1926.

VICTORIA.

STATE ELECTRICITY COMMISSION OF VICTORIA.

SEVENTH ANNUAL REPORT

FOR THE

FINANCIAL YEAR ENDED 30TH JUNE, 1926;

TOGETHER WITH

APPENDICES.

PRESENTED TO PARLIAMENT PURSUANT TO SECTION 25 (*b*) OF STATE ELECTRICITY COMMISSION ACT No. 2996.

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SEVENTH ANNUAL REPORT.

The Honorable F. W. Eggleston, M.L.A.,
Attorney-General,
Melbourne.

SIR,

As directed by section 25 (*b*) of the *State Electricity Commission Act* 1918, No. 2996, we have the honour to present our Seventh Annual Report, covering the financial year ended 30th June, 1926, with Profit and Loss Accounts and Balance-sheet.

ROYAL COMMISSION OF INQUIRY.

Following the Commission's letter of 29th July, 1925, to the Minister in charge of the State Electricity Scheme, His Excellency the Governor was pleased, on 3rd March, 1926, to appoint Mr. Willits H. Sawyer, of Columbus, Ohio, United States of America, a Royal Commissioner to inquire into the status and affairs of the Commission, and into the scope and working of the State Electricity Commission Acts.

The questions referred to the Royal Commissioner were set out in his commission as follow :—

(1) The Commission's works of power generation and distribution as they exist to-day, with particular regard to their general lay-out, the quality and efficiency of the plant, equipment and accessories established, and of the methods of operation employed.

(2) The works and projects now in progress for extending the supply of the State's generating capacity and the scheme or schemes contemplated for so doing, more particularly with regard to the Sugarloaf Hydro-Electric Scheme and for the further extension of the transmission systems to metropolitan and provincial centres.

(3) The works and projects which the Commission has under consideration for the future extension in its various systems, with particular reference to the increase of generating capacity both in basic-load and in peak-load stations operated or to be operated by the Commission.

(4) The Commission's sources of revenue from electric supply and the prospects of the growth of such revenue as to the Commission's operating expenses and overhead charges and the influence thereon of future growth of production, more especially as to the reasonableness of the Commission's tariffs and charges and as to whether the Electricity Supply undertakings are economically sound or will become so without any burden on consumers or the State.

(5) As to the agreement for the ultimate acquisition by the Commission of the Melbourne Electric Supply Company's undertakings, and as to the effect of such agreement upon the future revenue of the Commission, including the technical procedure now in process of execution for the supply of energy to and the conversion to three-phase distribution of the Company's Melbourne undertaking.

(6) The Commission's proposals for popularizing the use of electricity and for the sale of electricity consuming equipment.

(7) The economic value as a low-grade fuel of brown coal deposits at Yallourn under present and prospective methods of coal-winning, with special reference to possible alternative fuels.

(8) The Commission's coal-winning methods, present and prospective, and its proposals and schemes for further developing the open-cut workings at Yallourn and for cheapening the cost of production there.

(9) The Commission's briquette undertaking at Yallourn and the disposition of the output therefrom, having regard to the cost of production, present and prospective, as well as the output having to compete commercially with other available fuels, both domestic and industrial.

(10) The internal organization of the Commission, more particularly in relation to the control of its operations and staff at Melbourne, at Yallourn, and at other provincial centres.

(11) The system of distribution of electric power throughout the metropolitan area and country districts as between the Commission and other Authorities.

(12) The reasonableness of the overhead charges and operating costs in the various phases of the Commission's undertakings.

On 19th May, the Royal Commissioner submitted his report to the Lieutenant-Governor. Mr. Sawyer's general summary of the conclusions arrived at in his report is as follows :—

" Fundamentally, the undertaking is, as a whole, economically sound, and, by virtue of the importance of electrical energy to the State, it must go forward. To-day it is not directly financially profitable. The estimates given me show that it will become directly financially profitable during the calendar year 1927. With these estimates and this assumption I differ. I agree closely with the estimates as to the revenue expected within the next few years, but I believe that the operating expenses will be greater than have been assumed.

In my opinion, the Commission has proceeded in the past with information of an incomplete nature from its staff. The estimates now being made profit, to a certain extent, from past experience, but, in general, are even now too optimistic, and are not based on the thorough analysis necessary in such undertakings. The net loss from Electric Supply undertakings for the fiscal year ending 30th June, 1925, was £241,000, and for the fiscal year ending 30th June, 1926, the net loss is estimated to be reduced to approximately £200,000. For neither of these years has depreciation been taken into account. Taking it into account, as the Commission proposes to do, beginning 1st July, 1926, I expect to see a net loss for the fiscal year ending 30th June, 1928, but by the fiscal year ending 30th June, 1930, there should be a net profit on the present combined undertaking and on practically every separate undertaking. Until there is a real net profit, I recommend that there be no appreciable reduction in rates.

It seems to me unnecessary at this time to refer at length to the immense amount of brown coal deposits in the State of Victoria, or to what an asset Yallourn is to the State. It has been said many times before, and is true, but it is not an asset to the extent optimistically prophesied in early reports and even of later date ; but that asset can be, and I believe will be, translated into terms of electrical power, light, and heat, at monetary rates which will make the investment worth while.

I have no quarrel with those who say that, based on earlier reports, the public had a reasonable right to expect cheaper electricity with lower capital expenditure than obtains to-day, but I see no reason why I should condemn the undertaking because the earlier reports were too optimistic. The important question now is : Is the undertaking based fundamentally on economically sound principles ? That I have answered unequivocally, " Yes, it is." I may not be correct as to the exact date at which the economic soundness will be actually proven, but let it be clearly understood that there should be no interpretation contrary to my definite statement, as set out above.

While I have criticized the estimates, the design, and the operation as to portions of the undertaking, it should be appreciated that the undertaking presents many new and complicated problems. Although the staff is composed of technically-skilled men, speaking generally, it has lacked the practical experience to cope, to the desired degree, with the problems which confronted it. This is but natural, and it is not a criticism of the personnel. There is admittedly a scarcity of engineers in Australia who are familiar with large power-house design and operation, and the other problems confronting this staff, including the complex problem of how to win and burn most successfully brown coal with 65 per cent. moisture. I recommend that the Commission's practice of sending men abroad for experience be not only continued, but very appreciably broadened.

I recommend postponing a decision as to the building of any major power plant extension until a more thorough study can be made ; also, that the proposed extension to the briquette plant be postponed until the coal-winning situation is more definite as to appreciably reduced costs of coal winning.

I also recommend more complete and more frank publicity, especially as to finances. I consider the contract with the Melbourne Electric Supply Company as advantageous to the State.

As to coal winning, it would seem best to me to take advantage of the lower moisture coal in the old open cut, and I recommend that, at least for the immediate future, power station coal be largely taken from the old open cut, where the moisture content is approximately 48 per cent. I would not be surprised if it were found expedient to continue to use coal from the old open cut for several years, but, in any case, coal from the old open cut should be used until, based on careful studies, and taking all things into consideration, definite plans have been worked out which show it more advisable to return to the new open cut. I recommend postponing the expenditure of £489,000 proposed in connexion with coal winning in the new cut.

I recommend proceeding with the Sugarloaf-Rubicon Scheme, although the real data as to what may be expected in output is quite meagre. This scheme would not, in my opinion, be practicable by itself, but works in to the best advantage with a scheme like Yallourn.

The Commission's undertakings have grown to such an extent that the present form of organization is entirely inadequate to cope with the many and complicated problems which now present themselves, and I recommend quite radical re-organization and also augmentation of the present personnel.

As to retail distribution by the Commission, regarding which there has been considerable criticism as additional functions taken over by the Commission but not previously contemplated, my conclusion is that the State Electricity Commission, from an economical and efficiency stand-point, should conduct the retail distribution, but should furnish the local authorities with full and complete information.

I have previously approved the Commission making a trial of selling electrical appliances on a time-payment basis, and, in general, am in accord with the programme of the Commission, looking toward furnishing appliances and giving better service to customers.

I also recommend the formation of what may be called a Power Advisory Council, consisting of at least one representative each from the Electricity Commission, the Railways Commission, and the Tramways Board. It appears to me to be a mistake for any of these three organizations to go ahead on power matters without at least getting the advice of the others interested. Such a council as proposed should work for mutual benefit of all contributing parties and the State at large.

The present deficit is mainly due to overbuilding and high cost of coal winning, and I consider it essential to hold new capital expenditure to a minimum until liquidation of present burdens is more apparent."

While the Commission does not disagree with a number of the Royal Commissioner's conclusions, there are several recommendations with which it does not and cannot concur. It is convinced of the necessity for the immediate extension of the Briquette Factory (referred to later) and the extension of the new open cut to increase the supply of raw coal to the Power House and Briquette Factory, and thus secure a reduction in the cost of coal winning. Both works, the Commission holds, are essential and vital to the most economical and successful carrying out of the scheme. In this view it is fortified by the report of Herr J. Klitzing, of the Ilse Bergbau A.G., Germany, one of the most widely experienced brown coal engineers in Central Europe. Further reference to these matters is made under the appropriate headings.

The Government, on 23rd June, intimated that it accepted Mr. Sawyer's report and expected it to be worked to, stating at the same time that this direction was not to be taken as involving acceptance of the report in every detail, but, if the Commission deemed it advisable to make variations, the Government must be consulted and supplied with full reasons for the Commission's proposals. It was further intimated that, if the Commission considers at any time that the parts of the scheme as to which Mr. Sawyer recommended postponement should proceed, the Government desires to be informed, and the Commission must demonstrate the necessity for proceeding with such works.

PART I.—ADMINISTRATION.

WORKS OF POWER GENERATION, YALLOURN.

At the 30th June, 1925, the first installation of 50,000 kilowatts of generating plant at Yallourn was practically complete, with the exception of certain items, chiefly in the boiler house. During the year 1925–26 these works were completed, with the exception of the last two boilers, the construction of which was purposely postponed pending the results of extended experiments in the burning of raw brown coal that have been in progress on certain boilers since the power station commenced to function.

The fact that these spare boilers (not required immediately to meet the load on the station) were utilized for full-scale experiments with coal from the new open cut under various conditions of operation apparently gave rise to the so-called "combustion problem" which critics of the State scheme persistently asserted had arisen at Yallourn. Because statements of this nature do much to shake public confidence in the scheme, and in the hope that this bogey will be exploded once and for all, the Commission has devoted a section of this Report to a full and complete statement on the subject. At this stage it is sufficient to record that 65 per cent. moisture coal from the Yallourn (new) open cut is being successfully burned in the power station without any admixture of drier coal, and without any process of screening. (*Vide* Part IV.)

SUGARLOAF-RUBICON SCHEME.

The Sixth Annual Report contained particulars of the Sugarloaf-Rubicon Hydro-electric Scheme. The civil engineering works commenced during the period. A contract was placed with Messrs. Armstrong Whitworth at schedule rates, the estimated price being £155,333, and covers the whole of the headworks, races, pipe-line supports, and erection of power station buildings involved in the Rubicon, Royston, and Lower Rubicon sections. This contract does not include certain minor works which are not capable of inclusion in a contract ; the Commission is supplying cement and also pipe specials and structural steel for erection by the contractor.

By arrangement with the State Rivers and Water Supply Commission, the works at the Sugarloaf Power Station (Eildon Weir) will be constructed by that body on behalf of the Commission, the State Rivers Commission having available at the Weir a construction organization necessitated by the extensive works it has in hand there. Separate tenders are being invited for pressure pipe lines.

According to the present construction programme, the whole plant will be installed, tested, and operating before the end of May, 1928, although it is probable that the Lower Rubicon and Royston stations will be completed some months earlier.

Specifications were issued and tenders received for the plant for the group of power stations and the transmitting sub-station at Rubicon "A". Although acceptance of tenders was not actually completed when the financial year closed, definite orders were placed early in July. The plant ordered and the contractors for the various equipment are as follows :—

Turbo-Generators.—Boving and Co. Ltd., with Gibson Battle (Melbourne) Pty. Ltd. as sub-contractors for the Sugarloaf Power Station generators, and Australian Westinghouse Electric Co. Ltd. as sub-contractors for the generators for Rubicon, Lower Rubicon, and Royston Power Stations. The contract price is £82,369, delivered at site.

Power Station.	Number of Turbo-generators.	Output of each Turbine in b.h.p.	Output of each Generator in k.v.a. at 90 per cent. P.F.	Net Head.	Speed of Turbo generator, r.p.m.
				Feet.	
Sugarloaf	2	9,000	7,560	60 110	250
Rubicon	2	6,100	5,225	1,381	500
Lower Rubicon	1	3,750	2,990	269	750
Royston	1	1,060	840	245	1,000

The turbines are of the Re-action and Impulse type, and manufactured by Boving and Co. Ltd.

All the generators will be suitable for generating three-phase 50-cycle energy at 6,600 volts pressure between phases. The generator at Royston Power Station will be capable of maintaining its rated output at 6,900 volts pressure between phases.

Approximately 50 per cent. of the turbine plant will be manufactured in Victoria at Thompson's, Castlemaine.

Transformers.—Gibson Battle (Melbourne) Pty. Ltd.—the transformers for Sugarloaf Power Station and Rubicon "A" Sub-station. These transformers are suitable for operation without lightning arresters on the high-voltage side. The contract price amounts to £22,642, delivered at site.

Weymouths Ltd., Victoria—transformers for Rubicon and Lower Rubicon Power Stations. Contract price, £10,730.

Station.	Type of Transformer.	Number Ordered.	Total Output of each Three-phase Transformer or Transformer Bank, k.v.a.	No-load Voltage Ratio of each Three-phase Transformer or Transformer Bank.
			K.v.a.	
Rubicon "A"	Three-phase self-cooled ..	3	9,000	22,000/70,000
Sugarloaf Power Station ..	Three-phase forced oil-cooled ..	3	7,500	6,600/70,000
Rubicon Power Station ..	Single-phase self-cooled ..	7	5,500	6,600/23,800
Lower Rubicon Power Station ..	Single-phase self-cooled ..	4	3,000	6,600/23,800

Switchgear.—Metropolitan Vickers Electrical Co. Ltd. for Rubicon "A" Sub-station (excluding supervisory control). The switchgear is of the outdoor type, and certain portions will be manufactured in Australia. The contract price is £16,979, free on wharf, Melbourne.

Australian General Electric Co. Ltd. for Sugarloaf, Rubicon, Lower Rubicon, Rubicon Falls, and Royston Power Stations, including supervisory control equipment, both at generating stations and Rubicon "A" Sub-station. Certain portions will be manufactured in Australia. The 6,600-volt switchgear is of the indoor type, and the 23,800 volt of the outdoor type. Contract price amounts to £28,643 6s. 6d., delivered at site.

It was explained in last report that the Snob's Creek section of the scheme will be undertaken when the Commission regards it as justified, and, although the present works exclude this section, it is already clear that its construction must be undertaken before the present works have been completed.

FUTURE EXTENSION OF POWER STATIONS.

Reference to this question was made in the last Annual Report, and, as then intimated, it was the prime reason for the action of the Commission in instructing its Mechanical Engineer to proceed abroad. Mr. Sawyer, in the course of his inquiry, examined several possible alternatives drawn up to show the lines along which the studies of this problem were proceeding, but, as no concrete proposal had been finalized then, the Commission was unable to obtain the benefit of his views on a considered proposal. Investigations are still proceeding in the light of the information and data as to the latest power station design and practice obtained abroad by the Mechanical Engineer.

As, however, the growth in demand has rendered it essential that a minor extension of plant beyond that provided in the Sugarloaf Scheme (i.e., inclusive of the Snob's Creek section) be in operation by 1929, a view with which Mr. Sawyer fully concurred, it is necessary that a decision be made by the end of 1926 at latest as to the extent and location of such additional plant, to enable the Commission's recommendations to be placed before the Government as soon as possible. Consequently, the engineering staff is energetically devoting itself to the considerable preliminary work involved in a consideration of this nature.

EXTENSIONS TO BRIQUETTING FACTORY, YALLOURN.

In the Sixth Annual Report the Commission explained at length its reasons for urging the Government to sanction immediate extensions to treble the capacity of the present plant, so as to give an output of 330,000 tons per annum. On this proposal Mr. Sawyer recommended "that an enlargement of the briquetting plant, as proposed, be postponed for the present and until there is more practical evidence at hand as to the reduction in the cost of winning coal."

It must be pointed out, however, that the close relationship of coal production to the production of briquettes is a basic consideration. Assuming that the extended factory were in operation and supplied with coal won by existing methods, the inevitable consequence of the increase of coal requirements from the present 1,600 tons per day to 4,000 tons per day must be substantial reduction in the cost of coal. The one is a corollary of the other.

In submitting its proposals for extension of the briquetting plant, the Commission made a careful survey of the available market, and as a result reported that it anticipated no difficulty in disposing of the increased output. Trading for the year under review has confirmed this expectation.

The Commission intends again to bring before the Government, before the present session of Parliament rises, the question of authorizing these proposals, as it is strongly of opinion that if the briquette industry is to be developed upon the lines which Parliament envisaged when authorizing this section of the Commission's activities, the works recommended should be proceeded with immediately.

YALLOURN OPEN CUT.

Recognizing as a factor of paramount importance that any further developments in coal-winning operations in the new open cut must be upon lines which will assure coal production upon the best economic basis, the Commission has for some time had under consideration various proposals to achieve this end. In this connexion it has had very valuable expert advice from two leading German authorities in Herr Emil Gaudlitz, who was visiting Australia on private business, and Herr J. Klitzing, of the Ilse Bergbau A.G., believed to be the largest brown coal undertaking in the world, whom the Commission engaged to specially visit Australia for the purpose of examining the operations at Yallourn and submitting recommendations for their improvement, based on the latest practice in Central Europe. Both gentlemen submitted very valuable reports, Mr. Klitzing going into every detail of the work and offering a very comprehensive programme for the re-organization of coal-winning operations. Both these reports have been made available to Parliament.

The proposals submitted by Mr. Klitzing fall into two schemes—(*a*) the major scheme, which provides for the further development of the new cut; (*b*) an "intermediate" scheme for the development of the old brown coal mine until such time as the new cut can be brought to its highest operating efficiency under the major scheme. For a better understanding of the nature and extent of Mr. Klitzing's recommendations, the two proposals are summarized as follows :—

(*a*) Main Scheme.

