

* Figures taken from 1937-38 administration report.

18 Nellore	4th	1937-38	45,895	Do.	4,06,203	48,222	9,000	41,632	23,774	7.0
19 Tirupati-Tirumalai ..	5th	1936-37	28,189	Do.	6,10,439	50,110	2,498	59,136	22,670	3.75
20 Chittoor	4th	1937-38	22,018	Do.	1,30,442	20,716	2,204	19,444	8,554	7.05
21 Nageswaram	3rd	1937	48,627	Do.	2,24,911	72,681	6,566	81,343	25,404	10.08
22 Okkur	3rd	1937-38	20,000	Do.	1,89,761	16,114	1,313	21,296	1,377	0.61
23 Proddatur	3rd	1937-38	20,124	Do.	1,03,324	15,405	1,957	18,581	1,820	6.3
24 South Arcot	3rd	1937	1,50,000	Do.	8,16,726	1,50,682	8,296	1,22,408	46,823	17.8
25 Vizagapatam	4th	1937-38	57,303	Do.	2,88,141	1,14,801	12,211	1,03,630	49,101	1.9
26 Adoni	1st	1937	..	Do.	1,30,088	6,244	1,179	6,988	1,231	1.14
27 Gudiyattam	1st	1937-38	..	Do.	69,892	6,002	2,584	8,048	534	1.17
28 Gudiyattam	1st	1937-38	..	Do.	60,298	3,481	389	3,181	70	0.22
29 Ellore	1st	1937-38	..	Do.	3,85,590	12,342	1,569	17,477	3,507	4.6
30 West Ramnad	1st	1937-38	..	Do.	96,331	590	508	508	210	0.81
31 Narasaraopet	1st	1937-38	..	Do.	1,01,334	4,551	3,074	5,127	1,498	1.14
32 Ongole	1st	1937-38	..	Do.	1,05,231	709	33	1,426	684	5.46
33 Cuddapah	1st	1937-38	..	Do.	* 1,10,368	15,389	3,487	12,925	6,030	0.61
34 Ambur-Vaniyambadi ..	1st	1937-38	..	Do.	1,41,518	8,052	1,611	8,784	905	..
35 Chingleput	..	1937-38	..	Do.	Accounts not available.	Have not commenced supply.	..	..	..	..
36 Tellicherry-Cannanore ..	..	1937-38	..	Do.	2,46,826	..	..	..	..	..
37 Chittoor	..	1937-38	..	Do.	37,111	..	..	..	..	..
38 Bobbili	..	1937-38	..	Do.	..	..	..	..	..	..
39 Anakapalle	..	1937-38	..	Do.	..	..	..	..	..	..
40 Udupi	..	1937-38	..	Do.	..	..	..	..	..	..
41 East Ramnad	..	..	..	Do.	..	..	..	..	..	..
42 Salur-Parvathipur ..	..	..	..	Do.	..	..	..	..	..	..

* Accounts 31st December 1936 to 31st March 1938. Commenced working on 21st February 1938. Population taken from 1937-38 administration report.

Supply not commenced.

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

Serial number and name of of undertaking.	(12) Interest, special expenditure and income-tax on profit.	(13) Amount provided for depre- ciation and reserve.	(14) Financial result (surplus (+) or deficit (—)).	(15) Total of depreciation and reserve.	(16) Dividend on ordinary shares.	(17) Number of consumers.	(18) Number of units sold.	(19) Increase (+) or decrease (—) per cent on previous year.	Cost per unit sold.					
									Generation.				Repairs, maintenance and stores.	Distribution.
									(20) Coal and other fuel.	(21) Salaries and wages.	(22) Repairs, maintenance and stores.	(23) Distribution.		
1 Madras	£ 21,459	£ 60,000	£ 73,435	£ 546,901	8	PER CENT.	45,180,373	18.7	0.22	0.06	0.06	0.13		
2 Kanadukathan	£ 4,993	£ 20,388	£ 18,695	£ 1,87,224	..	523	282,750	14.21	0.71	0.24	0.30	0.32		
3 Devakottai	£ 4,918	£ 14,822	£ 5,415	£ 1,12,620	..	604	277,530	19.51	0.77	0.23	0.4	0.13		
4 Cochin	..	£ 2,937	£ 4,800	£ 3,700	0.93	165	124,179	..	0.75	0.53	0.84	0.7		
5 Trichinopoly-Srirangam	£ 30,564	£ 47,535	£ 1,43,143	£ 2,92,956	12 *	5,072	4,786,161	38	..	0.02	0.08	0.08		
6 Rajahmundry	£ 10,295	£ 26,213	£ 21,220	£ 1,15,854	5	795	496,533	19.47	0.48	0.28	0.17	0.27		
7 Calicut	£ 3,843	£ 23,500	£ 50,102	£ 63,789	24 interim	1,492	870,534	19.09	0.57	0.12	0.19	0.08		
8 Karaikudi	£ 16,830	£ 13,432	£ 23,866	£ 1,03,236	10	753	406,870	37.42	0.52	0.14	0.35	0.22		
9 Wellore	£ 24,415	£ 17,996	£ 14,250	£ 59,813	..	947	552,073	14.6	..	..	..	0.19		
10 Gunnur	£ 16,831	£ 25,000	£ 33,060	£ 42,332	..	1,147	472,909	34.7	0.53	0.22	0.21	0.34		
11 Kumbakonam	£ 9,923	£ 35,217	£ 29,936	£ 1,31,430	7†	1,448	601,346	23.05	0.87	0.29	0.48	0.20		
12 Nattarasankottai	£ 8,933	£ 45,339	£ 35,860	£ 1,64,942	5	2,389	2,697,126	37.5	..	..	..	0.27		
13 Salem-Kode	£ 9,475	£ 35,348	£ 4,824	£ 1,19,717	..	1,341	703,372	112.4	0.48	0.28	0.18	0.18		
14 Mangalore	£ 19,334	£ 6,210	£ 9,483	£ 19,614	..	452	189,472	7.45	0.57	0.24	0.46	0.42		
15 Palghat	£ 1,898	£ 6,311	£ —	£ 2,16,870	..	2,718	938,209	53.2	..	0.02	..	0.17		
16 Tinnevely-Tuticorin	£ 37,008	£ 61,311	£ —	£ 6,024	8	3,983	1,407,997	84.5	0.42	0.16	0.12	0.27		
17 East Tanjore	£ 16,255	£ 24,654	£ 70,86	£ 52,502	..	578	292,643	16.6	0.54	0.44	0.22	0.31		
18 Nellore	£ 6,433	£ 10,340	£ 10,340	£ 778	..	263	245,945	2.6	..	..	..	0.29		
19 Tirupatt-Tirumalai	£ 4,845	£ 23,573	£ —	£ 1,16,779	..	595	845,718	13.3	1.01	0.38	0.69	0.05		
20 Chittoor	£ 1,965	£ 3,130	£ 3,475	£ 8,783	6	112	87,080	99	0.87	0.79	0.22	0.44		
21 Nagesapatam	£ 2,669	£ 7,449	£ 14,349	£ 14,787	..	188	78,187	20.7	0.80	0.10	0.35	0.25		
22 Okkur	£ 5,284	£ ..	£ —	£ 8,634	..	1,423	1,007,165	48	..	..	..	..		
23 Proddatur	£ 39	£ 10,000	£ —	£ 10,000	..	..	..	..	..	..	..	..		
24 South Arcot	£ 399	£ ..	£ 36,570	£ ..	..	..	..	..	..	..	..	..		