This entails the re-arrangement of the Yallourn Open Cut and the application of dredges and machinery of special types used in German brown-coal workings. The scheme envisages substantial increase in the rate of stripping overburden by the use of dredges in conjunction with rakes of trucks drawn by electric locomotives. More rapid removal of overburden is regarded as a material factor in reducing the moisture of the coal. Appreciable reduction in the cost of coal winning is shown in the detailed estimates submitted by Mr. Klitzing.

Principal features.—(*a*) All coal-winning operations to be centralized on a single level working bench about 155 feet below the top of the coal. On this bench all the coal-winning and transport appliances can be made to operate in unison and supervision becomes effective. The bench is to be so located that the bottom of the coal deposit can be reached by a deep dredge operating to a depth of 82 feet, immediately discharging into 20-ton trucks. At the same time all the coal above this bench can be won by a scraper dredge also loading directly into trucks.

(*b*) Transport to the proposed 1,500-ton transfer bunker at the Power Station to be by 20-ton trucks and electric locomotives. To overcome the difference of 180 feet approx. in the level of the working bench and the bunker, the trains to be hauled up a steep incline by a hoist of special design.

(*c*) From the transfer bunker the coal to be supplied to the Power Station by belt conveyor leading directly over the boiler bunkers, and to the Briquette Factory through the existing No. 4 Ropeway extended to connect with the transfer bunker.

(*d*) Summary of capital expenditure :—

	£	£
(*a*) Overburden plant		200,000
(*b*) Coal-winning plant—		
(i) For an output of 5,700 tons per day ..	223,775	
(ii) Additional. For an output of 8,000 tons per day	65,225	
		289,000
		489,000

(*e*) Summary of operating costs :—

Costs for a daily output of	5,700 tons.	8,000 tons.
	d.	*d.*
Wages	3·54	2·52
Capital Charges	3·15	2·90
Maintenance and Repairs	2·86	2·86
Portion of Overburden Charge	3·60	3·60
Charge for Plant Account (second face)	..	1·20
Total	13·15	13·08
Rounded off	13·2	13·1
Add Overheads	2·42	1·72
	15·62	14·82
Cost per ton of Coal delivered	1/3·62	1/2·82

The above estimates intentionally exclude certain overhead charges which are not directly involved.

(*b*) Intermediate Scheme.

Principal features.—(*a*) Transfer from new cut to old open cut of existing 175B shovel, 3½ cubic yard capacity, to be used on coal winning after the machine has been electrified as originally intended. Shovel to load directly into coal trucks which are to be conveyed to the Power Station in trains of 4–5 trucks and entirely supersede existing method of winning coal by hand.

(*b*) Construct immediately the permanent 1,500-ton transfer bunker at the Power Station, together with belt conveyor to the boiler bunkers (part of main scheme).

(*c*) Provide four electric locomotives and fifteen trucks for the haulage of coal from the old cut.

(*d*) Transfer from new cut to old open cut 150B shovel, 2½-yard capacity, to supersede present hand removal of overburden and dumping overburden by means of sludge dump.

(*e*) Summary of estimated new capital expenditure involved :—

	£
Transfer of shovels, &c., to old open cut	9,000
New transport system	64,700
Bunker structure	36,900
	110,600

(*f*) Summary of estimated operating costs :—

Costs for a daily output of	1,000 tons.	2,000 tons (i.e., in two shifts).
	s.	*s.*
Wages per ton	1·14	1·14
Interest and Amortization per ton	1·34	0·67
Repairs and Maintenance	0·58	0·58
Cost per ton of Coal	3·06	2·39

Note.—These figures do not include any "overheads."

The rapidly increasing coal requirements of the Power Station, as well as the Briquette Factory requirements, make it essential that works of the intermediate nature proposed by Mr. Klitzing be at once undertaken, so as to meet the position until some scheme of major development in the new cut is proceeded with and brought into complete and satisfactory operation. On these grounds, the Commission recommended that the intermediate scheme be undertaken forthwith, and, with the approval of the Government, it had, prior to the close of the year, made a commencement with the works involved.

Mr. Sawyer recommended to the Government that Mr. Klitzing's main scheme be not proceeded with at present, but strongly recommended that the intermediate scheme be proceeded with at once in order to make full use of the old cut coal for the Power Station until it has been definitely proved that the high moisture coal from the new cut can be successfully burned. In the special portion of this Report devoted to this subject (see Part IV.), the Commission expresses its views on the complete success which has been attained in the combustion of the new cut coal.

It is to be clearly understood that Mr. Klitzing's intermediate proposals are in no sense an alternative to his main scheme, but only a preliminary step to its realization. The direction to proceed with Mr. Klitzing's intermediate scheme but to postpone his main scheme results in the unity of the two proposals being destroyed, but, having regard to this direction and the fact that substantial sums will have been invested in the necessary steps (including the intermediate scheme) to maintain coal supplies for about eighteen months, the Commission does not now regard it as essential that a decision be immediately arrived at on the nature of future works of major development in the new cut. On this question it is possible to postpone a decision for some months.

In these circumstances, the Commission has so far made no recommendation to the Government for the adoption of Mr. Klitzing's main scheme or any other works that envisage further substantial development in the new cut.

It is, however, essential to purchase immediately additional plant for the new cut so as to continue overburden removal at a rate sufficient to maintain supplies of new cut coal to the Power Station and the Briquette Factory. Therefore, at the close of the year the Commission had in preparation proposals for the purchase of a deep dredger of special design of the most modern type in use in German brown coal-fields, with the necessary locomotives, tracks and other appurtenances, at an estimated cost of, roundly, £120,000. The plant is in substitution for, but has a greater capacity than, the 175B shovel now ear-marked for transfer to the old cut. The acquisition of such plant forms no part of Mr. Klitzing's main scheme, the intention being to use it in a location different from that required by Mr. Klitzing's scheme, i.e., along the margin of the present new open cut. Nevertheless, ordinary prudence demands that the plant be of a type that will, if required, fit in with Mr. Klitzing's main scheme or any other scheme which may be adopted for future development.

TECHNICAL MISSION ABROAD.

Mr. C. T. Briggs, the Commission's Mechanical Engineer, left Australia in May, 1925, to make full inquiries into recent developments in power station design and operation in Great Britain, Central Europe, and the United States of America. Shortly after the new financial year commenced, Mr. J. M. Bridge, Engineer-in-charge of Coal Winning, left for Europe and the United States, and collaborated with Mr. Briggs in inspection of power plants, coal-winning operations, &c., both officers working in close touch with Mr. Commissioner Swinburne, who was then in Europe and who gave up much of a well-earned holiday to obtaining the latest information and advice for the benefit of the Yallourn undertaking and the State of Victoria generally.

Mr. W. G. Smellie, assistant engineer in the Briquetting and Research Branch, accompanied Messrs. Bridge and Briggs on their European inspections, acting as engineering assistant and interpreter.

The mission, as a whole, visited many large and important mines, power-houses, &c., and, in addition, made special investigations of plant or methods asked for by senior departmental officers in Victoria, and was thus able to secure for the Commission much valuable information.

Since their return the members of the Technical Mission have submitted further reports, all of which contain much interesting and useful information which will be of considerable value in the future development of the Yallourn scheme.

MELBOURNE ELECTRIC SUPPLY COMPANY LIMITED.

The Fifth and Sixth Annual Reports contained complete statements relative to the terms and conditions of the agreement entered into with the Melbourne Electric Supply Company. The franchise held by the Company expired on 12th November, 1925, and the new franchise governing the Melbourne and Geelong undertakings operated after that date, being subject to the overriding control of this Commission in matters of finance, management, and technique, as provided by the agreement and the *Melbourne Electric Supply Company's Act* 1924.

The works of conversion of the Melbourne undertaking upon the lines arranged with the Company proceeded throughout the year and satisfactory progress has been made. In addition to bulk supplies already being taken at Sub-station " B " (Collingwood–Fitzroy), the Company towards the close of the year took a further supply, this being given at the Commission's main Sub-station " G " (South Melbourne).

In order to supply the whole of the Company's area, as well as those of neighbouring municipalities, the Commission, with the approval of the Government, entered upon a programme of sub-station construction at various points as follows :—Sub-station " R," Richmond ; Sub-station " H," St. Kilda ; Sub-station " K," Camberwell ; Sub-station " O," Oakleigh ; Sub-station " M," Mentone.

With the exception of the last-named, the sub-stations are entirely of the ironclad type, with indoor switchgear and outdoor transformers. In Sub-stations " K " and " H " two 9,000 k.v.a. bank transformers are installed ; Sub-station " R " two 6,000 k.v.a., and in Sub-stations " O " and " M " 3,000 k.v.a. each.

To link the various sub-stations with existing sub-stations and Yarraville Terminal Station involved the provision of an underground and overhead cable system estimated to cost £113,000, while the erection of the new main sub-stations, complete with tranformer banks and all switchgear, was estimated at £157,000, making a total of £270,000. The scheme as adopted is estimated to provide for the full requirements of the Company's area for the next five years, while the effect of the system will be to greatly improve the present service in the areas concerned, and also enable the Company to deal adequately, economically, and quickly with all loads that may arise so far as these at present can be foreseen.

The Commission also undertook, on behalf and at the cost of the Company, to provide an underground ring main system from Sub-station " B " (Collingwood) and Sub-station " G " (South Melbourne), this being almost complete at the close of the year. Since the 30th June, further load has been transferred from the Company's power house to the Commission's mains.

DEMAND FOR ELECTRICAL ENERGY WITHIN RANGE OF THE STATE SCHEME AS AT PRESENT DEVELOPED.

The growth and nature of the demand within range of the present development of the State Scheme as at 30th June this year is summarized hereunder.

Metropolis of Melbourne.

Electric Supply requirements for all purposes.—Interesting data are contained in the following appendices :—

(*a*) Appendix No. 2 (*a*)—Curve showing the growth of demand since the year 1918, both as regards industrial (including tramways) load and for railway purposes. The curve also shows an estimate of the growth of demand up to the year 1930 for the requirements of railways, tramways, and industrial purposes. In the curves domestic consumption and public lighting are included in the industrial load.

(*b*) Appendix No. 2 (*c*)—Typical winter daily load curve, 1926.

(*c*) Appendix No. 3—A tabulation showing the actual growth in distribution and demand in the eight years from 1918–1925.

Metropolitan Area.

Generation of Electricity in Financial Year 1925–26 *and Comparison with Year* 1924–25.

—	—	Year 1925–26.	Year 1924–25.
		kw. hrs.	kw. hrs.
Energy generated for all purposes ..	(*a*) Railway purposes	155,000,000	157,500,000
	(*b*) Industrial and tramways	308,000,000	262,000,000
	Total	463,000,000	419,500,000
Distribution of energy for industrial and tramways purposes	Melbourne City Council—		
	Generated	16,500,000	18,000,000
	Purchased	61,500,000	58,800,000
	Melbourne Electric Supply Company—		
	Generated	35,000,000	25,800,000
	Purchased	95,000,000	89,800,000
	State Electricity Commission (other than that purchased by Melbourne City Council and Melbourne Electric Supply Company)—		
	Generated	77,000,000	53,000,000
	Railways Department (Newport " A ")—		
	Generated	23,000,000	16,600,000
	Total	308,000,000	262,000,000

Consumption per Capita.

—	Population.		Maximum Demand.		Consumption *per Capita.*	
	1925–26.	1924–25.	1925–26.	1924–25.	1925–26.	1924–25.
Inclusive railway traction	920,000	857,000	kw. 112,000	kw. 105,000	kw. hrs. 503	kw. hrs. 489
Exclusive railway traction			73,000	66,000	335	314

Distribution of Energy.—Within the metropolis the following undertakings are supplied in bulk from the State Scheme, viz. :—The Melbourne Electric Supply Company ; the City Councils of Melbourne, Brunswick, Footscray, Williamstown, Coburg, Northcote, Port Melbourne, and Preston; the Shire Councils of Nunawading (Box Hill) and Heidelberg; and H. V. McKay Pty. Ltd., Sunshine.

The Melbourne Electric Supply Company and Melbourne City Council do not receive from the Commission the whole supply required to meet the demand on these undertakings, both still having generating plants in operation, although, as indicated elsewhere, the time is fast approaching when the whole of the Company's requirements will be supplied from the State Scheme.

The Commission directly controls the local distribution in the City of Essendon and the Hopetoun Ward, City of Melbourne. The results of these operations are dealt with in the relevant parts of this Report.

The Commission also supplies a number of large industrial consumers with 25-cycle energy from Newport " A " Station.

Eastern Metropolitan District.—During the year the Government authorized the Commission to undertake local distribution in the Shire of Mulgrave, which includes Clayton; this, together with supply to the Ferntree Gully district, including the townships of Ferntree Gully, Upwey, and Belgrave, and quarries at Ferntree Gully, authorized last year, represent the only new centres added to this district.

Sunbury.—At the request of the Bulla Shire Council, the Commission acquired the Sunbury electric light undertaking which had been operated by the council for some years. The plant was reaching the end of its useful life, and the council was faced with heavy capital expenditure for replacement. The Commission decided that, although its proposals did not provide for immediate extension to Sunbury, such extension must be made within two or three years, and thus it would not be justified in permitting expenditure of loan moneys by the council if within a short period that body would be faced with substantial loss in the disposal of its generating plant. Moreover, the Hospital for the Insane is served by this undertaking, and the Lunacy Department had intimated that it intended to install its own generating plant in preference to continuing supply from the council. This course would have involved the council in a serious financial loss, as the hospital's demand equalled the remainder of the demand on the undertaking.

As it was found that the demand would justify the running of a 22,000-volt line from St. Albans to Sunbury, the Commission obtained Governmental authority to make this extension and to acquire the undertaking.

Country Districts.

Outside the metropolitan area the outstanding constructional work has been concerned with the newly-created North-Eastern district, which deals with the towns in the north and north-east of the State that will be served from the Sugarloaf–Rubicon Hydro-Electric Scheme, but, until that scheme is operating, will be supplied from Yallourn, through Thomastown.

As mentioned in last Annual Report, the undertakings at Shepparton and Echuca were administered from Head Office until the creation of the new district organization. This new organization commenced to function early in the new year, with head-quarters at Benalla, and at the close of the period the following new centres were operating under its jurisdiction :—Yarrawonga, Benalla, Wahgunyah, in addition to bulk supplies to the municipalities of Albury and Corowa. With the approval of the Government, negotiations, which have been finalized since, were also in progress at the end of the year for the acquisition of the undertakings at Kyabram, Tatura, Mooroopna, and Chiltern. Works were authorized also for Tongala, where no supply previously existed.

Gippsland District.—The Government approved of negotiations being finalized for the acquisition of the Bairnsdale undertaking, and authorized an extension of the transmission line from Maffra to Bairnsdale to link this undertaking with the State scheme. The town of Stratford, which is on the route of the line, will also be served. Construction was commenced, and there is every prospect, with the present rate of progress, that supply will be available to Bairnsdale early in 1927.

CONTINUITY OF SUPPLY.

A feature of the year's working which the Commission has viewed with particular gratification is the comparative freedom from serious interruption on main and branch transmission lines. With the exception of the trouble occasioned by flashovers due to climatic conditions (referred to elsewhere), the operating interruptions to supply have been singularly few, a fact which speaks highly for the efficiency of the electrical design and actual working of the large distribution system now under the Commission's care.

YALLOURN TERRITORY.

Town of Yallourn.

Dwellings.—The programme undertaken during the period provided for the erection of 50 weatherboard cottages, each containing four rooms, laundry and bathroom, and outbuildings. In addition, two five-roomed brick cottages were erected. In a few instances, to avoid monotony, the wooden houses have been built semi-detached with a brick party wall. As in the past, the works were carried out by contracts for labour only, the Commission providing the whole of the materials and delivering same to the site as required by the contractor.

Reduction in Rentals.—Towards the close of the financial year, the Commission decided upon a general reduction of rentals in the town to take effect from 1st July, 1926. These rentals, which are applicable to all houses, include water supply, sanitary service, &c., but do not include extras such as garages, &c., an extra charge for which remains. The effect of this decision is shown in the following statement :—

Type of House.	Former Rental.	New Rental.
	s. d.	s. d.
Four-roomed, wooden	..	15 0
Four-roomed, wooden (larger type)	22 6	20 0
Four-roomed, brick	30 0	25 0
Five-roomed, wooden	30 0	25 0
Five-roomed, brick	35 0	30 0
Six-roomed, brick	40 0	35 0

Civic and Public Buildings.—Permanent buildings for the Post Office and the State Savings Bank were completed and opened for public business. A church was erected by the Presbyterian Church on a site adjacent to that of the Anglican Church. On the site reserved for the Roman Catholic denomination measures have been taken to erect a similar building.

The erection by the Commission, on behalf of the Railway Department, of the station buildings was completed. This involved the erection of the station and two houses for the use of the local staff. The buildings are grouped around an open square, which provides the extra accommodation required for parking vehicles and for the greater traffic at this centre.

Hotel and Boarding-houses.—During the year, designs were prepared for a hotel to accommodate about 45 lodgers, and to provide facilities for the sale of liquor. The plans were drawn in accordance with the requirements of the Licensing Reduction Board, and were approved by that body. When the question of the Commission being granted a licence came before the Government, it decided that this project should not be undertaken without special approval of Parliament. Although the Commission made it clear that it was not in accord with this view, which it is understood was based primarily on a possibility that the Commission did not have legal authority to hold a licence, it trusts that the Government will see its way, before Parliament rises at the close of this year, to introduce legislation to authorize the construction of this much-needed accommodation at Yallourn.

The provision of licensed premises in the town has been contemplated by the Commission since the earliest days on the territory, and both police authorities and representatives of the industrial organizations have strongly urged the desirability of the Commission finalizing its proposals and proceeding with the erection of the necessary premises with the least possible delay.

Apart from the question of it being essential that proper accommodation be available for persons having business in the town, or for other visitors, it is directly against the interests of the Commission's employees and of the good management of the territory that the provision of licensed premises at Yallourn should have been postponed, and the position is quite serious enough to warrant the Government treating whatever legislation is necessary as an urgent measure in the House.

Attention was being given towards the close of the period to the design of permanent boarding-houses capable of providing board and lodging for single men.

Fire Brigade.—The operations of the brigade during the year were carried on with commendable smoothness and efficiency. The Commission takes the opportunity of recording its appreciation already conveyed to the members of the brigade of the excellent and willing manner in which the brigade engaged in fire fighting during the extensive bush fires which raged throughout the whole of the Yallourn area and surroundings last summer. The Commission cannot speak too highly of the efforts put forward by the brigade on occasions when the fires were of such a nature as to cause considerable concern to those in charge at Yallourn, and the way in which members of the brigade put personal convenience to one side and engaged more or less continuously in fire fighting is deserving of the utmost praise.