25 Vizagapatam	6,765	19,683	23,233	40,862	..	926	638,718	43.8	1.3 †	0.19	0.11	0.30	
26 Adoni	883	..	386	..	..	161	26,766	..	..	0.23	1.30	0.17	
27 Gudiyasam	71	880	538	880	..	85	34,622	..	..	..	..	0.2	
28 Gudiyasam	48	NIL	688	NIL	..	93	15,358	..	..	..	..	0.17	
29 Killore	..	..	—	8,567	..	258	31,348	..	..	..	..	0.65	
30 West Rannad	..	..	637	..	..	32	2,448	..	..	..	..	0.10	
31 Narasaraopet	..	..	2,498	..	..	131	23,650	..	1.02	0.57	0.25	0.11	
32 Ongole	..	1,200	—	NIL	3	49	4,612	..	1.88	0.73	0.21	0.54	
33 Cuddapah	82	NIL	4,732	1,200	..	321	54,294	..	0.82	0.56	0.35	0.20	
34 Ambur-Vaniyambadi	210	..	879	NIL	..	309	40,135	..	..	..	..	..	
35 Chingleput	..	..	..	..	..	..	..	..	..	..	..	..	
36 Tellicherry-Cannanore	..	..	..	..	..	..	..	..	..	..	..	..	
37 Chitacole	..	..	..	..	..	..	..	..	..	..	..	..	
38 Bobbili	..	..	..	..	..	..	..	..	..	..	..	..	
39 Anakapalle	..	..	..	..	..	..	..	..	..	..	..	..	
40 Udipi	..	..	..	..	..	..	..	..	..	..	..	..	
41 East Rannad	..	..	..	..	..	..	..	..	..	..	..	..	
42 Saur-Parvatipur	..	..	..	..	..	..	..	..	..	..	..	..	

* Includes bonus of two per cent.
† Includes waste and stores.
‡ Part supply purchased from Government.

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

Serial number and name of undertaking.	Cost per unit sold.					Average prices obtained.				Supply records (unit sold per head of population).			
	(24) Rent, rates and taxes.					(25) Management salaries and insurance.				(26) Total working costs.			
	AS.	AS.	AS.	AS.	AS.	AS.	AS.	AS.	AS.	AS.	AS.	AS.	PER CENT.
1 Madras ..	0.02	0.14	0.9	0.00	1.06	3.64	1.7	1.45	13.4	49.7	14,400	36.0	
2 Kanadukathan ..	0.02	0.45	3.37	0.27	3.76	8.4	2.53	4.75	2.75	1.61	144	21.4	
3 Devakottai ..	0.02	0.33	2.76	0.22	3.14	5.81	1.57	3.3	3.55	3.63	145	21.9	
4 Cochin ..	0.03	0.38	3.90	..	3.9	5.7	3.48	4.52	2.65	1.93	60	23.9	
5 Trichinopoly-Srirangam ..	0.01	0.12	0.9	0.1	1.07	3.02	1.9	1.55	4.36	20	1,208	49.2	
6 Belamundry ..	0.02	0.21	2.23	0.31	2.74	5.57	4.03	3.40	2.99	3.77	194	27.2	
7 Calicut ..	0.04	0.47	1.49*	0.7	2.02	5.66	3.83	3.2	2.98	4.98	390	23.6	
8 Karkudi ..	0.04	0.25	2.43	0.7	2.66	5.12	2.00	3.86	8.31	4.52	188	24.1	
9 Vellore ..	0.03	0.51	1.83	0.3	3.05	4.92	4.00	3.42	3.05	3.97	196	32.15	
10 Gunnur ..	0.03	0.65	2.04	0.47	2.58	5.57	2.39	3.48	2.49	3.05	250	21.6	
11 Kumbakonam ..	0.05	0.49	2.34	0.03	2.6	5.00	2.37	3.42	2.12	1.97	290	23.6	
12 Nattarasankottai ..	0.02	0.5	2.6	0.95	3.66	4.83	2.74	3.62	11.9	2.65	60	915.2	
13 Salem-Erode ..	0.02	0.3	1.33	0.01	1.43	5.01	2.5	3.22	3.63	6.01	319	33.8	
14 Rangaia ..	0.06	0.72	2.88	0.44	3.34	5.81	2.9	3.51	1.55	1.67	88	25.4	
15 Tiruvallur-Tuticorin ..	0.01	0.52	2.56	..	2.72	5.82	4.1	4.36	1.24	1.24	533	26.4	
16 Tiruvallur ..	0.08	0.92	3.86	0.60	4.47	3.84	2.18	2.65	4.95	6.4	562	28.1	
17 East Tanjore ..	0.02	0.35	1.57	0.18	1.75	5.8	0.32	3.44	2.82	2.82	190	31.2	
18 Tirupattur ..	0.06	0.5	3.5	0.32	3.85	4.5	2.9	3.44	1.77	..	50	19.9	
19 Tirupattur-Tirumalai ..	0.05	0.82	3.22	0.36	3.58	5.5	2.56	4.22	0.91	14.6†	560	17.3	
20 Chittoor ..	0.01	0.64	2.65	0.02	1.54	7.1	2.38	3.2	1.62	3.5	35	27.9	
21 Nellore ..	0.02	0.57	3.3	0.98	3.92	5.00	2.77	3.45	0.75	1.11	43	18.69	
22 Okkur ..	0.10	1.25	3.67	0.02	3.80	5.00	4.47	2.54	3.34	2.66	854	32.3	
23 Proddatur ..	0.05	0.48	1.78	0.01	1.96	6.1	2.9	3.18	8.4	1.76	280	32.5	
24 South Arcot ..	0.02	0.43	2.16	0.03	2.6	..	..	..	..	..	..	..	
25 Vengalpet ..	..	..	..	..	..	..	..	..	..	..	..	..	