Parks and Gardens.—Up to the present one section of the recreation area only has received attention, there being erected thereon two tennis courts and pavilion. The new sports oval to the east of the Railway Station has been completed and, while winter conditions to some extent prevented full use in the football season, the ground will be in good order for the cricket season. The appearance of the town and surroundings has been greatly improved during the past year owing to the development of the gardens and plantations, in which the nursery has been of the greatest assistance. Free supply of soil, shrubs, gravel, &c., by the Commission for private gardens has resulted in a remarkable improvement in the appearance of the town, the keenness of residents being further developed by the prizes offered for the best-kept gardens, &c.

Roads and Streets.—A certain amount of new road construction was carried out to sites for some of the new dwellings, although wherever possible vacant sites fronting existing roads were utilized. Ornamental trees of various kinds to the number of 700 were planted in existing streets and reserves. The street-planting programme embraces the greater part of the developed area, including the main roadway (Broadway) connecting the Railway Station square with the civic centre.

Clubs, Societies, &c.—The various sporting bodies continue to enjoy success, both in regard to the spirit of members and in competition with clubs in the surrounding districts. Football, soccer, cricket, tennis, and golf clubs vie with each other in the demand for public favour.

The brass band, Glee Society, Horticultural Society, the various Church Societies and the numerous balls held by the sporting bodies have contributed largely to the round of indoor enjoyment, and helped in a very marked degree to stimulate the community spirit among the residents.

General Store.

The activities of the Yallourn Store continue to expand. Due to the curtailment of loan funds two years ago, extensions to the main store buildings and provision of bakery and butchery in view for some two and a half years have had to be postponed. To overcome the position with regard to the butchery, it was necessary, because of the pressing demand from residents, to open temporary premises in the Western Camp. At the close of the year operations had not been commenced, but in the few months which have expired since there has been sufficient evidence to show that it is possible to operate this section of the store activities without loss, and provide meat at lower prices than previously charged.

The general activities of the Store made it necessary to provide more space for display, and to improve lay-out. Accordingly, two additional shops were authorized and are expected to be in occupation before Christmas. These will be under the same roof as the main store building. Further extensions to complete the store building as originally planned are in contemplation in order that the staff will have every facility to cope with available business. As is to be expected, the business offering at the Branch Stores at the Construction Camps continues to decrease with the reduction in personnel on the works.

OLD BROWN COAL OPEN CUT.

When the Commission took over the Old Brown Coal Open Cut from the Mines Department it also took over the existing accommodation for labourers engaged there. For some time this accommodation has been a cause of friction between the Commission and its employees, and has been the subject of criticism by Mr. Justice Powers of the Commonwealth Court of Conciliation and Arbitration.

While the future of the old cut was uncertain, the Commission was naturally averse from the expenditure of much money on accommodation, &c., that the near future might render unnecessary. When, however, the future policy in relation to this Open Cut was definitely determined, the questions of accommodation, sanitation, lighting, &c., were considered afresh. As a result, the Commission decided on the erection of twenty new cubicle blocks, each accommodating eight men, of which only fifteen will be completed at present, the remainder to be constructed as required later, and the provision of a central sanitary block. Provision for electric lighting has also been made. The total cost of the improvements at present authorized is in the vicinity of £8,500, and at the close of the year these works were actively in hand.

INDUSTRIAL.

Labour Turnover.—The following table shows the distribution of the Commission's labour forces, as compared with the position on 30th June, 1925 :—

	1926.		1925.	
	Operation.	Construction.	Operation.	Construction.
Yallourn	884	274	767	613
Old Brown Coal Open Cut	430	..	385	..
Metropolitan Area	91	406	104	275
Transmission Lines	17	201	..	335
District Undertakings	111	..	92	..
Rubicon Hydro-Electric Scheme	..	49	..	..
Water Power Surveys	..	10	..	23
	1,533	940	1,348	1,246

Arbitration.—Under the jurisdiction of the Commonwealth Court of Conciliation and Arbitration, new Awards affecting the Commission have been made, covering Federated Ironworkers, A.W.U. (construction work), and an unusually comprehensive Award by Mr. Justice Powers covering all men (other than skilled tradesmen) employed on coal-winning operations, both at Yallourn Open Cut and the Old Brown Coal Mine.

Wages.—The upward tendency of wages has been marked, increases under all Federal Awards occasioned by the rise in the Commonwealth Statistician's Cost of Living Index Number being 3s. per week, or an increase of 3½ per cent. Nine new Awards of State Wages Boards have increased wages to a similar extent. Increases in marginal rates have also been awarded in some instances. In the two A.W.U. Awards (Coal and Construction) 3s. 6d. per week was added to the metropolitan rate by the Court, applicable to Yallourn only, being the Court's estimate of the difference in cost of living between Yallourn and Melbourne.

At present the Commission's employees are governed by nine Commonwealth Awards, one Commonwealth Award under Private Arbitration (Coal Winning), and sixteen State Wages Board determinations.

Dislocations.—Three strikes occurred at Yallourn during the period under review, resulting in partial stoppages of work, viz. :—

Amalgamated Engineering Union	15 days.
A.W.U.	5 „
A.W.U.	7 „

The reasons for striking were, in the first case (A.E.U.), objection to the extra 1s. per day allowed for construction work being discontinued as far as operation men were concerned.

A.W.U. (coal) as a protest against the delay of the Court in hearing their claims for increased wages and better conditions, a position over which the Commission had absolutely no control.

A.W.U. (coal) second strike, dispute regarding interpretation of minor points in the Award.

These partial stoppages did not have the effect of causing a total cessation of the main operating activities.

The actual number of working shifts lost during the year on account of strikes totalled 12,798, involving an approximate loss in wages to strikers of £8,709, to others affected £1,988, making a total of £10,697. Although the basic wage for A.W.U. workers at Yallourn has averaged 14s. 5d. during the period, this has been reduced by loss of work through strikes to an average of 13s. 10d. per shift.

ELECTRIC LIGHT AND POWER ACT 1915.

During the past year several requests were received from electric supply undertakers for authority to increase their charges.

It was decided to recommend the following applications for the approval of the Governor in Council :—

Authority.	Price Ruling at Time of Application.		Prices Recommended by the Commission.		—
	Light per Unit.	Power per Unit.	Light per Unit.	Power per Unit.	
	s. d.	*s. d.*	*s. d.*	*s. d.*	
Federal Milk Company Pty. Ltd., Cohuna	0 9	0 6	1 0	0 9	
Tungamah Shire Council, Cobram ..	1 0	..	1 6	..	Subject to review on 30th November, 1926.
Winchelsea Shire Council, Lorne	1 0	..	1 6	..	

Since the passing of the Electric Light and Power Act in 1896, 187 Orders in Council authorizing the supply of electricity have been granted, of which 109 were issued to municipal councils and 78 to companies and persons. Thirty-four Orders in Council have been revoked, including a number which related to undertakings that have passed under the control of the Commission.

The following is a list of Orders in Council which have been recommended by the Commission during the year and approved by the Governor in Council, authorizing the establishment of electric supply undertakings in the areas indicated :—

Supply Authority.	Area.	Maximum Prices Authorized.	
		Lighting.	Power.
Broadford Shire Council ..	Township of Broadford	9d. per unit ..	..
Avoca Electric Light and Power Co. Pty. Ltd.	Township of Avoca	1s. 3d. per unit	9d. per unit
Warracknabeal Electric Light and Power Co. Ltd.	Township of Warracknabeal	1s. per unit ..	6d. per unit
Beechworth Shire Council ..	Portion of the township of Beechworth ..	1s. per unit ..	6d. per unit
Waranga Shire Council ..	Township of Murchison	1s. 3d. per unit	6d. per unit
Arapiles Shire Council ..	Township of Natimuk	1s. 3d. per unit	9d. per unit
Koo-wee-rup Electric Light and Power Co. Pty. Ltd.	Township of Koo-wee-rup	2s. per room per month plus 2d. per unit	7s. per h.p. per month plus 2d. per unit

LICENSING OF ELECTRIC WIREMEN.

The following statement sets out the number of licences issued to 30th June, 1926, and also the number issued during the period covered by this Report :—

Grade.	Number issued to 30th June, 1925.	Number issued from 1st July, 1925, to 30th June, 1926.	Total.
"A"	1,284	61	1,345
"B1"	59	20	79
"B"	694	86	780
"C"	896	98	994
Special Licences	33	9	42
Permits	2,169	247	2,416

During the year two examinations in theory and practice were held, and the Board of Examiners reports that there is a noticeable improvement in the knowledge and training of the candidates who present themselves, thus demonstrating that the Licensing of Wiremen Rules are having their effect in improving the standard of wiring work in the State.

PART II.—FINANCIAL AND COMMERCIAL.

ANNUAL ACCOUNTS.

The general Profit and Loss Account and Balance-sheet, accompanied by summarized Profit and Loss Accounts and Balance-sheets of the District Undertakings and of other activities of the Commission are contained in Appendix No. 1.

CAPITAL EXPENDITURE.

The following tabulation shows the capital expenditure from the inception of the Commission to 30th June, 1926 :—

1919–20.	1920–21.	1921–22.	1922–23.	1923–24.	1924–25.	1925–26.
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1,980 8 11	213,238 2 11	1,645,790 12 3	3,993,825 12 1	6,036,422 15 11	7,246,767 11 1	8,347,818 3 0

These figures do not include interest during construction which, at 30th June, 1926, amounted to £541,321 16s. 4d.

Also included in Appendix No. 1 is a detailed statement of capital expenditure incurred during the period under review, with details of the expenditure at 30th June, 1926, on the whole of the activities.

Payment of Interest.—Before commenting on the results of the various sections of the undertaking, it is pertinent to show to what extent the undertaking was, at the close of the year, returning interest upon capital invested, and this is set out in the following statement—

	£
Total interest paid for year 1925-1926	**466,000**
Deduct—	
Interest on Capital Works	**50,000**
Interest charged to Operation	**416,000**
Amount of interest met from revenues ..	**154,000**
Amount by which annual expenditure, including interest, exceeded the revenues	**262,000**

It is, therefore, clear that, even at this early stage, the revenues were sufficient to meet all operating expenditure and 37 per cent. of the total interest chargeable against operation.

Depreciation.—The item of depreciation has not been included in the accounts for the year except in the case of the Newport "B" Station, and in certain minor cases in the district undertakings. The Commission has decided to provide for this in its accounts as from 1st July, 1926, by which date the whole of its major operating activities will have been in full operation for a period of twelve months.

RESULTS OF OPERATIONS FOR THE YEAR.—ELECTRICITY SUPPLY.

REVENUE.	Year ended 30th June, 1926. £
Metropolitan Bulk Supplies (50 cycle)	357,388
" " " (25 cycle)	135,968
(In conjunction with Victorian Railways.)	
District Undertakings	219,896
Total	713,252

EXPENDITURE.	£
Metropolitan Bulk Supplies (50 cycle)	598,238
" " " (25 cycle)	135,968
(In conjunction with Victorian Railways.)	
District Undertakings	203,725
Total	937,931
Loss for Year, after providing for interest	224,679

Energy sold during the financial year 1925-26 equals 161,990,327 kw. hrs., compared with 101,000,000 kw. hrs. for 1924-25.

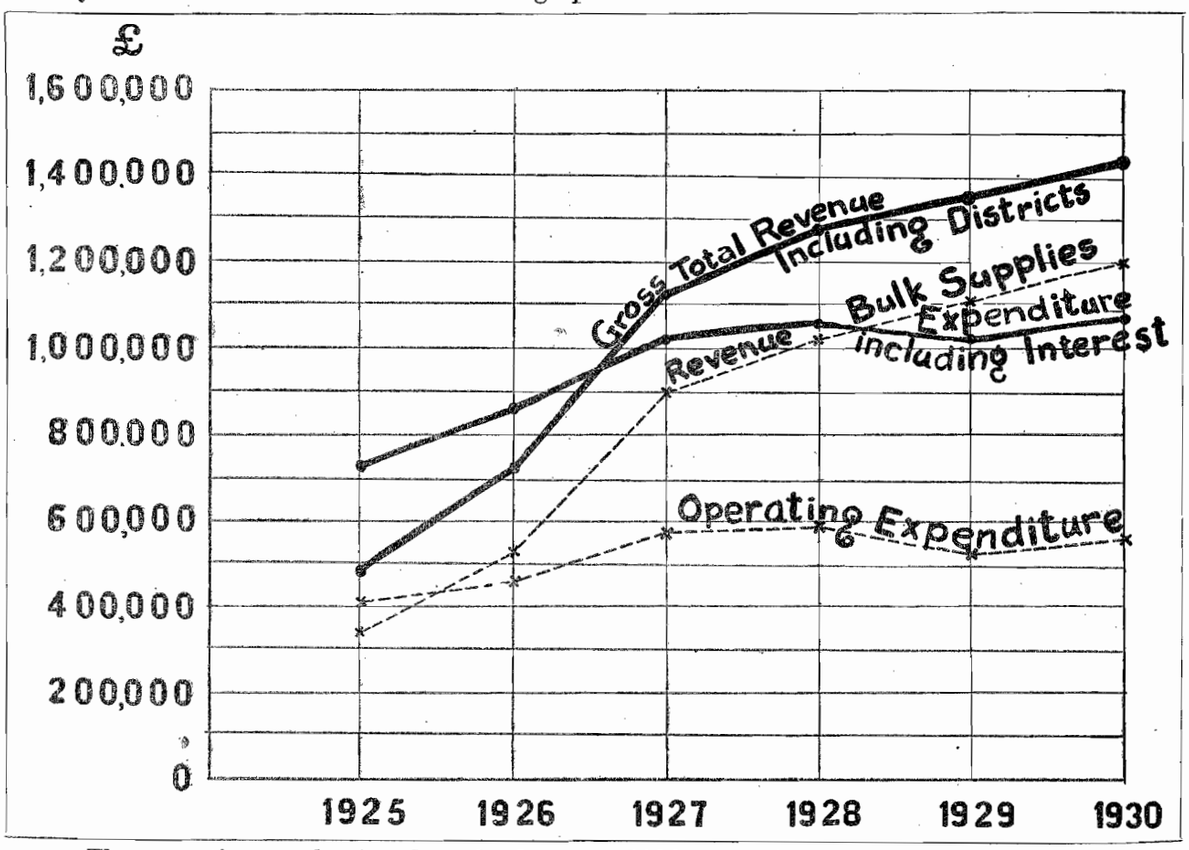
Metropolitan Bulk Supplies (50 cycle).—These consist of supplies given to the numerous supply undertakings for distribution in the metropolitan area, notably the Melbourne Electric Supply Co., Melbourne City Council, and those suburban municipalities engaged in the function of distribution. Supplies are also given direct to the Melbourne and Metropolitan Tramways Board, Melbourne and Metropolitan Board of Works at Spotswood, and to certain large industrial users.

The above tabulation shows that a loss for the year occurred on these supplies. Although this is slightly greater than estimated because certain large additional loads were not connected at the anticipated dates (but have since been connected), the result of the year's operations accords closely with the Commission's forecasts.

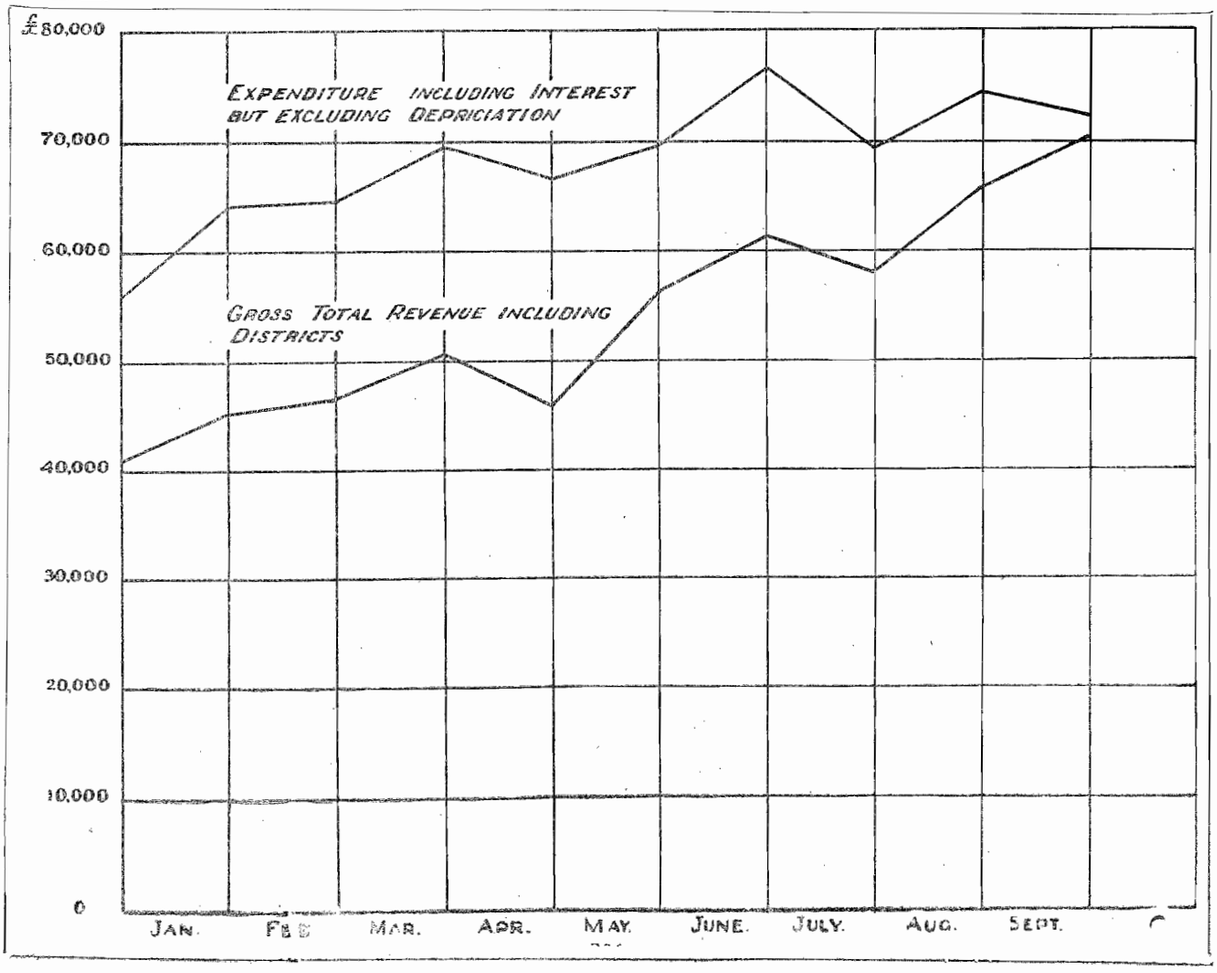
A factor also bearing on the loss was the increases in wages and alteration of conditions authorized by the Commonwealth Court of Conciliation and Arbitration and other wage-fixing authorities, which increased the Commission's wages bill by an amount of not less than £25,000 per annum.

Mr. Sawyer reported as follows :—" I have no hesitancy in saying I do not believe it possible for the combined electrical undertakings to show a net surplus for the calendar year 1927 after all proper charges—including depreciation—have been made. I do not believe it probable that there will be a net surplus for the calendar year 1928. I do believe it to be possible and probable that there will be a net surplus on the present electrical undertakings in the calendar year 1929."

During last Session of Parliament the Commission furnished the following forecast of the financial results of operations of the Commission's electric supply undertakings for the five calendar years ending 31st December, 1930, inclusive of all interest charges but exclusive of depreciation. No account is taken of the 25-cycle supplies furnished by the Victorian Railways Commissioners in conjunction with the Commission. The graph has been recorded in *Hansard*.



The operating results for the calendar year 1926 up to 30th September are noted in the following graph. The results assure that the estimates for the year will be realized, given normal operating conditions, with the additional demands to come on the system in the three months that remain.



Metropolitan Bulk Supplies (25 cycle) in conjunction with Victorian Railways Commissioners.—These supplies are merely "book entries" in the accounts of the Commission, the revenues being paid to the Railways Commissioners, who bear the cost of production at Newport "A" Power Station. Large bulk consumers in the metropolis are supplied from this source under contracts transferred to and administered by the Commission as the sole statutory authority for the sale of electricity generated in State-owned power stations. Such supplies are being gradually transferred to the 50-cycle system of the Commission, with the increased call on the output of the Newport "A" Station for railway traction. Thus, the revenue from these supplies receded from £190,023 in 1924–25 to £135,968 in 1925–26.

District Undertakings.—A total profit of £16,171 resulted from the year's operations. The results in the various districts and comparison with the preceding year have been dealt with in a separate section of the Report (page 23).

BRIQUETTE MANUFACTURE.

	1925-26.		1924-25.
	£		£
Revenue (and Briquettes on hand)	**129,353**	..	**47,734**
Expenditure	**169,278**	..	**83,991**
Loss	**39,925**	..	**36,257**

In comparing the loss of £36,257 for 1924–25 with the loss of £39,925 in 1925–26, it must be taken into account that the former loss followed only five months of operation, when the factory was in its initial stages, and costs could not, therefore, be regarded as on a normal basis. Increased interest charges to the extent of £27,076 were included in the accounts for this year, but the loss itself is almost wholly due to the fact that full output could not be maintained, for reasons explained elsewhere in the Report. The curves of briquette production in Appendix 4(*a*) illustrate this clearly. Towards the close of the year these difficulties had been partly overcome, the factory output for the last five months being—

May	9,492 tons
June	10,549 tons
July	9,537 tons
August	8,880 tons
September	10,574 tons
	49,032 tons

This represents an average for the five months of 9,806 tons per month. It is anticipated that the monthly average for the financial year 1926–27 will be about 9,000 tons. The monthly average for 1925–26 was 7,214 tons.

Attention is again drawn to the fact that this half factory was never recommended as a full commercial unit, and completely satisfactory results cannot be obtained until completion of the extensions contemplated in the Commission's recommendation of July, 1925.

With regard to actual trading during the year, no difficulty was experienced in marketing the briquettes produced. Notwithstanding the fact that metropolitan fuel merchants had stocked up very heavily during the summer, the sales for the winter months of May, June and July amounted to 32,632 tons, as against 18,096 tons for the corresponding period in 1925, an increase of over 80 per cent.

Depots were established throughout the metropolitan area, and considerably helped in effecting a more even distribution of supplies during the period of peak demand.

The trade in the industrial sphere was also extended, and at the end of the financial year had increased by 12 per cent. over that in June, 1925.

Old Brown Coal Open Cut.—The amount of sales, namely, £19,476, refers to supplies of coal sent to the metropolis and elsewhere for sales to the public, but excludes coal delivered to the Main Power Station, the latter expenditure being included in the costs of generation.

COMMISSION'S ELECTRIC SUPPLY UNDERTAKINGS FOR LOCAL DISTRIBUTION.

ESSENDON AND FLEMINGTON DISTRICT.

	1923–24.	1924–25.	1925–26.
Population of Supply Area	53,000	55,000	58,000
Number of Consumers	8,461	9,897	11,212
Percentage of Consumers to Population	16 per cent.	18 per cent.	19·3 per cent.
Sales of Energy—			
Lighting (Excluding adjustments for unread meters and service charges paid in advance at end of year)	1,408,397 kw. hrs.	1,797,678 kw. hrs.	2,294,687 kw. hrs.
Power (Excluding adjustments for unread meters and service charges paid in advance at end of year)	2,527,705 ,,	5,097,832 ,,	7,268,866 ,,
Public Lighting (Excluding adjustments for unread meters and service charges paid in advance at end of year)	235,424 ,,	543,625 ,,	588,874 ,,
	4,171,526 ,,	7,439,135 ,,	10,152,427 ,,
Revenue (Excluding adjustments for unread meters and service charges paid in advance at end of year)	£65,075	£77,347	£93,116
Average Revenue per kw. hr. sold	3·859d.	2·495d.	2·201d.
Maximum Demand of District in kws.	1,726	2,462	2,635
Total Connexions in kws.	9,380	11,824	13,911
Number of Motors	386	482	552
Total h.p. of Motors	2,045	3,413	3,871

EASTERN METROPOLITAN DISTRICT.*

	1923–24.	1924–25.	1925–26.
Population of Supply Area	8,200	10,000	15,500
Number of Consumers	826	2,246	2,898
Percentage of Consumers to Population	10 per cent.	22.4 per cent.	18.7 per cent.
Sales of Energy—			
Lighting (Excluding adjustments for unread meters and service charges paid in advance at end of year)	88,725 kw. hrs.	244,405 kw. hrs.	380,701 kw. hrs.
Power (Excluding adjustments for unread meters and service charges paid in advance at end of year)	24,933 ,,	140,887 ,,	314,705 ,,
Public Lighting (Excluding adjustments for unread meters and service charges paid in advance at end of year)	14,122 ,,	43,837 ,,	62,070 ,,
Bulk Supplies (Excluding adjustments for unread meters and service charges paid in advance at end of year)	..	260,879 ,,	437,669 ,,
	127,780 ,,	690,008 ,,	1,195,145 ,,
Revenue (Excluding adjustments for unread meters and service charges paid in advance at end of year)	£4,119	£15,482	£23,893
Average Revenue per kw. hr. sold (Excluding Bulk Supplies)	7·73d.	5·38d.	5·65d.
Maximum Demand of District in kws. (Excluding Bulk Supplies)	113	300	520 (estimated)
Total Connexions in kws. (Excluding Bulk Supplies)	(not available)	2,410	3,293
Number of Motors (Excluding Bulk Supplies)	30	78	93
Total h.p. of Motors (Excluding Bulk Supplies)	322	683	936

* Including Metropolitan South District for Years 1924–25 and 1925–26.

METROPOLITAN SOUTH-WEST DISTRICT.

	1924–25.	1925–26.
Population of Supply Area	..	1,700
Number of Consumers	318	365
Percentage of Consumers to Population	..	21·4 per cent.
Sales of Energy—		
Lighting (Excluding adjustments for unread meters and service charges paid in advance at end of year)	55,191 kw. hrs.	76,228 kw. hrs.
Power (Excluding adjustments for unread meters and service charges paid in advance at end of year)	160,813 ,,	181,422 ,,
Public Lighting (Excluding adjustments for unread meters and service charges paid in advance at end of year)	21,619 ,,	22,491 ,,
	237,623 ,,	280,141 ,,
Revenue (Excluding adjustments for unread meters and service charges paid in advance at end of year)	£4,442	£5,228
Average Revenue per kw. hr. sold	4·487d.	4·478d.
Maximum Demand of District in kws.	131	235
Total Connexions in kws.	575	753
Number of Motors	25	30
Total h.p. of Motors	306	385

COMMISSION'S ELECTRIC SUPPLY UNDERTAKINGS FOR LOCAL DISTRIBUTION—*continued.*

SOUTH-WESTERN DISTRICT.

	1923–24.	1924–25.	1925–26.
Population of Supply Area	..	26,391	27,100
Number of Consumers	2,582	3,683	3,974
Percentage of Consumers to Population ..	..	13·7 per cent.	14·7 per cent.
Sales of Energy—Units sold—			
Lighting (Excluding adjustments for unread meters and service charges paid in advance at end of year)	192,852 kw. hrs.	528,500 kw. hrs.	753,270 kw. hrs.
Power (Excluding adjustments for unread meters and service charges paid in advance at end of year)	136,351 ,,	646,510 ,,	960,336 ,,
Public Lighting (Excluding adjustments for unread meters and service charges paid in advance at end of year)	41,278 ,,	108,973 ,,	118,861 ,,
	370,481 ,,	1,283,983 ,,	1,832,467 ,,
Revenue	£11,306	£33,910	£43,074
Average Revenue per kw. hr. sold	7·32d.	6·34d.	5·64d.
Maximum Demand of District in kws. ..	529	(*a*) 732 (*b*) 88·5	(*a*) 867 (*b*) 111
Total Connexions in kws.	1,922	3,815	4,573
Number of Motors	146	277	348
Total h.p. of Motors	605	1,311	1,491

(*a*) Belmont Sub-station. (*b*) Supply to Bellarine Peninsula.

GIPPSLAND DISTRICT.

	1923–24.	1924–25.	1925–26.
Population of Supply Area	..	16,467	18,700
Number of Consumers	661	2,881	3,307
Percentage of Consumers to Population ..	..	17·5 per cent.	17·7 per cent.
Sales of Energy—Units sold—			
Lighting (Excluding adjustments for unread meters and service charges paid in advance at end of year)	44,324 kw. hrs.	486,931 kw. hrs.	594,692 kw. hrs.
Power (Excluding adjustments for unread meters and service charges paid in advance at end of year)	37,095 ,,	440,866 ,,	1,023,543 ,,
Public Lighting (Excluding adjustments for unread meters and service charges paid in advance at end of year)	10,762 ,,	68,938 ,,	87,659 ,,
	92,181 ,,	996,735 ,,	1,705,894 ,,
Revenue	£2,742	£21,358	£33,489
Average Revenue per kw. hr. sold	6·11d.	5·14d.	4·71d.
Maximum Demand of District in kws. ..	135	532	640
Total Connexions in kws.	421	2,980	3,896
Number of Motors	19	206	284
Total h.p. of Motors	146	1,227	1,551

NORTH-EASTERN DISTRICT.

	1924–25.	1925–26.
Population of Supply Area	8,000	13,025
Number of Consumers	1,026	1,850
Percentage of Population	12·8 per cent.	14·2 per cent.
Sales of Energy—Units sold—		
Lighting (Excluding adjustments for unread meters and service charges paid in advance at end of year)	90,305 kw. hrs.	219,223 kw. hrs.
Power (Excluding adjustments for unread meters and service charges paid in advance at end of year)	27,740 ,,	91,480 ,,
Public Lighting (Excluding adjustments for unread meters and service charges paid in advance at end of year)	16,971 ,,	43,183 ,,
Bulk Supplies (Excluding adjustments for unread meters and service charges paid in advance at end of year)	..	371,767 ,,
	135,016 ,,	725,653 ,,
Revenue	£5,050	£16,930
Average Revenue per kw. hr. sold	8·97d.	5·597d.
Maximum Demand of District in kws.	156	1,000 kw. (estimated)
Total Connexions in kws. .. .. .. (Excluding Bulk Supplies)	725	(not available)
Number of Motors .. .. (Excluding Bulk Supplies)	56	87
Total h.p. of Motors .. .. (Excluding Bulk Supplies)	237	300

DISTRICT UNDERTAKINGS.

General.—The details in the annexed tabulation and the graphs comprised in Appendix No. 6 (*b*) illustrate the growth in demand, number of consumers, and other details bearing on the operations of the main district undertakings, and, with the following summary of the year's results, are helpful in considering these undertakings as a whole (see page 23 also):—

(*a*) The total number of consumers increased during the year from 20,230 to 23,714, an increase of 3,484, or 17·2 per cent.

(*b*) No less than twenty new country and extra-metropolitan centres of demand were served, bringing the number of localities in which local distribution is undertaken to 73. Of these centres 39 had no electric service until supplied from the State scheme.

(*c*) Electric motors connected increased from 1,125 to 1,394 during the year, involving an increase in h.p. from 7,178 to 8,534.

Two-part Tariff.—The number of consumers charged under this tariff in the various districts is shown in graph appearing in Appendix No. 6 (*b*).

At the end of the year 7,731 domestic consumers were supplied under the two-part tariff, or 43·23 per cent. of the total residential consumers, and compared with the previous twelve months represents an increase of 4,269, or 123·3 per cent. This indicates that consumers are recognizing the benefits offered by the two-part tariff over a tariff based on a flat rate, and it is considered that, as consumers become better acquainted with its possibilities, domestic electrical appliances will be used to a steadily increasing extent.

Essendon-Flemington District.—After providing £2,966 for depreciation, there was a profit of £6,590 1s. 1d., and this has been transferred to a reserve account, providing for redemption of the purchase price, in accordance with the Government's instruction when authorizing the acquisition of the undertaking from the North Melbourne Electric Tramways and Lighting Company.

The general growth and the financial results achieved are regarded as satisfactory, particularly as power users continue to take full advantage of the substantial reduction in tariffs brought into operation some time ago.

Eastern Metropolitan District.—Operations resulted in a profit of £5,699 4s. 5d., without provision for depreciation. New centres connected were Ferntree Gully, Belgrave, Upwey, Greensborough, Montmorency, and portion of Mulgrave Shire. While development continued in the centres of Dandenong, Ringwood, and Lilydale, which previously comprised the district, the increase of 43 per cent. in the sale of energy for the year is primarily due to the new centres coming on to the system.

The bulk supplies given by the Commission on the Mornington Peninsula, notably to the Shires of Frankston-Hastings and Mornington, are included in the year's accounts.

Metropolitan South-West District.—The main centres served are Werribee and the Royal Australian Air Force at Point Cook. A profit of £968 10s. 5d. was made, without provision for depreciation. Energy sold for the twelve months showed an increase of 15 per cent., which, in view of the limited nature of the possible demand, is satisfactory.

Altona District.—The district relates to the supply to Altona and immediate neighbourhood, comprising 113 consumers, and is in its earliest stage of development. The loss for the year amounted to £372 19s. 7d. There was an increase of 34 consumers, and of 56 per cent. in connected load. This small undertaking is now showing sufficient development to justify the anticipation that it will shortly become payable.

Sunbury.—This undertaking passed from the Shire of Bulla to the control of the Commission on 1st May. Thus, a period of two months only, during which the generating plant was still supplying the undertaking, pending the completion of the Commission's transmission line, is included in the accounts for the year. There are 164 consumers. Revenue for the two months amounted to £564, and expenditure, exclusive of depreciation, to £348.

South-Western District.—Loss on the year's operations was £3,568 3s. 1d., compared with £8,234 16s. 4d. in 1924-25. Having regard to the fact that the undertaking as a whole has had less than two years for development, this result is satisfactory. Revenue has been sufficient to return interest amounting to £14,442 out of a total of £18,010, or 80·3 per cent. of the interest charged against the year's operations. There is every reason to anticipate that the operations for 1926-27 will provide full revenues sufficient to meet all operating expenses, including interest.

Gippsland District.—Operations resulted in a profit of £4,474 10s., without provision for depreciation. Although the exceptionally dry season adversely affected the dairy industry, development was not retarded, and sales of energy exceeded the previous year by over 70 per cent. New centres connected were Cowwarr and Morwell. The latter centre having been supplied previously in bulk by the Commission, the transfer related to the local distribution system, which was in the control of the Shire of Morwell.

North-Eastern District.—Prior to February, the district comprised only the undertakings of Shepparton, Echuca and Yarrawonga, each with its own generating plant. Since then supply has been made available from the main system at Albury, Corowa, Wahgunyah, and Benalla. Towards the close of the year the generating plant at Shepparton was closed down also, and supply given from the main transmission system. In the cases of Wahgunyah and Benalla, the undertakings have been acquired from the local municipalities. Albury and Corowa supplies are given in bulk at the Victorian border. Profit on the year's operation amounted to £1,975 1s., without provision for depreciation. Cost of operation of the transmission lines from Sugarloaf to Thomastown, including the operation of the Thomastown Terminal Station, is being capitalized until the works at Sugarloaf supersede the supply from the metropolis which at present obtains.

The district will include a number of other large centres as soon as negotiations have been completed. When the district has been developed, and includes the various main centres of demand which it is designed to serve, there is every reason to expect that it will, at an early stage of operation, return a revenue sufficient to meet all annual charges.

MERCHANDISING OF ELECTRICAL APPARATUS.

An important factor in the operations of these district undertakings will be the use of electric domestic appliances. The primary object of the introduction of the two-part tariff was to encourage this demand, but, as stated in our last Report, it could not be expected that the number of installations would attain to the proportions experienced in other parts of the world until better facilities had been given for purchase and servicing of apparatus.

The numbers of various classes of domestic appliances in use in the districts are shown in the accompanying table, but it is extremely probable that many small heating and cooking devices have been purchased and connected without the knowledge of the Commission's officers :—

—	Total Connected at 30th June, 1926.	Increase for Twelve Months ended 30th June, 1926.	Percentage Increase for Year.
			%
Electric Stoves	158	89	130
Fans	250	60	31
Grillers	276	113	69
Irons	6,881	1,827	36
Kettles	526	242	86
Radiators	3,145	968	49
Toasters	63	20	49
Vacuum Cleaners	57	15	47

The substantial percentage increase, in electric stoves particularly, demonstrates that consumers are eager to obtain the benefits offered by the two-part tariff, but our District Superintendents in all centres report that some system of hire purchase, under which apparatus could be obtained on terms that would not be burdensome to the consumer, is necessary if the system is to secure a larger percentage of customers as users of the more expensive domestic appliances.