26 Adoni ..	0.38	1.40	3.64	0.53	4.17	6.1	3.28	4.38	..	..	70	9.0	
27 Gudiyattam ..	0.16	1.71	3.3	..	3.74	5.25	5.58	3.54	..	..	42	14	
28 Gudivada ..	0.24	1.52	3.26	0.01	3.3	6.4	2.98	4.0	..	..	26	13.8	
29 Ellore ..	..	4.70	8.95	..	8.95	6.00	8.11	7.1	..	..	59	13.8	
30 West Ramnad ..	0.03	1.33	3.3	..	3.26	4.5	3.64	4.65	..	..	20	21.2	
31 Narasapur ..	0.06	1.16	3.44	..	3.46	5.55	2.76	5.15	..	..	32	16.5	
32 Ongole ..	0.10	1.47	4.97	..	4.97	6.95	1.49	2.58	..	..	60	8.4	
33 Cuddapah ..	0.14	1.73	3.02	0.02	3.32	6.53	2.98	5.42	..	..	44	14.1	
34 Ambur-Vaniyambadi ..	0.12	1.85	3.42	0.08	3.50	4.65 †	3.54	3.87	..	..	50	14.75	
35 Chingleput ..	..	..	..	..	..	..	..	..	..	..	..	..	
36 Tellicherry-Cannanore ..	..	..	..	..	..	..	..	..	..	..	..	..	
37 Chicacole ..	..	..	..	..	..	..	..	..	..	..	..	..	
38 Bobbili ..	..	..	..	..	..	..	..	..	..	..	..	..	
39 Anakapalle ..	..	..	..	..	..	..	..	..	..	..	..	..	
40 Udupi ..	..	..	..	..	..	..	..	..	..	..	..	..	
41 East Ramnad ..	..	..	..	..	..	..	..	..	..	..	..	..	
42 Saur-Parvatipur ..	..	..	..	..	..	..	..	..	..	..	..	..	

* Excluding depreciation.

† Includes power for steel rolling mills.

‡ Includes energy sold under special contract.

§ Commenced on 15th November 1937.

|| Commenced on 24th July 1937 (partly generating).

¶ Commenced on 21st February 1938.

** (Commenced working on 14th April 1937.

NOTE.—The figures in columns (6) to (35) are computed from the accounts submitted by the licensees.

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.			(6)	Costs—Working.			(10)	(11)
						Capital—Total expenditure at the end of the year.	From supply.	From meter rent and other sources.		RS.	RS.	RS.		
1 Bellary ..	11th 1937-38	47,573	A.C. 400/230 V. 50 cycles.	6,14,717	9,309	1,15,459	70,465	11.5	40,779	10.5	11.5	11.5	40,779	10.5
2 Berwada ..	8th 1937-38	60,427	D.C. 460/230 V. 50 cycles.	4,52,456	94,263	6,026	59,696	13.5	10,751	8	13.5	13.5	59,696	13.5
3 Cceanana ..	8th 1937-38	65,952	D.C. 460/230 V. 50 cycles.	1,24,670	18,583	3,397	10,751	8	18,975	4.3	13.5	13.5	10,751	8
4 Hindupur ..	3rd 1937-38	21,673	A.C. 400/230 V. 50 cycles.	1,14,239	13,596	1,075	4,652	4.3	18,975	4.3	13.5	13.5	4,652	4.3
5 Hoepet ..	8th 1937-38	35,314	D.C. 460/230 V. 50 cycles.	3,09,153	47,949	3,077	20,584	7	50,122	7	11.5	11.5	20,584	7
6 Kurnool ..	1st 1937-38	56,928	D.C. 460/230 V. 50 cycles.	2,98,194	41,457	3,247	18,043	6.15	60,442	6.15	11.5	11.5	18,043	6.15
7 Masulipatam ..	1st 1937-38	10,656	D.C. 460/230 V. 50 cycles.	1,58,223	5,445	300	756	.82	10,290	.82	11.5	11.5	756	.82
8 Tiruvallur ..	16th 1937-38	25,616	D.C. 460/230 V. 50 cycles.	6,80,600	4,314	4,314	15,970	11.1	15,970	11.1	11.5	11.5	15,970	11.1
9 Ootacamund ..	16th 1937-38	65,268	D.C. 460/230 V. 50 cycles.	3,56,848	81,398	4,338	54,659	15.3	54,659	15.3	11.5	11.5	54,659	15.3
10 Conjeevaram ..	7th 1937-38	14,296	D.C. 460/230 V. 50 cycles.	1,87,254	47,076	3,076	41,175	11.3	20,862	11.3	11.5	11.5	20,862	11.3
11 Comoor ..	8th 1937-38	65,198	D.C. 460/230 V. 50 cycles.	6,00,200	2,25,577	13,586	1,59,484	10.4	1,59,484	10.4	11.5	11.5	1,59,484	10.4
12 Polichchi ..	8th 1937-38	42,417	D.C. 460/230 V. 50 cycles.	1,97,657	68,662	2,668	70,244	12.7	20,191	12.7	11.5	11.5	20,191	12.7
13 Tiruppur ..	4th 1937-38	33,031	D.C. 460/230 V. 50 cycles.	1,50,109	59,701	4,684	62,423	10.4	17,874	10.4	11.5	11.5	17,874	10.4
14 Tirunelveli ..	4th 1937-38	18,059	D.C. 460/230 V. 50 cycles.	2,17,528	94,467	6,150	81,518	18.6	9,774	18.6	11.5	11.5	9,774	18.6
15 Tirunelveli ..	16th 1937-38	1,82,869	D.C. 460/230 V. 50 cycles.	10,72,410	3,08,886	15,154	2,48,268	17.1	1,75,423	17.1	11.5	11.5	1,75,423	17.1
16 Madurai ..	10th 1937-38	64,869	D.C. 460/230 V. 50 cycles.	4,50,108	1,10,086	7,043	77,805	13.6	58,200	13.6	11.5	11.5	58,200	13.6
17 Madurai ..	3rd 1937-38	12,184	D.C. 460/230 V. 50 cycles.	74,553	20,825	1,043	2,711	3.0	2,711	3.0	11.5	11.5	2,711	3.0
18 Udumalpet ..	3rd 1937-38	18,899	D.C. 460/230 V. 50 cycles.	42,877	15,925	964	21,445	6.6	24,759	6.6	11.5	11.5	24,759	6.6
19 Palani ..	3rd 1937-38	23,056	D.C. 460/230 V. 50 cycles.	1,00,065	32,728	1,910	32,024	13.4	12,578	13.4	11.5	11.5	12,578	13.4
20 Palani ..	3rd 1937-38	27,056	D.C. 460/230 V. 50 cycles.	1,00,065	32,728	1,910	32,024	13.4	12,578	13.4	11.5	11.5	12,578	13.4
21 Karur ..	3rd 1937-38	23,056	D.C. 460/230 V. 50 cycles.	1,00,065	32,728	1,910	32,024	13.4	12,578	13.4	11.5	11.5	12,578	13.4
22 Bodinayakanur ..	3rd 1937-38	27,056	D.C. 460/230 V. 50 cycles.	1,00,065	32,728	1,910	32,024	13.4	12,578	13.4	11.5	11.5	12,578	13.4
23 Periyakulam ..	3rd 1937-38	23,056	D.C. 460/230 V. 50 cycles.	1,00,065	32,728	1,910	32,024	13.4	12,578	13.4	11.5	11.5	12,578	13.4
24 Sembium ..	3rd 1937-38	23,056	D.C. 460/230 V. 50 cycles.	1,00,065	32,728	1,910	32,024	13.4	12,578	13.4	11.5	11.5	12,578	13.4
25 Tiruvallur ..	3rd 1937-38	23,056	D.C. 460/230 V. 50 cycles.	1,00,065	32,728	1,910	32,024	13.4	12,578	13.4	11.5	11.5	12,578	13.4
26 Alandur ..	3rd 1937-38	23,056	D.C. 460/230 V. 50 cycles.	1,00,065	32,728	1,910	32,024	13.4	12,578	13.4	11.5	11.5	12,578	13.4
27 Tirupattur ..	3rd 1937-38	23,056	D.C. 460/230 V. 50 cycles.	1,00,065	32,728	1,910	32,024	13.4	12,578	13.4	11.5	11.5	12,578	13.4
28 Tiruvannamalai ..	3rd 1937-38	23,056	D.C. 460/230 V. 50 cycles.	1,00,065	32,728	1,910	32,024	13.4	12,578	13.4	11.5	11.5	12,578	13.4
29 Villivakkam ..	3rd 1937-38	23,056	D.C. 460/230 V. 50 cycles.	1,00,065	32,728	1,910	32,024	13.4	12,578	13.4	11.5	11.5	12,578	13.4
30 Villivakkam ..	3rd 1937-38	23,056	D.C. 460/230 V. 50 cycles.	1,00,065	32,728	1,910	32,024	13.4	12,578	13.4	11.5	11.5	12,578	13.4
31 Dharmapuri ..	3rd 1937-38	23,056	D.C. 460/230 V. 50 cycles.	1,00,065	32,728	1,910	32,024	13.4	12,578	13.4	11.5	11.5	12,578	13.4
32 Wellington Cantonment ..	3rd 1937-38	23,056	D.C. 460/230 V. 50 cycles.	1,00,065	32,728	1,910	32,024	13.4	12,578	13.4	11.5	11.5	12,578	13.4
33 Anantapur ..	3rd 1937-38	23,056	D.C. 460/230 V. 50 cycles.	1,00,065	32,728	1,910	32,024	13.4	12,578	13.4	11.5	11.5	12,578	13.4
34 Kodalkanal ..	3rd 1937-38	23,056	D.C. 460/230 V. 50 cycles.	1,00,065	32,728	1,910	32,024	13.4	12,578	13.4	11.5	11.5	12,578	13.4

* Includes revenue expenditure, interest and loan repayment.

NOTE.—The figures in columns (6) to (35) are computed from the accounts submitted by the licensees.

No accounts.

No accounts.

Commenced supply during 1938-39.

Commenced supply towards the close of 1937-38.

APPENDIX D-2—cont.

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

Serial number and name of undertaking.	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	Cost per unit sold.		
									Generation.	Salaries and Wages.	Main and Repairs.
1 Bellary ..	12,683	13,968	14,110	RS.	Nil.	717	321,541	PER CENT.	AS.	AS.	AS.
2 Berwada ..	16,135	36,551	16,779	Nil.	Nil.	776	847,495	10	0.92	0.42	0.16
3 Cceanana ..	14,562	16,689	29,765	6,000	12,000	610	513,143	21	0.36	0.14	0.39
4 Hindupur ..	5,056	5,644	51	Nil.	Nil.	215	65,193	47	0.44	0.2	0.13
5 Hoepet ..	5,740	3,465	4,553	..	..	146	48,525	21	0.69	0.55	0.21
6 Kurnool ..	11,132	9,314	138	..	..	440	278,718	7.7	0.89	0.61	0.57
7 Masulipatam ..	16,416	16,256	13,938	..	..	390	197,368	23	0.57	0.29	0.05
8 Tiruvallur ..	2,637	2,745	4,645	..	..	19,769	1,07,369	9.5	1.09	1.03	0.19
9 Ootacamund ..	19,920	64,661	9,460	..	..	1,017	1,257,309	..	Energy purchased in bulk from Government.	0.44	0.37
10 Conjeevaram ..	9,956	13,245	31,076	..	..	641	381,355	15.5	0.47	0.16	..
11 Coonoor ..	6,471	6,415	8,976	15,655	42,643	2,655	234,620	12.2	Energy purchased in bulk from Government.	0.16	..
12 Colmbatore ..	..	37,508	79,630	..	..	..	1,669,967	11.1	Energy purchased in bulk from Government.	0.16	..
13 Pollachi ..	10,956	10,956	1,088	8,147	12,452	591	726,901	10	Do.	Do.	Do.
14 Dindigul ..	11,272	11,272	1,962	4,640	11,990	588	303,534	40.2	Do.	Do.	Do.
15 Virudunagar ..	11,186	11,186	1,412	..	..	516	491,014	56.4	Do.	Do.	Do.
16 Tiruppur ..	13,680	13,680	19,475	6,388	12,798	731	1,231,925	10	Do.	Do.	Do.
17 Madurai ..	64,607	36,045	75,732	..	..	2,261	1,968,372	83	0.31	0.13	0.06
18 Tanjore ..	12,585	16,321	30,293	..	..	837	586,430	10.4	Energy purchased in bulk from Government.	0.13	0.06
19 Udumalpet ..	4,973	4,973	2,887	..	..	239	178,732	21.6	Do.	Do.	Do.
20 Palani ..	4,268	4,268	1,657	..	..	408	145,397	49.1	Do.	Do.	Do.
21 Karur ..	6,918	6,918	2,622	3,048	4,006	480	245,487	87.7	Do.	Do.	Do.
22 Bodinayakanur ..	4,364	4,364	7,627	..	..	181	58,731	25.6	Do.	Do.	Do.
23 Periyakulam ..	5,577	5,577	7,065	..	..	151	72,167	20.9	Do.	Do.	Do.
24 Sembium ..	3,951	3,491	7,135	..	..	151	179,977	15.8	Energy purchased in bulk from Madras Electric Supply Corporation.	Do.	Do.
25 Tiruvallur ..	1,182	5,641	2,414	..	..	90	98,763	8.9	Do.	Do.	Do.
26 Alandur ..	1,918	2,040	2,198	..	..	71	74,084	6.7	Do.	Do.	Do.

Commenced supply towards the close of 1937-38.

Commenced supply during 1938-39.

NOTE.—The figures in columns (7) to (35) are computed from the accounts submitted by the licensees.

* The figures entered between columns 12 and 13 represent the total of interest and loan repayment.

APPENDIX D-2—cont.