The Commission had done its utmost in the last four years to urge traders to remedy the lack of initiative and enterprise displayed in handling this class of business, pointing out that it is in their interests and those of consumers and supply authorities alike for them to exploit the available market to its utmost. With one or two exceptions, traders in general have failed to seize the opportunities offered, and even the introduction of the two-part tariff, with its exceedingly favorable energy rates, has failed to produce increased activity on their part.

This has left the Commission no alternative but to enter the field of merchandising and ensure that its consumers have proper facilities for securing the benefits offered by the two-part tariff. At the close of the year it was negotiating with various firms, who made proposals that the Commission handle their products on a consignment basis, also offering to finance hire-purchase sales. Arrangements on these lines have been completed, but the Commission will also be handling apparatus purchased direct from the manufacturer in those cases where it is of opinion that such method is in the best interests of its consumers.

The lines along which the Commission is moving in this question were discussed with Mr. Sawyer, who fully concurred.

In order to gain experience in the operation of the arrangement, steps have been taken to establish a show-room at Sale, in the Gippsland District, and a trial will be made also at a selected centre in the Western District.

PART III.—DESIGN, CONSTRUCTION, AND OPERATION.

In the Sixth Annual Report a comprehensive *résumé* was given of the design of the Commission's activities at Yallourn, as well as a general description of the main items of plant in use. Comparatively few additions to the design or plant have been made during the twelve months under review.

YALLOURN OPEN CUT.

Overburden Removal.—To provide speedier removal of overburden a new electrically-driven dragline, three steam locomotives, and 40 5-yard side-tipping trucks were obtained for operation on the south face of the open cut, and a system of 3 ft 6 in. gauge railway tracks laid to connect with a new dumping area. The erection of the dragline was almost complete when the financial year closed.

One steam shovel operated on a two-shift basis on overburden removal throughout the year, the quantity removed being 402,970 cubic yards place measurement, of which 122,700 cubic yards were from the south face. The total quantity of overburden removed since operations commenced is 1,582,590 cubic yards.

A large drain has been constructed along the west of the open cut area, cutting off all surface waters from that locality, and diverting them into the Latrobe River. This was rendered necessary as the natural drainage for this water was over an area now brought into the open cut. This drain also carries the main drainage from the township and briquetting areas.

Coal Winning.—Coal winning was carried on, on a three-shift basis, till 3rd October, 1925, and on a two-shift basis for the remainder of the period.

The total output of coal from the Yallourn open cut for the year was 690,248 tons, all of which passed through the screening house, and the total amount of coal excavated from the commencement of operations till the end of this period was 1,132,808 tons. During the year 336,147 tons of Yallourn coal were sent to the power station, and 353,120 tons to the briquetting plant (see Appendix No. 4(*b*)).

The recrushing plant in the screening house was completed, and operated satisfactorily.

One half of the coal storage bins were in service as required and worked satisfactorily in acting as a buffer, enabling production of coal in the open cut to continue when deliveries to the power house or briquetting plant were held up by minor stoppages.

Three additional screens have been installed in the screening house, and the belts extended and modified to deliver all coal to the ropeway loaders at one central loading station, with satisfactory results.

The reclaiming belts under the storage bins, delivering the coal to the central loading station, were almost complete, and will enable the full capacity to be used as a buffer storage, thus increasing operation efficiency.

On 17th February an extensive fire occurred in the open cut, due to sparks from an adjacent bush fire. The greater part of the exposed coal area was alight, but the fire service of water mains and hydrants, &c., proved satisfactory, and the fire was extinguished within sixteen hours. The actual amount of damage did not exceed £1,000, and coal-winning operations were delayed for only 23 hours.

OLD BROWN COAL OPEN CUT.

The total output for the year was 175,009 tons, of which 114,565 tons were used in the power station. The amount of overburden removed was 335,070 cubic yards.

Boring operations were continued on the west side of the coal-pit, in order to define the western limit of the coal deposit. Nineteen machine bores were sunk, and of these twelve showed payable coal.

To provide increased supplies of crushed coal to the power station a second crusher was installed, and also a loading belt from the crusher to the railway trucks at the old cut, and an unloading belt from railway trucks into the Yallourn screening house. The unloading belt was completed and in operation before the end of the period, the loading belt being about half completed.

At the close of the period a start had been made on the erection of a timber bridge across the Latrobe, to permit of the transport of the power shovels from the new to the old cut, as provided in Mr. Klitzing's intermediate scheme.

ELECTRICITY SUPPLY.

YALLOURN POWER STATION.

Maximum Load during year ended 30th June, 1926	**36,000 kw.**
Total Units generated during year ended 30th June, 1926	**137,717,716 kw. hrs.**
Total Energy purchased from Briquetting Factory	**4,960,870 „**
Total	**142,678,586 „**

Curves appearing in Appendix 2(*b*) show the output of the station for each month of the financial year.

During the year such further progress was made with the erection of plant that, with the exception of a section of the boiler house equipment, the power station has been completed for the 50,000 kw. installation.

During the latter period of the year a step-grate drier was installed on No. 2 boiler, to work in conjunction with the existing stokers, and has since been in continuous operation. The operation of this drier is dealt with in the special section of this Report, dealing with the burning of low-grade brown coal.

An order was placed with the Howden-Ljungström Co. for the supply of one waste gas preheater unit complete, with forced and induced draft fans. It is expected that delivery will be made in the latter part of this year, when steps will be taken to install it on No. 7 boiler, which is being scheduled to go into service about December.

The third telpher, to which reference was made in the last Report, was erected and put into service by June, and assisted in handling the much larger coal supplies required as a consequence of the materially increased demand on the station.

Investigatory work dealing with the various phases of raw, predried and pulverized fuel, both with 48 per cent. and 65 per cent. moisture coal, was carried out, and, in addition, various investigations, resulting in modifications designed to improve the original plant, have been completed or are in progress, with regard to boiler feed, steam superheat, boiler arch design and construction, soot blowers, coal weighers, and particularly furnaces and stokers.

The electrical plant and equipment at the power station gave complete satisfaction throughout the year's operations.

Following an operating defect at Newport " B " Power Station, when a generator, paralleled on the bus-bar and carrying load, was deprived of field by the accidental opening of a field switch, a series of investigations was carried out at Yallourn, to ascertain the limitation of switching and the exact performance of a machine under such emergency conditions. These tests established without doubt the ability of the machines to operate for a short time without field and without dropping load to any extent. As a consequence, definite instructions have been issued to the operating staff for the immediate restoration of field to a machine under such conditions, and the tests have already had the satisfactory result that, following an accidental opening of a field switch on a generator at Yallourn, the system load was not interfered with in any way, and the operator restored normal conditions without any disturbance to supply.

In view of the fact that the main transformer banks had been in service for two years, and that the demand upon the Yallourn Power Station is rapidly growing, the overhaul of the main transformer banks was undertaken during the month of June, and they were found to be generally in a very satisfactory condition. Loading tests during the period showed that the transformer banks may each be loaded safely during the winter period to an output of 32,000 k.v.a. without exceeding guaranteed temperature rises. This means that, with the present equipment in transformers and transmission lines, provided the power factor of the Melbourne load can be satisfactorily corrected by means of synchronous plant, there should be no difficulty in transmitting 60,000 kw. for short periods from Yallourn by means of the transformers and transmission lines at present installed.

Tests.—A series of tests has been carried out at the Melbourne City Council Power Station on the unit type of pulverizing plant, to ascertain the possibilities of pulverizing and burning 48 per cent. raw coal without predrying, and a further number of tests is in progress at Geelong Power Station, on a Thompson boiler, equipped with Erith-Riley stokers, to try this type of stoker with the high-moisture run-of-mine coal from Yallourn.

NEWPORT "B" POWER STATION.

Maximum Demand during year ending 30th June, 1926 ..	**16,800 Kw.**
Total Energy generated during year ending 30th June, 1926 ..	**46,031,164 Kw. Hrs.**

There have been very few major interruptions of supply from Newport " B " during the year, a definite restriction occurring on one occasion only, owing to the failure of a connecting cable between Newport " B " Power Station and Yarraville.

SUGARLOAF–RUBICON SCHEME.

During the year plans and specifications were prepared for the head works of the Royston, Rubicon, and Lower Rubicon sections of the scheme, and the contractors, Messrs. Armstrong and Whitworth, commenced work towards the end of the year. In addition, a certain amount of preparatory work was carried out by day labour prior to placing the contract. This comprised chiefly a road 2 miles long to the site of the Rubicon Power Station, 2 miles of steel tramway to extend the existing line of the Rubicon Lumber and Tramway Co. to the Rubicon Power Station, haulage incline along the Rubicon pipe line, and minor buildings for accommodation and storage.

The construction of the Rubicon Falls Power Station was brought to completion. This station will function at the outset for construction purposes on the territory but will later form part of the main scheme. Its installed capacity is 400 h.p.

To link the various power stations a total of 3.8 miles of 6,600-volt (single circuit) and 2 miles of 22,000-volt (double circuit) transmission line will be erected.

At the end of June, 1.3 miles of the 6,600-volt line had been erected and the construction of the remaining portions of the system was in hand, with the exception of the last mile to Rubicon "A" not required at present. One circuit only of the double circuit construction is being erected in the first instance.

YALLOURN–YARRAVILLE 132,000-VOLT TRANSMISSION LINE.

The main transmission line from Yallourn to Yarraville, 132,000 volts pressure, operated satisfactorily throughout the year, with the exception of a few days when flashovers were experienced, caused by heavy deposits of soluble salts of potassium and sodium on the insulators. The presence of such matter in the atmosphere was due to the extraordinary sequence of bush fires coupled with the absence of rain, the occurrence of morning and evening fogs causing the material to be deposited on the insulators. A number of total interruptions took place, and to reemdy the trouble recourse was had to cleaning the insulators by hand.

The operation of the two circuits comprising this line has been very much improved by the introduction of modified balance relays at each end of the line. There has been no recorded case of a flashover of either circuit due to atmospheric induction during the year, and the operating reliability of the lines is regarded as very high. The Commission's experience in respect to the flashovers is practically unique, as far as this State is concerned, and the particular combination of atmospheric conditions which gave rise to it is likely to occur only at very long intervals. Arrangements have been made, however, for regular flashover tests on control strings during dry periods so that the earliest steps can be taken to prevent a recurrence of this trouble.

In all, fifteen automatic openings of circuit breakers, involving a total delay of only 29 minutes to consumers, occurred during the year's operation of this main transmission line. In most cases the interruption was on one circuit only, which enabled supply to be maintained on the other circuit, but, when both lines were affected, supply was maintained through the frequency changers at Yarraville.

The stoppages can be classified as follow :—

Flashovers	13
Short circuit caused by mental patient	1
Cable failure on 22,000-volt distribution system	1
Failure of conductors or tower parts	Nil
Total	15

A gratifying feature of the year's experience in the operation of this main line was the total absence of any trouble which could be ascribed to failure of insulators.

Periodical tests with the aislometer at six months intervals have been very satisfactory in indicating the extremely low percentage of insulators in which defects arise in practice. A complete test of the transmission line was made some months after the trouble occurred from bush fires, and it was found that, out of the total of 30,000 insulator discs on the transmission line, only five were faulty, due to cracks evidently caused by expansion under the abnormal temperatures from fires.

Prior to this test two cases of defective insulators had been found on the circuits since the transmission line was put into operation more than two years ago. The aislometer instrument has been of very great value in this work of insulator testing, and its use marks a definite advance in the practice of transmission line maintenance.

NEWPORT TO YARRAVILLE CABLES.

Two cable faults occurred on the four 22,000-volt underground cables between Newport and Yarraville Terminal Station during the early part of 1926.

TERMINAL STATIONS.

Yarraville.—This station was in satisfactory operation throughout the year.

The 12,500 kw. frequency changer continued to be of great assistance to the Railways Department and the Commission as a medium for the interchange of energy between the 25-cycle and the 50-cycle systems.

A statement showing the amount of energy interchanged and the total made available from this station for main distribution during the year appears in Appendix No. 3.

Thomastown.—This Station was completed during the year, insofar as the switching equipment for 22,000 and 66,000-volt lines and one main transformer bank are concerned.

The station is the connecting link between the Sugarloaf–Rubicon Scheme and the main metropolitan system, but is being used at present for transmission of energy to the North-East from the existing steam stations until the first section of the hydraulic and electrical works in the Sugarloaf territory has been brought into operation.

A 22,000-volt circuit from Sub-station " C," through the Preston sub-station of the metropolitan ring, at present supplies this terminal station, and arrangements are under way to provide an additional link with Yarraville, through Sunshine sub-station, by a circuit carried on the telephone poles alongside the main Yallourn line. These circuits, with the additional circuit from Thomastown to Sub-station " C," and the circuit from Thomastown to Ringwood will eventually serve for the absorption of energy from the Sugarloaf system in the metropolitan and outer metropolitan area.

The station is of outdoor design (see photograph in Appendix No. 7). The machine-house and the control buildings have been constructed, although the former is at present only a shell with crane facilities to deal with transformer assembling and maintenance. A feature of some importance has been the introduction of galvanized-iron pipe for bus-bars on the 66,000-volt structure. This bus arrangement is economical and satisfactory, and has the fewest possible insulated supports.

The station is at present equipped with one transformer bank of 13,500 k.v.a. rating on the 66,000-volt winding, but the transformers, being designed for full output when fitted with forced air cooling, are at present rated only for 6,000 k.v.a. with natural cooling, the forced air equipment not yet having been installed.

The latter k.v.a. capacity is considered to be adequate for the output of the station until energy is received from the Sugarloaf–Rubicon scheme, when forced cooling will be applied, and the additional transformer bank installed.

METROPOLITAN DISTRIBUTION SYSTEM.

The principal metropolitan construction work during the year was the provision of works to supply the requirements of the Melbourne Electric Supply Co.'s system.

The new sub-stations in course of construction will be supplied by 22,000-volt circuits from the Yarraville Terminal Station, and, after consideration of a number of alternatives, it was decided to reach the company's area via South Melbourne, crossing the River Yarra by overhead circuits. It, therefore, became necessary to build two steel towers in order to obtain the clearance between the lowest conductor and high water level, as required by the Melbourne Harbour Trust.

These towers support four circuits, which from the river proceed easterly for a considerable distance overhead, and at the terminal station and Sub-station " G " terminate in underground cables. The mains were put in service early in June, and have provided a very satisfactory link.

The arrangement of the towers, photographs of which appear in Appendix No. 7, is as follows :—

The towers immediately adjacent to the river are 247 feet in height, with a span of 891 feet. At a distance of 1,300 feet on the western side, and 800 feet on the eastern side, are shorter towers 38 feet in height, for the purpose of sustaining the terminal stress of the conductors. The base of the taller towers is 40 feet square, and that of the shorter 20 feet square.

The 38-ft. towers have been designed to withstand the terminal tension of all twelve conductors, while the 247-ft. towers have been designed to withstand safely the unbalanced stresses due to six broken conductors. The weight of each of the larger towers is approximately 30 tons.

The task of erecting the twelve (0.15 square inch) copper conductors at such a height over the river, without interference with shipping, offered difficulties of a nature not previously experienced in the Commission's operations.

Arrangements were made with the Ports and Harbours Department to keep shipping clear of the crossing for two hours on a Sunday morning. During this period a 1½-in. circular steel cable 3,000 feet in length was hoisted into position at the apex of the towers and heavily anchored at each end. This steel cable afterwards was used to carry running sheaves, to which each conductor in turn and auxiliary hauling ropes were suspended by jumpers. Great care had to be exercised to prevent the " bight " of the conductor from hanging down in such a way as might interfere with shipping.

Three power winches were used to operate the various hauling ropes employed and to tension the conductors after erection. Approximately 10 tons of copper cable were erected between the two terminal towers. This stringing work was performed within a period of less than two weeks.

The crossings are specially insulated with four 11-in. disc insulators in series, each insulator having an ultimate mechanical strength approximately of 20,000 lb. Lightning arresters are installed on the overhead lines adjacent to the crossing on the South Melbourne side, at the point where the high crossing junctions with the 2 miles of overhead construction to Sub-station " G " at South Melbourne. Insulation on the overhead pole line is designed for 33,000 volts, although the line is operating at 22,000 volts, the proximity to the bay justifying the higher class of insulation.

The main sub-stations in course of completion in the area of the Melbourne Electric Supply Company are :—

Sub-station " G "—South Melbourne, Sub-station " R "—Richmond, Sub-station " K "—Camberwell, Sub-station " H "—St. Kilda, Sub-station " O "—Oakleigh, Sub-station " M "—Mentone.

With the exception of the two last named, the sub-stations are equipped throughout with ironclad indoor type switchgear and outdoor transformers, the cables being connected through sealing bells.

In Sub-stations " G," " K," and " H," two 9,000 kva. bank transformers are installed ; in Sub-station " R," two 6,000 k.v.a. banks ; and in each of Sub-stations " O " and " M," 3,000 k.v.a.

Only Sub-stations " G " and " R " supply three-phase energy, the remainder being designed either for purely four-wire three-phase operation and arranged for the balancing of 4,000-volt single-phase circuits, or for both balanced three-phase and three-phase four-wire operation. This variety of design has been necessitated by the partial change-over of the existing single-phase system of the Melbourne Electric Supply Company to three-phase, the complete change-over only being effected in the purely industrial portions of the area.

The only interruption of any serious duration at the main sub-stations during the year was at Sub-station " D " (Ascot Vale) feeding the Essendon and Flemington area, due to the failure of one single-phase unit in a three-phase 3,000 k.v.a. transformer bank. Supply was restored within 1 hour 44 minutes.

Progress was made with the installation of duplicate banks at Sub-stations " C " (Brunswick) and " D " (Ascot Vale), together with additional transformer switchgear, so that the chance of a lengthy interruption is eliminated.

The metropolitan cable system functioned satisfactorily, with the exception of a number of faults in the late summer, considered to have been due to jointing defects made evident by the operating temperatures attained under summer loading conditions.

It is satisfactory, in view of the care and attention given to the relay system on the Commission's network, to record that entirely correct isolations were obtained in all cases of fault or trouble on the metropolitan network system, a result which can be achieved only by the most painstaking attention to the installation of a correct relay system, and subsequent care in maintenance and calibration.