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

Serial number and name of undertaking.	Cost per unit sold.				Supply records.				Units sold per head of population.	Maximum load on undertaking.	PER CENT.		
	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)				(31)	(32)
	AS.	AS.	AS.	AS.	AS.	AS.	AS.	AS.	AS.	AS.	AS.	KW.	
1 Bellary	0.43	..	0.21	2.28	1.32	3.6	5.26	3.48	4.3	2.83	1.7	200	18.4
2 Bezwada	0.11	..	0.11	1.17	1.02	2.19	4.51	3.18	2.51	3.6	8.3	360	32.2
3 Cocanada	0.27	0.009	0.11	1.27	0.98	2.25	5.2	3.08	3.12	2.6	3.86	240	24.4
4 Hindupur	0.7	..	0.46	2.74	2.62	5.36	7.35	3.48	5.35	1.41	0.58	40.5	18.4
5 Hospet	0.56	..	0.72	3.6	3.4	7.0	8.9	4	5.3	0.73	0.14	57	8.7
6 Kurnool	0.19	..	0.12	1.71	1.18	2.89	8.9	4	2.9	1.48	5.3	136	23.4
7 Masulipatam	0.31	..	0.29	2.83	2.68	4.91	5.6	3.04	3.64	1.18	0.81	129	17.5
8 Tiruvallur	0.75	..	0.53	4.05	4.03	8.35	5.5	4.12	4.65	1.51	20	7.6	19.5
9 Tuticorin	0.08	..	0.2	0.93	1.05	1.98	3.22	1.98	1.36	18.8	2.85	755	18.5
10 Ootacamund	0.22	..	0.19	1.33	0.97	2.3	5.65	3.12	3.61	1.29	1.05	188	23.1
11 Coimbatore	0.36	..	0.24	2.0	0.91	2.81	4.32	2.27	3.42	8.63	6.7	27.4	27.2
12 Coimbatore	0.09	..	0.17	1.02	0.86	1.53	3.32	1.98	2.29	7.55	6.67	686	27.4
13 Pollachi	0.07	..	0.39	1.13	0.24	1.55	4.25	2.03	1.57	4.47	2.4	294.3 KVA.	35.3
14 Dindigul	0.16	0.01	0.39	1.89	0.46	2.54	5.77	2.37	2.22	4.27	5.32	155	29
15 Virudunagar	0.12	0.01	0.31	1.79	0.36	2.16	5.68	2.32	2.1	2.27	9.2	264	21.4
16 Tiruppur	0.06	0.01	0.09	0.81	0.18	1.06	3.74	2.15	1.31	6.74	56.8	468	30
17 Madurai	0.18	0.01	0.12	1.21	0.6	2.03	3.21	1.63	2.63	6	2.14	900	25
18 Tanjore	0.25	..	0.13	1.36	0.77	2.13	4.15	2.98	3.2	3.43	2.45	223	30
19 Udumalpet	0.21	0.01	0.62	1.77	0.45	2.22	4.4	2.16	1.96	2.98	9.16	110 KVA.	23.2
20 Palni	0.16	..	0.47	1.88	0.47	2.35	4.35	2.12	2.2	1.99	4.85	7	23.1
21 Karur	0.17	0.02	0.44	1.46	0.46	2.12	4.32	2.13	2.3	3.28	5.95	92	30
22 Bodinayakanur	0.14	0.08	0.63	4.56	1.19	5.75	5.43	2.32	3.67	0.89	0.39	38.6	17.2
23 Periyakulam	0.15	0.06	1.46	3.69	1.24	4.9	4.8	2.29	3.36	1.03	0.03	40.5	23.3
24 Sankarankovil	0.43	0.01	0.18	1.75	0.66	2.44	4.55	3.0	3.06	1.78	1.18	88	23
25 Thuvattur	0.33	0.03	0.29	1.88	1.17	3.08	5.75	2.68	3.48	1.7	0.53	49	21.9
26 Alandur	0.55	0.03	0.45	2.5	0.85	3.35	4.45	2.89	2.1	0.98	2.68	73.4	11.6
27 Tirupattur	..	..	..	..	..	..	..	..	..	..	..	..	..
28 Tiruvannamalai	..	..	..	..	..	..	..	..	..	..	..	..	..
29 Sivakasi	..	..	..	..	..	..	..	..	..	..	..	..	..
30 Villupattam	..	..	..	..	..	..	..	..	..	..	..	..	..
31 Dharmapuri	..	..	..	..	..	..	..	..	..	..	..	..	..
32 Wellington Cantonment	..	..	..	..	..	..	..	..	..	..	..	..	..
33 Anantapur	..	..	..	..	..	..	..	..	..	..	..	..	..
34 Kodaikanal	..	..	..	..	..	..	..	..	..	..	..	..	..
		No accounts.											
		Commenced supply towards the close of 1937-38.											
		No accounts.											
		Commenced supply during 1938-39.											

NOTE.—The figures in columns (6) to (35) are computed from the accounts submitted by the licensees.

* Includes revenue expenditure alone.

Commenced supply during 1938-39.

Commenced supply towards the close of 1937-38.

No accounts.

No accounts.

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)
A. Company undertakings—Generating.		
1 Madras	53,750 KVA.	3 × 1,875; 1 × 6,250; 1 × 7,500; 1 × 15,625; 1 × 18,750 KVA.
2 Kanadukathan	370 KW	2 × 65; 1 × 130; 1 × 110 KW.
3 Devakottai	290 KW	1 × 60; 2 × 40; 1 × 150 KW.
4 Cochin	105 KW	3 × 35 KW.
5 Calicut	775 KVA	2 × 250; 1 × 159; 1 × 125 KVA.
6 Karaikudi	275 KVA	1 × 75; 2 × 100 KVA.
7 Tirumalai-Tirupati	480 "	2 × 100; 1 × 280 KVA.
8 Nattarasankottai	165 "	2 × 82.5 KVA.
9 Mangalore	750 KW	3 × 250 KW.
10 Tinnevely-Tuticorin	1,995 KVA	1 × 820; 1 × 800; 1 × 375.
11 Okkur	220 "	1 × 100; 2 × 60 KVA.
12 Guntur	350 KW	2 × 150; 1 × 50 KW.
13 Nellore	330 KVA	2 × 133; 1 × 64 KVA.
14 Proddatur	120 "	2 × 60 KVA.
15 Rajahmundry	560 "	2 × 133; 1 × 294 KVA.
16 Cuddapah	100 "	2 × 50 KVA.
17 Narasaraopet	170 KW	2 × 75; 1 × 20 KW.
18 Ongole	332.6 KVA	2 × 133 KVA; 1 × 66.6 KVA.
19 Chingleput	100 KW	1 × 40; 1 × 60 KW.
20 Tellicherry-Cannanore	185 KVA, 216 KW.	1 × 216 KW; 1 × 135 KVA; 50 KVA.
21 Adoni	380 KVA	2 × 190.
22 Chittoor	280.25 KVA	2 × 112 KVA; 1 × 37.5 KVA; 1 × 18.75 KVA.
23 Udipi	262 KW	2 × 110 KW; 1 × 42 KW.
B. Local Authority undertakings—Generating.		
1 Bellary	218 KW	1 × 55; 1 × 67; 1 × 96 KW.
2 Cocanada	450 "	1 × 40; 2 × 80; 1 × 250 KW.
3 Hindupur	60 "	2 × 25; 1 × 10 KW.
4 Hospet	133 KVA	2 × 54; 1 × 25 KVA.
5 Kurnool	583 "	1 × 53; 1 × 80; 1 × 180; 1 × 270 KVA.
6 Masulipatam	235 "	2 × 117.5 KVA.
7 Tiruvallur	98.5 KW	2 × 40; 1 × 18.5 KW.
8 Bezwada	562.5 "	2 × 112.5; 1 × 37.5; 1 × 300 KW.
9 Anantapur	125 "	2 × 50; 1 × 25 KW.
10 Kodaikanal	40 "	2 × 20 KW.
Government.		
1 Pykara	23,430 KVA	3 × 7,810 KVA.
2 Glen Morgan	1,125 "	3 × 375 "
3 Mettur	37,500 "	3 × 12,500 "
4 Vizagapatam	1,500 + 750	2,810
5 Bezwada	3,000	3,750
		6,560 KVA.

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 Coochin.
5 Bodinayakanur.	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 Guntur.
14 Karur.	14 Gudiyattam.
15 Kurnool.	15 Gudivada.
16 Kodaikanal.	16 Kanadukathan.
17 Masulipatam.	17 Karaikudi.
18 Madura.	18 Kumbakonam.
19 Ootacamund.	19 Madras.
20 Palni.	20 Mangalore.
21 Pollachi.	21 Mayavaram-Mannargudi-Tiruvarur.
22 Periyakulam.	22 Nattarasankottai.
23 Sembium.	23 Nellore.
24 Sivakasi.	24 Narasaraopet.
25 Tiruppur.	25 Negapatam.
26 Tanjore.	26 Okkur.
27 Tiruvottiyur.	27 Ongole.
28 Tiruvallur.	28 Palghat.
29 Tiruvannamalai.	29 Proddatur.
30 Tirupattur.	30 Rajahmundry.
31 Udamalpet.	31 South Arcot.
32 Virudhunagar.	32 Salem-Erode.
33 Villivakkam.	33 Srivilliputtur.
34 Wellington Cantonment.	34 Trichinopoly-Srirangam.
	35 Tirumalai-Tirupati.
	36 Tinnevely-Tuticorin-Palamcottah.
	37 Tellicherry-Cannanore.
	38 Udipi.
	39 Vizagapatam.
	40 Vellore.

APPENDIX F-2.

New licences granted and under construction.

Salur-Parvatipuram.

APPENDIX F-3.

*New applications for licence received.*Neikuppai.
Amalapuram.Tuni.
Kallal.

APPENDIX F-4.

Licensed undertakings put into service during the year.

Anantapur.	Bobbili.
Kodaikanal.	Anakapalle.
Chicacole.	Udipi.
Wellington Cantonment.	

APPENDIX F-5.

Licensees who reduced their tariffs in 1938-39.

Local authority undertakings.	Companies.
1 Tanjore.	1 Kanadukathan.
2 Hospet.	2 Tirupati.
3 Cocanada.	3 Devakottai.
4 Dindigul.	4 Okkur.
5 Madura.	5 Gudiyattam.
6 Ootacamund.	6 Negapatam.
7 Masulipatam.	7 Kumbakonam.
8 Bezwada.	8 Vellore.
9 Coonoor.	9 Rajapalaiyam (West Ramnad).
10 Bellary.	10 Vizagapatam.
11 Tiruppur.	11 Karaikudi.
12 Virudunagar.	12 Palghat.
13 Kurnool.	13 Trichinopoly-Srirangam.
14 Tiruvallur.	14 Mayavaram-Mannargudi-Tiruvarur.
15 Alandur.	15 Chittoor.

APPENDIX F-6.

Licensees who charged more than 6 annas per unit for lighting and fans.

Local authority undertakings.	Companies.
1 Hindupur.	Lights only or lights and fans—
2 Kodaikanal.	1 Nattarasankottai.
	2 Kanadukathan.
	3 Cuddapah.
	4 South Arcot.*
	5 Chingleput.

* Lights only.

APPENDIX G.

List of Villages and Townships supplied with electrical energy.

PYKARA SYSTEM.

1 Adivalli.	57 Kallar.
2 Agrebara Samakulam.	58 Kaniyur Karatholuvu.
3 Allinagaram.	59 Kantia Goundenchavadi.
4 Andipalaiyam.	60 Kengikode.
5 Angalakurichi.	61 Kannampalaiyam.
6 Angeripalaiyam.	62 Kannarpalaiyam.
7 Anthiyur.	63 Karadibhavi.
8 Anuppupalaiyam.	64 Karamadai.
9 Appanaickenpatti.	65 Kariamangalam.
10 Arasur.	66 Karumampalaiyam.
10-A Aravankadu.	67 Kattabettu.
11 Aruppukottai.	68 Kiranatham.
12 Athapagoundenpalaiyam.	69 Kilkotagiri.
13 Athipalaiyam.	70 Kolathur.
14 Avanashi.	71 Konakkarai.
15 Ayakudi.	72 Kondayampalaiyam.
16 Avanashilingampalaiyam.	73 Kotagiri.
17 Batlagundu.	74 Kottampatti.
18 Bodinathan.	75 Kottur.
19 Bodipalaiyam.	76 Krishnarayapuram.
20 Bodipatti.	77 Kunniemuthur.
21 Bommaigoundenpatti.	78 Kurichi.
22 Chandrakavi.	79 Kurudampalaiyam.
23 Chennimalai.	79-A Kusavapalaiyam.
24 Chettipalaiyam.	80 Lakshmanapuram.
25 Chikkadasampalaiyam.	81 Machampalaiyam.
26 Chikkarampalaiyam.	82 Madukkarai.
27 Chinna Kalyanamuthur.	83 Madathupalaiyam.
28 Chinna Kumarapalaiyam.	84 Mailampatti.
29 Chinnaputhur.	85 Makkinaickenpatti.
30 Chinna Valavadi.	86 Malayandipatnam.
31 Chittoor.	87 Mangalam Vangipalaiyam.
32 Dasampalaiyam.	88 Mangalagaramputhur.
33 Devarashola.	89 Maniakarampalaiyam.
34 Dhali.	90 Mettupalaiyam.
35 Erasampatti.	91 Muthur.
36 Ganapathi.	92 Narasimhanaickenpalaiyam.
37 Glen Morgan.	93 Nallampalli.
38 Gobichettipalaiyam.	94 Nambipalaiyam.
39 Gomangalam Pudur.	95 Nanjundapuram.
40 Govindanaickenpalaiyam.	96 Neelikonampalaiyam.
41 Gudalur.	97 Neikarapatti.
42 Guruvappanaikanur.	98 Nilambur.
43 Idigarai.	99 Nellithurai.
44 Ingur.	100 Odanthorai.
45 Irugur.	101 Oddarpalaiyam.
46 Iyerpadi.	102 Ondiputhur.
47 Jakkarpalaiyam.	103 Onnipalaiyam.
48 Jagathala.	104 Othaikalmadapam.
49 Jellipatti.	105 Palathurai.
50 Kalapatti.	105-A Palladam.
51 Kalbhavi.	106 Papanaiickenpalaiyam.
52 Kallapalaiyam.	107 Pasumalai.
53 Kallipalaiyam.	108 Peddampatti.
54 Kallimadai.	109 Peedampalli.
55 Kalligudi.	110 Perianaickenpalaiyam.
56 Kalingarayanpalaiyam.	111 Peria Nagamam.

APPENDIX G—cont.

List of Villages and Townships supplied with electrical energy—cont.

PYKARA SYSTEM—cont.