In Collingwood and South Melbourne districts, where the heavy industrial demands ard supplied from Sub-stations " B " and " G " respectively, a 6,600-volt ring main system, basee upon the main sub-station in each case, has been designed and constructed on behalf of the Melbourne Electric Supply Company.

In the case of Collingwood area, there are four ring main switching stations, and two, but eventually three, switching stations in South Melbourne area, the ring main cable consisting of 3 core 0.25 sq. in. armoured cable.

These rings are protected by the Callender-Hunter system, with one of the three cores split, yielding virtually a four-core system with special protective transformers at each end of the cable section.

The system has not yet been in operation for sufficient time to justify definite comment, but up to the present there has been no fault with any of the cables so protected.

CONSTRUCTION OF MAIN DISTRIBUTION AND SUB-STATIONS FOR SERVICE TO THE NORTH-EASTERN DISTRICT.

Work on the 66,000-volt line from Thomastown to Wangaratta and the 22,000-volt lines from Wangaratta to Albury and from Springhurst to Corowa was completed in January, 1926, and the section of the 66,000-volt line between Benalla and Shepparton four months later.

Some of the difficulties in the construction of the 66,000-volt line through sections of the route between Thomastown and Wangaratta were described in last Report. An interesting section of the work started in December and completed the following month was the erection of steel cables over the waters impounded by the Sugarloaf Dam. This work is breifly described :—

> A flying fox was erected from the edge of the water on the Sugarloaf side to the site of the structures in this hill. This was found very useful for transporting insulators, erecting gear, &c., and also for carrying the ends of the conductors from the water's edge to the structures. Horses were used for the haulage. The method adopted for conveying the cable across the water provided for a very light high-strength steel cable to be taken across from the northern side to the southern side, at which point it was attached to a barge. The barge was then hauled across to the northern side by means of a caterpillar tractor on the northern bank. In order to avoid kinking of the cable, considerable stress had to be maintained on the cable as it paid out. This was effected by means of powerful brakes on the cable drum.
>
> The 66,000-volt conductors consist of four 37/14 high-grade steel cables, three of which are in operation and one is spare. There are also two steel cables for telephone purposes, making six cables in all.

In the mountainous country between Murrindindi and Taggerty and between the Sugarloaf Dam and Maindample an additional aluminium core-steel reinforced cable was erected. In the event of the failure of insulators or breaking of one of the conductors, the spare conductor can be put into use, thus greatly reducing the period that the circuit would be out of service, as, owing to the nature of the country, considerable time would otherwise be required to find a fault and effect repairs.

Switches have been inserted at Kinglake, Murrindindi, Taggerty, Sugarloaf and Maindample, so that in the event of failure the line can readily be sectionalized and the fault located.

In May, 1926, the line as far as Wangaratta was converted to 66,000 volts. There was no interruption to supply to Corowa during the period of conversion, as arrangements were made for the Municipality of Albury to supply Corowa through the Commission's transmission line between Albury–Springhurst and Springhurst–Corowa.

The step down and switching stations in Benalla, Wangaratta and Shepparton were constructed to entirely new designs. The Wangaratta and Shepparton sub-stations are novel so far as Australia is concerned, as regulation on the 22,000-volt side of the 66,000–22,000 volt step down transformers is effected by means of step regulators and auto-boosting and bucking transformers. It appears to afford the solution of the difficult problem of automatic regulation of lines at this voltage.

MAIN AND BRANCH DISTRIBUTION SYSTEMS—DISTRICT UNDERTAKINGS.

Metropolitan and Extra-Metropolitan.

Melbourne Branch.—Extensions were made to the 6,600-volt system during the year, to enable supplies to be given to additional consumers, including the municipalities of Port Melbourne, Heidelberg, Preston and Northcote. About 4 miles of underground cable were laid, and nearly 6 miles of overhead line erected.

Essendon–Flemington District.—A considerable amount of what might be called "consolidation" work was accomplished, following the heavy work of complete changeover to alternating current supply in the previous years, and at the present time a number of additional sub-stations, one of which will be a steel kiosk, are under construction or projected. The total number of 6,600-volt sub-stations erected as at 30th June, 1926, was 29, with total installed transformer capacity of 5,490 k.v.a. During the twelve months under review 10·52 route miles of low-tension reticulation and 3·8 route miles of street lighting mains were erected—an increase of approximately 10 per cent.

Eastern Metropolitan District.—During the year supply was made available to Ferntree Gully, Upwey and Belgrave, by a 6,600-volt overhead line from Ringwood sub-station. An overhead line was also erected to supply Greensborough and Montmorency, while an extension to Eltham was in progress at the close of the year.

In Ringwood and Croydon, which has been taken over from the Lilydale Shire Council, the whole system was changed from single to three phase.

From Dandenong an extension was made to supply various centres of demand in the Mulgrave Shire.

Metropolitan South District.—The only supplies at present given in this district are bulk supplies to the Shires of Frankston-Hastings and Mornington. At the close of the year the 22,000-volt line serving the area was being extended from Moorooduc to the Flinders Naval Base, where a 250 k.v.a. sub-station will be erected and a 6,600-volt supply made available to the Navy Board.

Metropolitan South-West—(Point Cook and Werribee).—During the year the supply voltage was raised from 6,600 to 22,000. A 2 miles extension of the 22,000-volt main was made to give augmented supply to Corpus Christi College, where a 50 k.v.a. sub-station was erected and put into service. At Laverton a 250 k.v.a. substation was erected to give supply to the Royal Australian Air Force Depot.

Since last year 1·3 route miles of low tension reticulation and 0·4 route miles of street lighting mains were erected, representing an increase of about 12 per cent.

Altona.—The route mileage of reticulation erected during the period was 0·87, making a total to date of 4·17 route miles. In addition, the street lighting mains were extended from 2·15 to 2·35 route miles.

Country Districts.

South-Western District.—The service given has been most satisfactory, there having been only two accidental total shutdowns on the 44,000-volt line from Geelong (Belmont) during the year, one of which covered a period of 2 hours 10 minutes between midnight and 5 a.m., due to a piece of wire having been deliberately thrown across the line. Thus, interruption during the working day period due to other causes amounted to 15 minutes only for the whole year.

About 15 miles of 6,600-volt mains and eleven small sub-stations with a total capacity of 160 k.v.a. were erected to supply various groups of consumers.

Additions to the low tension reticulation systems represented an increase of about 7 per cent.

Gippsland District.—There were no additions to the 22,000-volt section of the main distribution system during the year, but short extensions were made to the 6,600-volt sections to supply the Gippsland Blue Metal Quarries and the Beet Factory at Maffra.

Extensions involved the erection of three 6,600-volt transformers with a total capacity of 315 k.v.a.

The operation for the year was highly satisfactory, with very few interruptions of supply.

In February, the reticulation of the township of Cowwarr was completed and supply extended to nine farming consumers.

North-Eastern District.—By far the greatest constructional activity in country supplies was shown in this district.

At the request of the Council, the work of converting the reticulation system in Corowa from direct to alternating current was undertaken by the Commission, and a bulk supply made available to the town during February. As 66,000-volt transformers were not at that time available, supply was given temporarily at 22,000 volts.

Bulk supply at 3,300 volts was given to Albury in May from a main sub-station on the Victorian side of the Murray River at Wodonga.

At Wahgunyah, conversion from direct to alternating current was carried out.

Reticulation work at Springhurst was in progress at the end of the year.

In May, when the Commission assumed control of the Benalla undertaking, the local generating plant was taken out of commission and supply made available at two 6,600/400–230 volt sub-stations erected in the town.

During the year three 22,000/400–230 volt sub-stations were erected at Shepparton. A fourth sub-station was in course of erection. At the end of the year only a small portion of the electrical requirements of the town were being generated at the local power station.

Echuca will shortly be supplied by the 22,000-volt system from Shepparton, and other connexions shortly to be linked to the scheme include Kyabram, Tatura, Tongala, Mooroopna, Springhurst and Chiltern, while reconditioning will be effected at Yarrawonga.

WATER POWER INVESTIGATIONS.

Investigations were continued throughout the year to determine the potential resources of the State as regards the development of hydro-electric energy.

These investigations have, for the most part, comprised surveys of possibilities previously located by exploration.

In the Gippsland District, surveys on the Tanjil River, which were in hand at the time of the last Report, were completed, but a decision as to the possibilities of this stream cannot be reached pending the collection of long-period stream-flow data, which are being obtained.

The Mitchell River, below Waterford, has shown possibilities for development, and surveys were commenced during the year, gaugings being instituted at the same time.

A review of the data on which the Kiewa Scheme was based led the Commission to carry out extensive additional surveys, and two parties were engaged upon this work during the whole of last summer, with gratifying results. Special attention is being given to stream gaugings related to this scehme.

Following upon exploration work in the North-eastern portion of Victoria during the previous year, surveys were commenced on the Mitta-Mitta River, in the Omeo District.

In connexion with these investigations, the importance of accurate long-period records of stream flows cannot be overstated, and the Commission continues to give special attention to this work.

During the year several new gauging stations were established, and some existing stations abandoned when necessary records had been obtained.

At the 30th June, the Commission was maintaining 25 regular gauging stations in various parts of the State, six being equipped with automatic recording gauges.

The Commission takes pleasure in recording its appreciation of the conscientious attitude of the local gauge readers during last summer's disastrous bush fires in the Noojee district. This was exemplified by the fact that there was no interruption in the gauging returns received, despite the fires which, in one case, involved the total loss of the gauge reader's homestead.

BRIQUETTING AND RESEARCH.

Briquetting Plant.

The Briquetting Factory operated successfully during the whole period. Output was affected in several months on account of the need for a fifth boiler. A contributing factor also was the reduction in coal supplies because the New Cut in its initial stages of development was unable to supply the requirements of the Power Station for New Cut coal as well as the Briquette Factory, preference being given to the Power Station.

The monthly output of the factory, shown in Appendix No. 4 (*a*), is regarded as very satisfactory in the circumstances. The year's operations demonstrated that, with four boilers in continuous service, the rated output of the factory can be maintained without difficulty. When the existing half-factory was designed, our German consultants regarded four boilers as the absolute minimum for the presses to be installed, and urged the installation of a fifth boiler as standby.

The Commission, however, resolved to postpone such expenditure until experience of the factory's operations over an extended period proved its necessity. The Commission is now convinced of the necessity for the fifth boiler, as, under present conditions of working, the regular withdrawal of such boiler for overhaul affects the output. The Commission is of opinion that the reductions in cost of production consequent upon full output being maintained will repay the cost of this installation in from two and a half to three years.

The proposed installation provides for a boiler of 5,500 square feet of heating surface, with economizer, capable of operation at 38 atmospheres pressure, the total cost being estimated at £26,400, spread over the two years which will elapse before the boiler can be placed under steam. The proposal has the concurrence of Mr. W. H. Sawyer, and has been authorized by the Government.

Pulverized Fuel.

For over two years investigations have been conducted conjointly by the Victorian Railways Department and the Commission into the commercial aspects of drying and pulverizing brown coal, and the utilization of such fuel for both stationary and locomotive boilers. Tests of a minor character were also made in the combustion of pulverized brown coal in an annealing furnace. For comparative purposes the tests were extended to include the pulverizing and combustion of black coal, black and brown coal mixtures, carbonized brown coal, and carbonized brown coal briquettes.

The drying of the coal was effected in " direct " rotary driers, and carried on for over two years without serious accident. Experience gained in these experiments was not sufficient, however, to justify establishment of direct drying on a large commercial scale, and for the present the Commission is satisfied that the only satisfactory and safe method of drying is by the use of steam as in the briquette factory at Yallourn.

The investigators were enabled to obtain much valuable information that will be of material assistance in the design of any commercial plant that may be established hereafter.

The experiments proved that there is no difficulty in either drying brown coal or pulverizing it subsequently.

Pulverized brown coal was used almost continuously for over two years in the furnace of a large water tube boiler at Newport " A " Power Station. The results were most satisfactory as to ease of operation, steaming capacity, flexibility in steaming and economy of the calorific value of the fuel.

The prospects of pulverized brown coal being commercially used on Victorian locomotives are at present somewhat indefinite. The efficiency of combustion is higher than with lump black coal, but some practical problems of locomotive operation remain to be solved.

When pulverized brown coal can be offered to the Railway Department at a price low enough to show a reduction in that Department's present fuel costs (which may be practicable at no distant date), there will be inducement to the Railway Department to review this question.

The prospects of pulverized brown coal finding a market in industrial establishments are undoubtedly most promising. These combined experiments by the Railway Department and the Commission have resulted in a material advance in the knowledge and experience of both Departments in preparing and utilizing fuel from an indigenous and practically inexhaustible source of supply, and are calculated to hasten the day when such fuel is used on a large commercial scale.

The Commission desires to express its appreciation of the earnest and valuable co-operation given by the officers of the Railway Department throughout these lengthy investigations.

Fuel Research.

During the year experimental work on the pilot carbonizing plant at Yallourn was continued, the objects of the experiments being :—

(1) To investigate, under conditions approaching a works scale, the technical possibility of utilizing brown coal for the production of—
   (*a*) gas suitable in calorific value and composition to replace that usually manufactured at gas works from bituminous coal ; and
   (*b*) a solid residue of high heating value and combustibility capable of replacing black coal for locomotive use and/or other purposes.

(2) Assuming favorable results from inquiries (*a*) and (*b*)—to collect as much data as possible on the economic aspects of the process.

During the year, 22 tests, each of three or more days' duration, were carried out, and considerable data collected.

Seventeen of the tests were on briquettes ; the remaining five on old mine and new cut raw coal, treated separately. The tests have shown that from briquettes there can be produced continuously a gas of steady calorific value of about 410 B.T.U. per cubic foot when the temperature of the external walls of the retort is maintained at 650°C. The carbonized residue (or char) has a calorific value of about 13,750 B.T.U. per lb. with an ash content of 4 per cent. Tests with this residue on a boiler furnace show that it is in every way suitable for dust firing, igniting readily, and giving a very high furnace temperature.

On the basis of dry coal, the gas yield is about 9,220 cubic feet per ton. The gas contains about 29·5 per cent. of CO_2. If this were removed by water scrubbing or otherwise, the heat value of this CO_2-free gas would be well above the standard required for town gas purposes. The volume of CO_2-free gas would be about 6,500 cubic feet per ton of dry coal.

Laboratory carbonization of the char shows that an increased amount of good quality gas can be obtained by increasing the carbonizing temperature above 700° C. A fresh series of experiments in a high temperature retort is being initiated to explore the possibilities in this direction.

PART IV.—UTILIZATION OF LOW-GRADE BROWN COAL FOR PRODUCTION OF ELECTRICITY AT YALLOURN POWER STATION.

1. The problem of utilizing the low-grade brown coal deposits in Gippsland for the generation of electricity has, since the inception of the Morwell Scheme, attracted the attention of the general public, and has, especially of late, been the subject of much public discussion. The Commission has concluded that, to assist those interested and for general information, it is desirable that the Commission itself should make a comprehensive statement upon the situation as it exists to-day, and review the history and sequence of events which have led up to it.

2. The people of this State have entrusted to the Commission what was fundamentally a difficult problem, namely, to put to efficient commercial use the extensive resources of low-grade fuel which this State possesses. It is not the fault of the Commission that this fuel is of inferior quality; nor that there existed here no previous knowledge or experience as to the best manner of turning these resources to commercial advantage; nor that, owing to the post-war international political situation, information of any real value from abroad was inaccessible to the Commission at the time that it was called upon to undertake this work. There was no alternative but either to decline such a task altogether, or to attack it resolutely—dealing with the difficulties involved as they arose, one by one—subduing and eliminating them, progressing steadily, from one proved and tested position to the next—and so approaching a final and complete solution by the only methods sanctioned by modern scientific practice.

3. This acute period of experimentation, inevitable under the circumstances, is now past, and Parliament and the people may feel assured that nothing remains to demonstrate that this high-moisture fuel, available in such vast quantities in Gippsland, can be burnt for the generation of electricity and the manufacture of briquettes in a fully efficient, economic and satisfactory manner.

4. It might be inferred that, in the course of this difficult period of research and experiment, much money has been expended, if not wasted. The actual expenditure involved has been relatively small, and will be recouped, many times over, in the practical application of the economic results which have been realized.

5. At the outset, it is desirable to emphasize several paramount considerations :—

(*a*) There has never, from the outset, been any difficulty in actually burning this high-moisture coal in any of the boiler furnaces. From the moment that coal from the New Cut was available until the present time 65 per cent. moisture brown coal has been in regular and continuous use, both in the whole boiler plant of the briquetting factory and in a number of the boilers in the power house. The "efficiency" of this combustion was not, however, considered as high as was thought to be capable of attainment, and the whole problem has therefore resolved itself mainly into one of raising the efficiency of combustion to the desired standard.

(*b*) There never has, from the outset, been any difficulty in maintaining the output of steam from the Yallourn boiler house requisite to carry the growing demand upon it for electric services. At no time and under no circumstances has there been any failure of the necessary steam supply, or anything approaching a danger of such failure. The only doubt hitherto felt was whether the *total* capacity for steam production of the entire boiler plant would be adequate (under altered conditions of coal supply deliberately introduced subsequently by the Commission itself for an entirely different object) to serve the *full* load which the power house was designed to carry when such full load is realized. Any such doubts have now been entirely dispelled as the result of the research work applied to these problems.

(*c*) There has been no delay in the pursuit of the necessary investigations, and no interests have suffered by reason of any supposed or alleged dilatoriness in the adoption of measures to improve combustion conditions. On the contrary, there has existed no reason, either of policy or of economy, why the investigations undertaken should not be deliberate and prolonged, so that conclusions could be thoroughly confirmed. The full demand upon the Yallourn power house will not arrive until the winter load of 1927, and this test the boiler plant will now be in a position to meet in an entirely efficient and economic manner.

6. In order that the position may be fully understood, it is necessary to furnish some statistical particulars. The present section of the Yallourn power house has been designed to make available a total output of 50,000 kilowatts of electric energy. Such an output will require about 700,000 lb. of steam per hour. To supply this, a boiler plant has been provided comprising twelve large boilers, of which ten are to be, at any one time, in regular service, while two will be in reserve for any emergency or for overhaul. Thus, each of the ten boilers in service must be capable of supplying at least 70,000 lb. of steam per hour.

7. To generate this steam, the Commission called for tenders, in 1921, for a plant of twelve boilers, each having a rated capacity of 70,000 lb. per hour, with grates suitable for burning raw brown coal of a quality then known to exist in the Old Brown Coal Mine at Morwell, that is to say, coal having a moisture content of 45 per cent. to 50 per cent. There was then no information available to any one that the brown coal deposits of Gippsland showed any variation in physical quality, and no one would have been justified in assuming, in the entire absence of any data to the contrary, that the coal which would become available in the new works at Yallourn would differ in quality, in any material respect, from the coal already known to exist in very close proximity to the proposed new field. It is true that the territory in which this new field was to be located had previously been systematically bored by the Mines Department prior to the creation of the Commission, but these bores made no disclosure whatever of any difference in physical character or moisture content of the underlying coal, as distinguished from the coal which had been opened up for many years immediately on the other side of the River Latrobe.

8. There was, further, no ground at all for doubting that 50 per cent. moisture coal could be successfully burnt on travelling grates of the automatic type which were to be provided under the contract for the Yallourn boiler plant. For some years previously prolonged experience with the burning of many thousands of tons of this fuel was obtained at the Spencer-street power house of the Melbourne City Council. This had fully demonstrated the suitability of that type of furnace grate. The event has proved the correctness of the original design, for, on the completion of the first units of the new Yallourn boiler plant in 1924, exhaustive and prolonged tests with Old Mine coal proved that the boilers, as designed, were capable of a steam output well in excess of their rated capacity.

9. In 1921 the metropolis was suffering from a serious and rapidly increasing shortage of electric energy owing to war and post-war conditions, and it was then a matter of extreme urgency, in the public interest, to install and get into operation, as quickly as possible, new generating plant. Even if the Commission had then any reason to suspect that the coal likely to become available in the new workings would contain more than 50 per cent. moisture, it would not have been justified in postponing the entire scheme, as then embarked upon, merely because the particular design of furnace grate intended to be provided under this boiler contract might not prove to be the very best under any possibly different physical condition of the coal available. It was evident from the first that the furnace grates were only a detail, capable of modification and adjustment should the necessity arise. The contract for the supply of this boiler plant, *including grates of the automatic travelling type*, was therefore placed towards the end of 1921. These grates embodied the very best and latest features of the most modern British engineering practice, as distinguished from some form of fixed grate which had become the more usual German practice in the post-war period.

10. In the meantime, the Commission made preparations to open up the new territory by the removal of the overburden which lay upon the new coal deposits. At the earliest practicable moment steps were also taken to have exploration shafts sunk into this coal, with a view, primarily, to the verification of the results disclosed by the bores, as to its depth, and as to the absence of intrusions of any strata of non-combustible material. This exploration, while fully verifying the general expectations as to the extent and uniformity of the coal deposit, quite unexpectedly disclosed that the coal existing south of the river carried a substantially higher percentage of moisture than any brown coal deposit previously opened up in this State—in fact up to 65 to 66 per cent. of moisture. It naturally took several months to complete two shafts, in different parts of the field, in order that the deposit might be thoroughly tested throughout its entire depth of 200 feet, not only for moisture content, but also for other important physical characteristics.

11. The results so revealed were, admittedly, unexpected, but, in the meantime, the contract for the boiler plant and buildings had been let. The Commission therefore had no alternative but to courageously attack the situation by fully investigating to what extent, if at all, the economics of the boiler plant would be affected by the wetter coal, and in what manner and by what modifications of the design of the furnaces any difficulties encountered could be satisfactorily met. In view of the complete success which has been achieved, there can be no longer any doubt that the Commission adopted the right course in deciding to push on with the boiler plant as originally designed and in adopting subsequently such modifications in or additions to the furnaces

as would be disclosed by appropriate research and experiment. This decision was influenced very largely by the grave public urgency of getting the Yallourn plant into speedy operation, regardless whether or not the highest attainable efficiency could be achieved from the outset.

12. Fortunately, during 1922 and 1923, the Commission had in operation at Yallourn a small temporary power plant (for the service of the works), and this afforded a convenient and suitable means for close research into combustion problems under actual working conditions. It was by then known that " wet " brown coal of a physical character and moisture content approximating to that in the new Yallourn open cut was being successfully used for all purposes in some of the mid-European brown coal fields. It was also known that German practice in the burning of brown coal of various moisture contents favoured the use of a form of fixed grate known as the " step " grate. It was, however, also ascertained that such step grates to burn 65 per cent. moisture coal required grate areas from two to three times those sufficient for the type of travelling grate proposed to be installed. This would have involved so large an increase in the floor area of the boiler house as to be quite out of the question at Yallourn. The Commission's engineers held the view that a much better and a much cheaper line of action would be to retain the travelling grate and to add to it some device for the pre-drying of the coal, that is, external of the furnace proper, though not external of the boilers *per se*. The event has shown that these views were perfectly sound, and that the Commission has been well advised in giving its staff authority to proceed on those lines.

13. Accordingly, researches were instituted, during 1922 and 1923, at the temporary power plant, into the pre-drying of the " wet " coal, before its entry into the furnace, by the application of the principle of utilizing the waste furnace gases by passing them through the stream of coal on its way from the overhead boiler bunkers to the travelling grates. This was effected by means of a device which has come to be known as a " drier," and the results of these experiments were so encouraging that it was decided by the Commission that further experiments of the same nature, on a full-sized scale, should be made in the permanent Yallourn boiler house. Four of the large boilers then in course of erection in that boiler house were accordingly equipped with such " driers," in which were embodied all the improvements suggested by the preceding experiments.

14. These four boilers, so equipped and supplied with new cut screened coal, have been in continuous and satisfactory use since the early days of commercial operation in 1924. They have always been able to yield their full-rated output of steam. They have been fired continuously (except for very short periods of temporary overhaul of each boiler in succession) with the 65 per cent. moisture new Yallourn cut coal, and have always been able to burn this fuel exclusively, *without any admixture with any drier coal.* Hence, in so far as the problem of the *combustion* of the " wet " coal is concerned, these four boilers have provided a complete solution, and fully justified the public statements of the Chairman, made at the time, to the effect that there was no difficulty in satisfactorily burning this coal.

15. It may be mentioned, incidentally, that the briquetting factory boiler plant also came into commercial operation in December, 1924. This boiler plant (which is small in comparison with that of the power house) was intentionally furnished with fixed step grates of the German type, so that the Commission could have an opportunity of gaining the benefit of actual experience with grates of this type. There has, in this plant, never been the slightest trouble with the combustion of the " wet " coal. The full rated output of steam has been furnished by it from the outset up to the present day. Nothing but new Yallourn, i.e., nothing but " wet " coal has ever been burnt in these furnaces.

16. There was, however, one aspect in which the Commission was not entirely satisfied and in respect of which it proceeded to seek, and has now found, a complete and satisfactory solution. This aspect related to a matter in which the combustion problem was only indirectly involved, but which affected mainly the satisfactory prosecution of coal-winning operations. It was, in short, a question of the *texture* of the coal necessary to be supplied to the Commission's several activities.

17. The Commission's original scheme provided for the subdivision of the coal produced from the open cut into two categories by the *screening* of same—the finer and coarser parts (technically known as " undersize " or " slack " and " oversize ") being sent to the briquetting factory, whereas the intermediate texture (technically known as " mediums ") was sent to the power house boilers. This was the method put into use at the inception of operating conditions and worked very well up to a point; but, after considerable experience therein, and after close observation of the whole field of activity at Yallourn, the Commission came to the conclusion, early in 1925, that much was to be gained, in elasticity and economy of operation, if a situation

could be brought about which would entirely eliminate the necessity for screening the coal at all—in other words, if the operations both of the power house and of the briquetting factory could be re-organized, without undue expenditure, so that both plants could receive and successfully use *unscreened* coal (technically known as " run-of-mine " product), and that, thereby, material overall economy and simplification of operation could be effected.

18. Instructions were accordingly issued, early in 1925, to the engineering staff, to investigate the possibility of efficiently burning " run-of-mine " product from the new open cut in the boiler plants, as they then stood. It was ascertained that no difficulty of any kind existed, in doing this, in the briquetting factory boilers. But, in the power house boilers, it was found that the presence of a high percentage of " fines," or " slack " coal, had the effect of reducing the steaming capacity of the boilers, besides introducing special, purely mechanical difficulties in regulating the flow of coal within the afore-mentioned driers, particularly in wet weather.

19. When this was reported, the Commission instructed its engineers to launch inquiries and to institute researches and investigations with the object of developing modifications to the furnace conditions, and particularly to the grates themselves, which would permit of " run-of-mine " coal being efficiently burned without the use of pre-driers or any other prior preparation. There was ample time for such investigations because, as stated, the boiler plant was throughout operating with entire success, and producing all the steam required, without any difficulty whatsoever. In initiating these investigations, the Commission had in view, not the special interests of the power house, but the overall benefits to operations as a whole if " run-of-mine " coal could be exclusively used in all its activities at Yallourn.

20. In pursuit of a solution of the problem set by the Commission, an experimental model plant was established, with a view to testing various arrangements, one of which was a *compound* grate, consisting partly of a fixed step grate, and partly of a travelling portion, and in which combination the function of the step grate was to act as a " drier." The action of the arrangement is as follows :—The wet coal is fed on to the step grate, which is set at an angle so that the coal, while passing down on its way to the travelling grate is dried mainly by exposure to the radiated heat from the furnace itself. The design of the step grate allows for adjustments which govern the rate at which the partially-dried coal is fed on to the travelling grate. This conception, which is believed to be new as applied to modern power station practice, was due to Mr. C. T. Briggs, the Commission's Mechanical Engineer, an officer of high capacity and long experience in boiler practice, and the members of his staff. In order to afford every opportunity for exhaustive inquiry, the Commission sent Mr. Briggs on a visit of inspection to England, Europe, and America, for the express purpose of ascertaining whether anything could be learned which would give any greater promise of success than his own proposal, in the particular objective aimed at, under the particular conditions already existing at Yallourn. In the meantime, Mr. Briggs' idea was fully tested out on the experimental plant with highly satisfactory results. There was, at this juncture, ample time for a deliberate investigation of this nature, as the boiler plant could not in any case be taxed to its full rated capacity until 1927, and, in the meantime, the Commission was experiencing no difficulty whatever in obtaining from the plant all the steam required for regular daily operation. The greatest load hitherto carried by the power house has been 35,000 kilowatts out of the total available capacity of 50,000 kilowatts, and steam for this was available as and when required. Mr. Briggs was accordingly directed to proceed abroad, and was absent altogether six months. Fortified by his observations abroad and by the experiments, the Commission approved of the addition of the special form of step grate to the travelling grate already installed in one of the large boilers in the power station at Yallourn.

21. The device in question is that to which Mr. Sawyer, in his report, refers as the " supplementary step grate," the decision to install this having been reached before that gentleman arrived in Australia. Moreover, the observation in his report that there is nothing new in the use of step grates is undoubtedly true in a general sense, inasmuch as grates of this type have been in use, from the outset, at the Yallourn Briquetting Factory. But the implication that the use of a step grate functioning as a drier, in combination with a travelling grate, was already well known, is incorrect, as it is believed that, beyond an ineffectual attempt made in Germany some years ago, this is a development entirely novel in power station practice, with plants using low-grade fuels.

22. From the moment that this apparatus was put into commercial use, it proved an unqualified success. Adequate experience of its operation under normal and regular commercial conditions is now available and entitles the Commission to state that a position has been reached in which combustion problems, involving the commercial use of high-moisture low-grade Yallourn coal, taken from the new open cut on the south of the river, used as mined, without screening and without any admixture with any other fuel, have been completely and satisfactorily solved.

The full requisite output of steam necessary to give the maximum quantity of energy which this power station will be called upon to supply (i.e., 50,000 kilowatts)—a situation which is expected to be reached in May or June of 1927—is now assured, even if the boiler house is supplied exclusively *with run-of-mine new-cut coal.* In addition, the Commission has accomplished a still more important objective, in that it will be able to dispense with any preliminary preparation of the coal, by screening, pre-drying, or any other process, and will thereby achieve greatly increased elasticity of coal-winning operations, resulting in more economic production, and in a diminution of interruptions in coal supply due to accidental breakdowns.

23. This has been brought about with an expenditure in research and experiment which is entirely negligible relative both to the value of the results obtained and to the capital invested in the boiler plant. In point of fact, this plant, as originally designed and contracted for in 1921, stands, to-day, unaltered and unimpaired in every particular—except only that it is being added to by the installation of supplementary "step grates," at a cost which will not exceed £4,000 for each boiler—an inconsiderable sum compared with the increased combustion and coal-winning advantages which have resulted.

24. In brief, the boiler plant, as it will now be brought to completion upon the lines indicated, embodies a very definite and very valuable scientific advance, and will be a substantially better commercial proposition than would probably have been achievable with German fixed step grates alone. It will give an output of steam sensibly greater than its rated capacity. These results have been obtained without the necessity to discard or scrap a single pennyworth of the plant as originally obtained, and without any capital expenditure worthy of consideration in relation to the cost of the original plant and to the economies effected. The results of these prolonged and systematic investigations, and of the experience which has been gained in the production and utilization of Victoria's brown coal deposits, will be reflected, for all time to come, in every future development or activity in this State which is based upon the use of our brown coal resources.

25. To sum up, the boiler plant, as originally procured, with the addition of driers, and for the reception of which due provision was made in the original contract, would have been quite satisfactory for all the needs of the power house if the Commission had been content to continue the practice of screening the coal, so as to deliver to the power house a product from which the fine or slack coal had been eliminated. But the decision to dispense with screening, and thereby simplify and reduce the operation of coal-winning, has necessitated a further modification, by the adoption of a supplementary step grate, in association with the originally provided travelling grate. This modification has proved completely successful, and the cost of making it is negligible in comparison with the economies which can consequentially be effected in coal-winning operations.

CONCLUSION.

Personnel of the Commission.

As mentioned in last Annual Report, Sir David Orme Masson was appointed by the Government to act as a Commissioner during the absence abroad on leave of Commissioners Sir Thomas Lyle and the Hon. George Swinburne. This appointment terminated with the return of the Hon. George Swinburne on 30th November, 1925. The Commission records its acknowledgment of the valuable service rendered to the State and to his colleagues by Sir David Masson during the period of his temporary appointment.

At the close of the period under review, the Hon. George Swinburne resigned from the Commission, and the Government regretfully accepted his resignation to date from 6th July, 1926.

It was with very deep regret that his colleagues on the Commission parted with Mr. Swinburne. The following resolution was recorded in the Commission's minutes :—

> "That this Commission, on learning of the Government's acceptance of the resignation of the Hon. George Swinburne as a member of the State Electricity Commission of Victoria, desires to place on record its deep appreciation of the long and valuable services which Mr. Swinburne has rendered to this State as a member of the Commission. Appointed as one of the original Commissioners, Mr. Swinburne has, with the exception of a short period, remained a member until now; and his colleagues have ever found their association with him marked by the greatest cordiality and helpful co-operation, and he has at all times been willing to take upon himself any special services that his colleagues desired to have carried through. In this way, Mr. Swinburne has given the greatest service to the community, oftentimes at considerable disadvantage to his own interests. While it is regretted that for health reasons it has been necessary for Mr. Swinburne to take this step the Commission hopes for his speedy restoration to full vigor now that he is no longer burdened with the arduous and exacting duties of Commissioner.
>
> In parting from Mr. Commissioner Swinburne his colleagues gladly pay tribute to the ability, energy and courtesy with which that gentleman has discharged his many duties to his colleagues and to the State."

The vacancy thus created was filled by the appointment of Mr. F. W. Clements as a Commissioner as from 7th July, 1926.

Staff.

The loyal and efficient service of officers and employees has been noted with pleasure and much appreciated by the Commission, and its Report would be incomplete without this acknowledgment.

We have the honour to be,

Sir,

Your obedient servants,

JOHN MONASH, Chairman.

THOMAS R. LYLE, Commissioner.

ROBERT GIBSON, Commissioner.

F. W. CLEMENTS, Commissioner.

R. LIDDELOW, Secretary.

28th October, 1926.

APPENDICES.

APPENDICES.

APPENDIX No. 1.

AUDITOR-GENERAL.—VICTORIA.

Melbourne.

AUDITOR-GENERAL'S CERTIFICATE.

I certify that the accounts have been examined with the books and vouchers, and I am of opinion the Balance-sheet fairly exhibits a true and correct view of the undertaking at the 30th June, 1926. The values of the stores have been accepted on the certificates of the storekeepers.

J. A. NORRIS,
Auditor-General,
20th September, 1926.

STATE ELECTRICITY COMMISSION OF VICTORIA.

GENERAL BALANCE-SHEET AS AT 30TH JUNE, 1926.

LIABILITIES.

	£	£ s. d.	£ s. d.
CAPITAL AUTHORIZED BY PARLIAMENT UNDER—			
LOAN ACT No. 3029	355,000		
" " 3101	1,430,000		
" " 3160	2,006,000		
" " 3234	1,576,000		
" " 3306	1,447,000		
" " 3381	1,569,500		
" " 3433	1,841,000		
	10,224,500		
EXPENDITURE UNDER ABOVE ACTS		6,205,351 1 10	
ADD EXPENDITURE UNDER TREASURY ACT No. 3274/3200		2,391,623 3 10	
ADD EXPENDITURE UNDER TREASURY ACT No. 3345/3200		1,051,482 13 7	
ADD AMOUNT ADVANCED BY TREASURY FROM PUBLIC ACCOUNT ON ACCOUNT OF LOAN		175,068 18 6	
LIABILITY ON ACCOUNT OF LOAN FUNDS			9,823,525 17 9
ADVANCED BY TREASURY FROM PUBLIC ACCOUNT (SECTIONS 5 AND 6, ACT No. 3239)			233,296 10 4
DEBENTURES GUARANTEED BY COMMISSION			63,971 13 3
RESERVE ACCOUNTS—			
Depreciation		67,208 1 6	
Bad and Doubtful Debts		407 11 0	
Redemption		10,589 9 1	
			78,205 1 7
SUNDRY CREDITORS AND ACCRUED CHARGES		143,025 17 7	
INTEREST ACCRUED		173,067 7 6	
			316,093 5 1
TRUST MONEYS—			
Security Deposits		7,052 6 3	
Unclaimed Wages		873 10 4	
Consumers' Deposits		4,665 14 5	
Sundries		720 0 0	
			13,311 11 0

ASSETS.