112 Peria Valavadi.	137 Sowripalaiyam.
113 Perumanallur.	138 Sular.
114 Perundur.	139 Sundakampalaiyam.
115 Perur.	140 Thekkampatti.
116 Perursettipalaiyam.	141 Theni.
117 Pidampatti.	142 Thirumuruganpundi.
118 Podanur.	143 Thithipalaiyam.
119 Pookulam.	144 Thottipalaiyam.
120 Pottayampalaiyam.	145 Tudiyalur.
121 Pudunatham.	146 Udamalpet.
122 Puthur.	147 Uppilipalaiyam.
123 Raghai-bhavi.	148 Uthukuli.
124 Rakkipalaiyam.	149 Uthupalaiyam.
125 Rangayypalaiyam Pudur.	150 Vadamadurai.
126 Rasipalaiyam.	151 Vadugapalaiyam.
127 Ravathur.	152 Valparai.
128 Samathur.	153 Vanniyampalaiyam.
129 Samanthorai.	154 Vellalur.
130 Saravanampatti.	155 Vellakinar.
131 Sembanallur.	156 Venasampatti.
132 Sengalipalaiyam.	157 Vettakaranpudur.
133 Sengodagoundenpalaiyam.	158 Virapandi.
134 Singanallur.	159 Virakaralam.
135 Sinnavadampatti.	160 Viyampalaiyam.
136 Sircar Samakulam.	

METTUR SYSTEM.

1 Ammapettai.	16 Macdonald's Choultry.
2 Arkonam.	17 Madathupalaiyam.
3 Arni.	18 Namakkal.
4 Bhavani.	19 Neringipet.
5 Dharmapuri.	20 Omaresdiyur.
6 Edayarpalaiyam.	21 Pullampatti.
7 Erode.	22 Polur.
8 Ganapathipalaiyam.	23 Rakkipalaiyam.
9 Jalarpet.	24 Rasipuram.
10 Kalbhavi.	25 Singampatti.
11 Kaveripauk.	26 Thalappalaiyam.
12 Karimangalam.	27 Thengalapalaiyam.
13 Kesarimangalam.	28 Valasu.
14 Koilpalaiyam.	29 Valluvambakkam.
15 Komarpalaiyam.	30 Virapandi.

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, Ltd.
- 2 Vasantha Mills.
- 3 Cambodia Mills.
- 4 Rajalakshmi Mills.
- 5 Somasundara Mills.
- 6 Kaleswara Mills.
- 7 Ranga Vilas Mills.
- 8 Pankaja Mills.
- 9 Lakshmi Mills.
- 10 Janardhana Mills.
- 11 Cotton Mills.
- 12 Palamalai Renganathar Mills.
- 13 Murugan Mills.
- 14 Saroja Mills.
- 15 Pioneer Mills.
- 16 Radhakrishna Mills.
- 17 Gnanambhika Mills.
- 18 Kamala Mills.
- 19 Balasubrahmanya Mills.
- 20 Kothari Textiles.
- 21 Kasthuri Mills.
- 22 Vysial Mills.
- 23 Sarada Mills.
- 24 Lotus Mills.
- 25 Dhanalakshmi Mills.
- 26 Ramalinga Choodambhika Mills.
- 27 Buckingham and Carnatic Mills.
- 28 Asher Textiles.
- 29 Palani Andavar Mills.
- 30 Sri Venkatesa Mills.
- 31 Tirumoorthy Mills.

PYKARA SYSTEM—cont.

Mills under construction—

- Kumaran Mills.**
Dwaraka Mills.
Soundararaja Mills.
Mills registered during the year —
Bagyalakshmi Mills.
Meenambika Mills.
Theni Mills.

Factories—

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

METTUR SYSTEM.

Mills electrified—

- * Rajendra Mills, Salem.
 - * Pullicar Mills, Tiruchengodu.
 - * Trichinopoly Mills, Trichinopoly.
 - Mettur Industries, Mettur.
- Mills under construction—
- * Dalmia Cement Works, Dalmiapuram.
 - * Jawahar Mills, Salem.
 - South India Sugar, Limited., Pugalur.
 - Mettur Chemicals.
 - * Thirumagal Mills, Gudiyattam.
- Others—
- Indian Steel Rolling Mills, Negapatnam.
 - The Railway Workshops, Golden Rock.

THERMAL SYSTEMS.

- Bezawada—
The Andhra Cement Works, Bezawada.
Vizagapatam—
Mines at Garbham and Kodur.

* In licensees' areas.

APPENDIX I.

List of tea factories in the various systems.

- | | |
|---------------------------|------------------------------|
| 1 Ibez Lodge. | 19 Iyerpadi estate. |
| 2 Nonsuch estate. | 20 Shekkalmudi estate. |
| 3 Glen Morgan estate. | 21 Thonimudi estate. |
| 4 Bengorm estate. | 22 Anamalai ropeway Company. |
| 5 Devershola estate. | 23 Injiparai factory. |
| 6 Glendale factory. | 24 Stanmore estate. |
| 7 Parkside estate. | 25 Nallakkathu factory. |
| 8 Bhavani estate. | 26 Srikundra factory. |
| 9 Prospect estate. | 27 High Forest estate. |
| 10 Terrace factory. | 28 Valparai Township. |
| 11 Kilkotagiri estate. | 29 Karmalai estate. |
| 12 Tuttappallam estate. | 30 Kadalapparai estate. |
| 13 Kilmalort factory. | 31 Mukkottumudi factory. |
| 14 Rousdonmullai factory. | 32 Sellaliparai estate. |
| 15 Pachamalai estate. | 33 Mount Stuart factory. |
| 16 Akkamalai estate. | 34 Vellamalai estate. |
| 17 Kallayar estate. | 35 Urilikkal estate. |
| 18 Monica factory. | |

APPENDIX J.

Load and revenue results of municipal electricity undertakings managed by the department for the years 1937-38 and 1938-39.

	Udumalpet.	Fahel.	Dharap- pan.	Periyakulam.	Rodinayakanur.	Sivakasi.	Karur.	Tiruvanna- malai.	Tripudat- tur.
1 Peak load in K. W. ..	110	328	90	38	37	50	45	41	80
2 Units purchased ..	202,499	238,556	155,104	83,001	100,982	62,890	69,837	80,628	118,205
3 Units sold or distributed ..	174,103	211,136	130,761	72,107	88,109	58,762	65,327	73,831	99,736
4 Total connected load in K.W. ..	308	346	293	139	158	91	120	185	202
5 Number of consumers ..	291	297	285	131	229	141	182	146	295
6 Cost per unit purchased ..	0.78	0.76	0.74	1.24	1.24	2.34	1.72	0.74	0.748
7 Cost per unit sold ..	1.51	1.9	1.29	3.02	2.8	3.36	3.5	2.06	2.283
8 Total capital expen- diture to end of year ..	74,553	84,616	57,508	68,513*	65,682	53,372*	49,044	82,167	110,573
9 Gross revenue ..	21,426	24,940	27,861	13,606	17,818	12,346	15,037	10,278	14,768
10 Operating and mainte- nance expenses includ- ing Agency fees ..	20,242	20,036	18,283	6,619	16,460	15,477	17,094	14,355	18,763
1 Interest on capital or annuity ..	4,100	4,973	2,908	4,268	3,768	5,577	2,937	4,354	5,709
2 Balance for sinking fund, depreciation reserve, etc. ..	-- 2,916	-- 69	-- 1,020	5,310 -- 3,344	-6,422 -- 3,236	-7,635 -- 3,672	-- 6,471	11,269†	1,601†
							2,964		

* Includes losses and adjustments.
† Total of items 11 and 12.

Government of Madras

PUBLIC WORKS DEPARTMENT.

(Electricity)

G.O. No. 2062, 23rd August 1939

Electricity department—Administration Report, 1938-39—
Recorded with remarks.

READ—the following paper :—

From the Chief Engineer for Electricity, dated 4th July 1939,
No. 63-G/39-31.

Order—No. 2062, Electricity, dated 23rd August 1939.

Recorded.

2. The report contains a record of continued progress of electrical development in the Presidency. The Pykara and Mettur hydro-electric systems continue to work satisfactorily. The total number of units generated under all Government systems during the year under review was 131.1 million units against 101.3 million units in 1937-38. The net revenue realized from the Pykara system during 1938-39 was Rs. 17.5 lakhs against Rs. 15.2 lakhs in 1937-38. The Mettur system commenced operation only on the 1st November 1937 and it yielded a net revenue of Rs. 3.6 lakhs in 1938-39. A review of the needs of the Pykara power area indicated that additional generating plant would be necessary and a scheme costing Rs. 45 lakhs for the purpose was sanctioned by Government. A fourth generating unit was completed and brought into use in March 1939 while a fifth was under erection. In the Mettur power system, the lines to Arkonam, Conjeeveram, Polur, Arni and Villupuram were energised. The Vizagapatam thermal station commenced commercial operation in March 1938 while the Bezwada thermal station came into operation during the last week of March 1939. The Papanasam Hydro-Thermal Electric scheme which was sanctioned in March 1938 was in the preliminary construction stage during the year.

Good progress has been maintained in rural electrification. By the end of the year 1,429 agricultural pumps with a connected load of 8,574 h.p. were supplied with power in the Pykara system against 970 pumps with a connected load of 5,927 h.p. in 1937-38.

In the Mettur system the total number of pumps at the end of 1938-39 was 64 against 19 in 1937-38. It is hoped that there will be rapid increase in agricultural pumps in this area also as a large number of rural extensions schemes were completed during the year.

3. The Government desire to place on record once again their warm 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.I.).

„ Statistical Officer under the Director of Industries and Commerce.

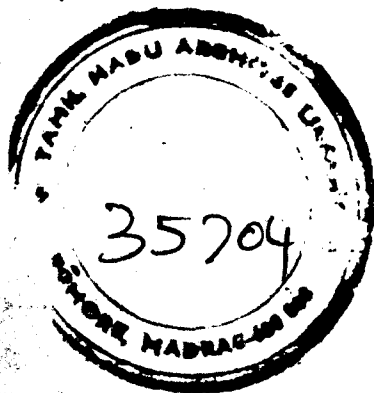
„ Principal, Agricultural College, Coimbatore.

„ Bibliotheque Nationale, Paris.

„ Inspector of Municipal Councils and Local Boards.

„ Accountant-General, Madras.

Press.



R

Cb. 2011Y N38

N39

C
R. 1/89

R. 1/89

AGENTS FOR THE SALE OF MADRAS GOVERNMENT PUBLICATIONS.

IN INDIA.

NEW BOOK COMPANY, Booksellers, etc., 'Kitab Mahal,' 188 90, Hornby Road, Bombay.

D. B. TARAPOREVALA SONS & Co., Bombay.

THACKER & Co. (LTD.), Bombay.

N. S. WAGLE, Circulating Agent and Bookseller, No. 6, Tribhuvan Road, Girgaon, Bombay.

THE BOOK COMPANY, Calcutta.

BUTTERWORTH & Co. (LTD.), 6, Hastings Street, Calcutta.

R. CAMBRAY & Co., Calcutta.

THACKER, SPINK & Co., 3, Esplanade East, Calcutta.

K. KRISHNA AYYAR BROTHERS, Booksellers, Publishers, etc., The Round, Trichur (Cochin State).

THE CHRISTIAN LITERATURE SOCIETY FOR INDIA, Post Box No. 501, Park Town, Madras.

CITY BOOK COMPANY, Post Box No. 283, Madras.

C. COOMARASWAMI NAYUDU & SONS, 27 and 35, Chinnathambi Street, Madras.

HIGGINBOTHAMS (LTD.), Mount Road, Madras.

THE LAW PRINTING HOUSE, 11, Mount Road, Madras.

G. A. NATESAN & Co., Madras.

P. R. RAMA IYER & Co., 368, Esplanade Row, Madras.

P. VARADACHARI & Co., Booksellers, 8, Lingha Chetti Street, Madras.

Agent, THE SOUTH INDIA SAIVA-SIDDHANTA WORKS PUBLISHING SOCIETY, LTD., 6, Coral Merchant Street, Madras.

VENKATHAMA & Co., Educational Publishers and Booksellers, Esplanade, Georgetown, Madras.

THE LITTLE FLOWER COMPANY, Educational Publishers and Booksellers, 44, Lingha Chetti Street, Georgetown, Madras, E.

D. SRI KRISHNAMURTI, Editor of "Grama Paripalana," Ongole (Madras).

E. M. GOPALAKRISHNA KONE, Pudumantapam, Madura (Madras).

NATIONAL WELFARE PUBLICITY, LTD., Mangalore (Madras).

M. SEENACHALAM & Co., Proprietors, The Hindu Press, Masulipatam (Madras).

B. VENKATARAMAN, Correspondent, Permanent Fund Buildings, Neela South Street, Negapatam (Madras).

THE HINDUS AN PUBLISHING Co., LTD., Rajahmundry (Madras).

THE MODERN STORES, Salem (Madras).

The Proprietor, THE HOUSE OF KNOWLEDGE, Booksellers and Publishers, Pallingraharam P.O., Tanjore (Madras).

S. KRISHNASWAMI & Co., Teppakulam Post, Trichinopoly For. (Madras).

L. VAIDYANATHA AYYAR, Law Bookseller, Teppakulam P.O., Trichinopoly (Madras).

A. VENKATASUBBAN, Law Bookseller, Vellore (Madras).

BHAWANI & SONS, Booksellers, etc., Connaught Place, New Delhi.

The Manager, THE INTERNATIONAL BOOK SERVICE, Booksellers, Publishers, News Agents and Stationers, Poona, 4.

P. N. SWAMINATHA SIVAN & Co., Commission Agents, Booksellers, etc., Pudukkottai State. (Branches also at Karaikudi and Davakottai.)

The Proprietor, THE PUNJAB SANSKRIT BOOK DEPOT, Saidmitha Street, Lahore (Punjab).

MOHANLAL DOSSABHAI SHAH, Books Agent, etc., Ajmer.

B. S. MATUR & Co., Chatur Vilas, Poona Civil Lines, Jodhpur (Rajputana).

THE BOOKLOVERS' RESORT, Booksellers and News Agents, Talikad, Trivandrum.

NOTICE.

Official publications may be obtained in the United Kingdom either direct from the office of the High Commissioner for India, India House, Aldwych, London, W.C. 2, or through any bookseller.