	£ s. d.	£ s. d.	£ s. d.
YALLOURN WORKS—			
Power Station and Equipment	2,119,178 12 5		
Coal Supply Plant and Equipment	932,336 11 8		
Briquetting Plant and Equipment	508,688 6 8		
Township	360,019 10 9		
General Plant, Buildings and Equipment—Permanent	323,406 15 9		
General Plant, Buildings and Equipment—Temporary	107,563 8 4		
Township Lighting Undertaking	10,511 5 9		
		4,361,704 11 4	
METROPOLITAN SUPPLY SYSTEM—			
Power Station and Equipment—Newport "B"	766,892 18 6		
Main Transmission Systems	631,524 7 10		
Terminal Stations	554,838 7 9		
Main Distribution System	511,101 15 7		
Distribution System—6,600 volt	81,944 0 11		
		2,546,301 10 7	
METROPOLITAN SUPPLIES SUSPENSE ACCOUNT		6,690 19 8	
SUGARLOAF WORKS—			
Power Station and Works		78,044 11 9	
NORTH-EASTERN DISTRICT—			
Transmission and Transformation System	249,082 17 10		
Power Stations and Distribution Systems	70,585 13 7		
		319,668 11 5	
SOUTH-WESTERN DISTRICT—			
Transmission and Transformation System	138,568 0 7		
Distribution Systems	186,579 4 0		
		325,147 4 7	
GIPPSLAND DISTRICT—			
Transmission and Transformation System	98,641 15 7		
Distribution Systems	98,400 6 1		
		197,042 1 8	
METROPOLITAN SOUTH-WEST DISTRICT—			
Transmission and Transformation System	9,445 4 1		
Distribution System	15,913 15 6		
		25,358 19 7	
EASTERN METROPOLITAN DISTRICT—			
Transmission and Transformation System	26,474 13 6		
Distribution Systems	103,704 3 3		
		130,178 16 9	
ESSENDON AND FLEMINGTON DISTRICT—			
Distribution System		161,739 15 9	
ALTONA DISTRICT—			
Distribution System		3,313 17 0	
SUNBURY—			
Transmission and Transformation System	6,011 10 1		
Distribution System	5,087 11 0		
		11,099 1 1	
SERVICE BUILDINGS AND EQUIPMENT—			
Head Office Building, Furniture and Fittings	119,561 1 0		
Footscray Store Buildings and Workshop	23,821 9 2		
Dandenong Store Buildings and Workshop	8,847 17 2		
South Melbourne Garage and Equipment	1,891 6 10		
Briquette Depot Equipment	2,147 14 11		
		156,269 9 1	
			8,322,559 10 3

Motor and Other Vehicles			23,526 10 10
Electric Supply Power Surveys			1,732 1 11
Stores on Hand—			
Yallourn Store	128,247 8 7		
Footscray Store	237,623 3 9		
Dandenong Store	54,106 11 11		
Stationery Store	1,770 1 6		
Garage Store	1,847 9 9		
Corowa Store	1,268 16 11		
Sugarloaf Store	10,500 9 7		
Thomastown Transmission Line Store	3,821 9 8		
Thomastown Terminal Station Store	2,184 2 10		
Western District Store	8,389 6 11		
Gippsland Store	6,326 15 1		
Eastern Metropolitan Store	2,403 6 2		
Sunbury Store	16 7 9		
Metropolitan South-West Store	79 14 11		
Essendon and Flemington Store	6,071 12 1		
North-East Store	4,921 10 10		
Altona Store	54 12 0		
		469,633 0 3	
Coal Stocks on Hand	2,433 7 2		
Briquette Stocks on Hand	10,322 10 0		
		12,755 17 2	
Sundry Debtors—			
Head Office—Bulk Supply and General	77,263 4 8		
Brown Coal	2,202 11 5		
Briquettes	21,354 16 3		
Yallourn	7,129 7 10		
Gippsland District	5,852 13 9		
Western District	8,077 2 2		
North-Eastern District	5,842 12 9		
Eastern Metropolitan District	4,099 9 7		
Metropolitan South-West District	835 17 0		
Altona District	20 11 10		
Essendon and Flemington District	12,587 7 2		
Metropolitan South District	996 7 2		
Sunbury District	390 7 9		
		146,652 9 4	
Payments in Advance		2,377 4 2	
Victorian Government Stock		4,846 8 4	
Cash—			
At Bank	15,392 7 11		
At Branches	1,593 0 8		
Advances to Officers	1,819 19 5		
Stamps on Hand	142 10 5		
		18,947 18 5	
		9,003,031 0 8	
Loan Flotation Expenses		171,700 6 10	
Advances to and Capital Expenditure on behalf of Melbourne Electric Supply Company		145,050 1 4	
Interest During Construction		541,326 16 4	
Expenses in Connexion with Inquiry by American Experts		7,334 3 2	
Amount charged to Commission by Treasury in accordance with Decision of Cabinet, 22nd July, 1922		62,023 6 8	
Profit and Loss Account		597,938 4 0	
		£10,528,403 19 0	

£10,528,403 19 0

There is a contingent asset and liability in respect of securities lodged as bona fides under Contracts to the extent of £45,859 4s. 2d., and held by the Bank on the Commission's behalf.

Certified correct,
R. LIDDELOW, Secretary.

STATE ELECTRICITY COMMISSION OF VICTORIA.

GENERAL PROFIT AND LOSS ACCOUNT FOR YEAR ENDED 30TH JUNE, 1926.

Dr

	£ s. d.	£ s. d.	£ s. d.
To Balance at 30th June, 1925		335,662 16 1	
Less Rebate on Freight from Old Open Cut to Power Station—Financial Year 1924–25 ..	6,608 9 4		
Less Overcharge of Interest—Financial Year 1924–25 ..	6,310 10 1		
		12,918 19 5	
			322,743 16 8
To Loss—			
Western District			3,568 3 1
Altona District			372 19 7
Briquette Manufacture			39,924 12 7
Metropolitan Supply System			240,850 0 9
Transfer to Redemption Account—Essendon and Flemington District			10,589 9 1
			£618,049 1 9

Cr.

	£ s. d.
By *Profit*—	
Essendon and Flemington District	6,590 1 1
Gippsland District	4,474 0 10
North-Eastern District	1,975 1 0
Metropolitan South-West District	968 10 5
Eastern Metropolitan District	5,699 4 5
Sunbury District	238 19 9
Yallourn Township Lighting Undertaking	165 0 3
Balance carried to Balance-sheet	597,938 4 0
	£618,049 1 9

STATE ELECTRICITY COMMISSION OF VICTORIA

Metropolitan Supply System.

Profit and Loss Account for Year ended 30th June, 1926.

	£	s.	d.		£	s.	d.
To Purchase of Energy	142,151	0	2	By Power Sales—			
Power Generation	344,862	18	5	Commission's Undertakings	67,049	5	8
Transmission, Transformation, and Distribution	40,163	16	10	Private Companies and Municipalities	489,516	15	11
Interest	255,350	6	10	Miscellaneous Revenue	3,839	9	11
Depreciation	18,727	10	0	Balance	240,850	0	9
	801,255	12	3		801,255	12	3

Briquette Manufacture.

Profit and Loss Account for Year ended 30th June, 1926.

Dr.				*Cr.*			
	£	s.	d.		£	s.	d.
To Briquettes on hand 30th June, 1925	675	0	0	By Sales	119,705	18	5
Operating and Maintenance Expenses	125,872	16	11	Briquettes on Hand	10,322	10	0
Freight	6,148	11	8	Balance	39,924	12	7
Selling Expenses	5,375	10	6				
Interest	31,881	1	11				
	169,953	1	0		169,953	1	0

Brown Coal Mine—Old Open Cut.

Profit and Loss Account for Year ended 30th June, 1926

Dr				*Cr.*			
	£	s.	d.		£	s.	d.
To Operating and Maintenance Expenses	58,420	2	9	By Sales	59,358	18	7
Selling Expenses	644	19	1	Rents	237	16	0
Freight	157	8	8				
Interest	374	4	1				
	59,596	14	7		59,596	14	7

EXPENDITURE OUT OF CONSOLIDATED REVENUE 1st JULY, 1925, TO 30th JUNE, 1926.

	£	s.	d.		£	s.	d.
To Expenditure—				By Treasury Account—			
Salaries	2,760	0	0	Division 71/1	5,515	7	11
Power Investigations—Surveys	5,569	7	7	Division 71/2	6,881	13	8
Licensing of Wiremen	1,317	10	10	Division 71/3	4,599	12	7
Electric Inspection	2,750	3	2	Division 71/4	2,146	16	0
Research Work	4,599	12	7				
Experimental Coal Pulverizing Plant	2,146	16	0				
	19,143	10	2		19,143	10	2

STATE ELECTRICITY COMMISSION OF VICTORIA.

DISTRICT UNDERTAKINGS.

PROFIT AND LOSS ACCOUNT FOR YEAR ENDED 30TH JUNE, 1926.

	Essendon and Flemington District.	South-Western District.	Gippsland District.	Eastern Metropolitan District.	Metropolitan South-West District (Werribee).	Altona District.	North-Eastern District.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
EXPENDITURE.								
To Generation, Purchase of Energy and Distribution	74,668 17 6	27,413 19 8	19,095 11 3	15,070 13 10	2,924 9 5	1,629 6 1	11,757 12 8	152,560 10 5
Interest	8,048 16 6	18,010 15 3	10,456 17 1	5,155 0 11	1,214 5 3	324 6 10	3,089 18 10	46,300 0 8
Depreciation	2,966 0 0	..	..	..	..	..	..	2,966 0 0
Bad and Doubtful Debts	116 7 6	52 7 6	44 2 6	105 19 1	6 8 0	3 5 10	18 0 10	346 11 3
Total	85,800 1 6	45,477 2 5	29,596 10 10	20,331 13 10	4,145 2 8	1,956 18 9	14,865 12 4	202,173 2 4
INCOME.								
By Sales	92,390 2 7	41,908 19 4	34,070 11 8	26,030 18 3	5,113 13 1	1,583 19 2	16,840 13 4	217,938 17 5
Total	92,390 2 7	41,908 19 4	34,070 11 8	26,030 18 3	5,113 13 1	1,583 19 2	16,840 13 4	217,938 17 5
Profit	6,590 1 1	..	4,474 0 10	5,699 4 5	968 10 5	..	1,975 1 0	19,706 17 9
Loss	..	3,568 3 1	..	..	..	372 19 7	..	3,941 2 8

BALANCE-SHEET AS AT 30TH JUNE, 1926.

	Essendon and Flemington District.	South-Western District.	Gippsland District.	Eastern Metropolitan District.	Metropolitan South-West District (Werribee).	Altona District.	North-Eastern District.	Total.
ASSETS.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Generating Plants	..	..	..	..	..	..	11,238 2 5	11,238 2 5
Transmission and Transformation Systems	..	138,568 0 7	98,641 15 7	26,474 13 6	9,445 4 1	..	249,082 17 10	522,212 11 7
Distribution Systems	156,673 15 0	181,824 6 7	94,559 12 9	100,124 3 0	15,648 8 0	3,312 2 0	56,615 2 9	608,757 10 1
Interest during Construction	..	4,528 9 11	1,819 15 6	687 19 10	47 0 6	78 1 2	6,309 3 9	13,470 10 8
Tools, Instruments, Vehicles, and Office Furniture	5,066 0 9	4,754 17 5	3,840 13 4	3,580 0 3	265 7 6	1 15 0	2,732 8 5	20,241 2 8
Stores on Hand	6,071 12 1	8,389 6 11	6,326 15 1	2,403 6 2	79 14 11	54 12 0	4,921 10 10	28,246 18 0
Sundry Debtors	12,587 7 2	8,077 2 2	5,852 13 9	5,095 16 9	835 17 0	20 11 10	5,842 12 9	38,312 1 5
Payments in Advance	31 13 7	35 6 11	47 8 2	28 9 3	5 12 8	..	55 0 2	203 10 9
Victorian Government Stock	..	..	2,520 13 9	185 7 1	..	..	1,261 6 2	3,967 7 0
Cash at Bank and in Hand	218 1 0	70 10 0	76 7 1	56 15 10	10 13 6	..	79 1 3	511 8 8
Balance Profit and Loss Account	..	11,802 19 5	..	..	..	618 12 11	..	12,421 12 4
	180,648 9 7	358,050 19 11	213,685 15 0	138,636 11 8	26,337 18 2	4,085 14 11	338,137 6 4	1,259,582 15 7
LIABILITIES.								
Sundry Creditors and Accrued Charges	637 4 11	6,722 1 4	11,494 8 3	19,814 18 9	3,968 0 4	..	23,109 2 2	65,745 15 9
Interest Accrued	2,833 16 2	6,668 14 5	3,446 14 7	1,329 6 0	390 11 6	110 13 2	2,332 7 8	17,112 3 6
Consumers' Deposits	3,105 16 6	770 19 2	245 15 6	260 10 3	38 6 6	22 1 0	221 15 0	4,665 3 11
Reserves—								
Depreciation	14,028 12 10	..	69 1 2	589 7 0	..	..	..	14,687 1 0
Bad and Doubtful Debts	216 7 6	141 1 1	42 13 11	2 8 1	0 15 10	0 7 6	3 13 0	407 6 11
Redemption Account	10,589 9 1	..	..	..	..	..	..	10,589 9 1
Balance Profit and Loss Account	..	..	5,914 3 11	10,890 6 9	1,549 8 4	..	3,327 0 1	21,680 19 1
Balance carried to General Balance-sheet	149,237 2 7	343,748 3 11	192,472 17 8	105,749 14 10	20,390 15 8	3,952 13 3	309,143 8 5	1,124,694 16 4
	180,648 9 7	358,050 19 11	213,685 15 0	138,636 11 8	26,337 18 2	4,085 14 11	338,137 6 4	1,259,582 15 7

STATE ELECTRICITY COMMISSION OF VICTORIA.

STATEMENT OF CAPITAL EXPENDITURE.

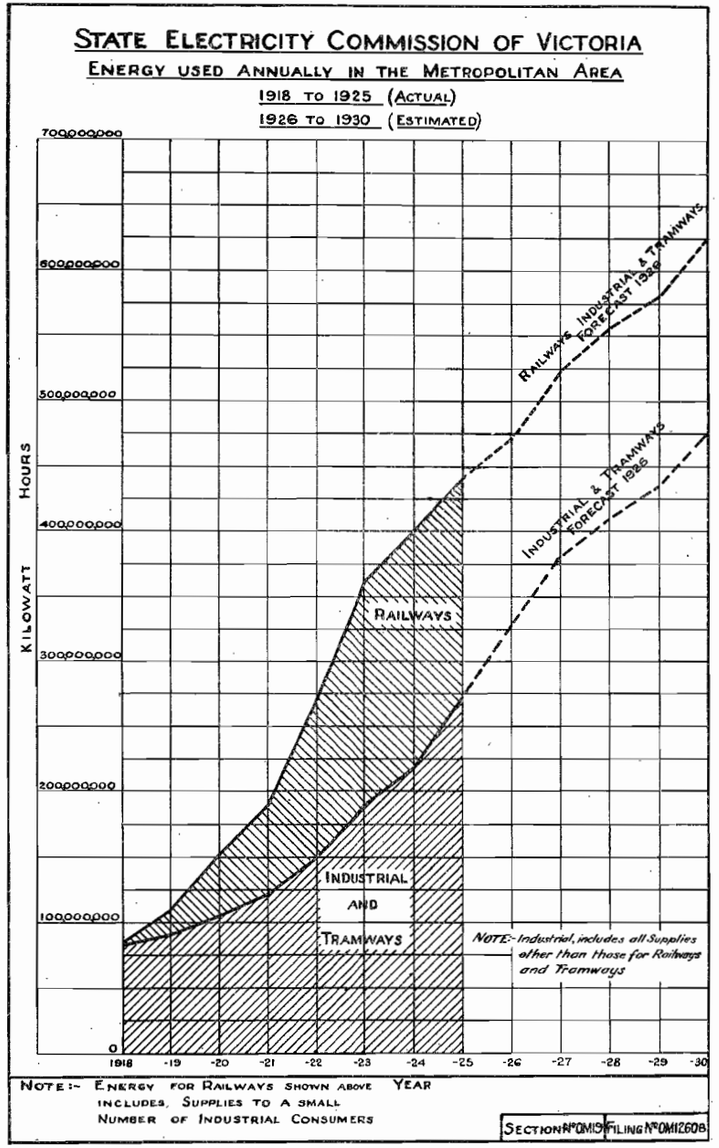
—	Expended to 30th June, 1925.	Total at 30th June, 1925.	Additional for Year 1925–26.	Total for Year 1925–26.	Expended to 30th June, 1926.	Total at 30th June, 1926.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
YALLOURN WORKS—						
Power Station and Equipment	2,014,561 10 8		104,617 1 9		2,119,178 12 5	
Coal Supply Plant and Equipment	693,604 6 6		238,732 5 2		932,336 11 8	
Briquetting Plant and Equipment	493,145 10 9		15,542 15 11		508,688 6 8	
Township	336,589 14 4		23,429 16 5		360,019 10 9	
General Plant, Buildings and Equipment—Permanent	296,565 13 11		26,841 1 10		323,406 15 9	
General Plant, Buildings and Equipment—Temporary	111,270 4 6		(*a*) 3,706 16 2		107,563 8 4	
Township Lighting Undertaking	10,308 15 3		202 10 6		10,511 5 9	
		3,956,045 15 11		405,658 15 5		4,361,704 11 4
METROPOLITAN SUPPLY SYSTEM—						
Power Station and Equipment—Newport "B"	753,925 0 3		12,967 18 3		766,892 18 6	
Main Transmission Systems	563,087 8 5		68,436 19 5		631,524 7 10	
Terminal Stations	470,180 9 10		84,657 17 11		554,838 7 9	
Main Distribution System	390,251 15 3		120,850 0 4		511,101 15 7	
Distribution System—6,600 volt	56,521 13 3		25,422 7 8		81,944 0 11	
		2,233,966 7 0		312,335 3 7		2,546,301 10 7
METROPOLITAN SUPPLIES SUSPENSE ACCOUNT	..	..	6,690 19 8	6,690 19 8	6,690 19 8	6,690 19 8
SUGARLOAF WORKS—						
Power Station and Works	25,094 9 8	25,094 9 8	52,950 2 1	52,950 2 1	78,044 11 9	78,044 11 9
NORTH-EASTERN DISTRICT—						
Transmission and Transformation System	71,117 0 11		177,965 16 11		249,082 17 10	
Power Stations and Distribution Systems	26,231 0 9		44,354 12 10		70,585 13 7	
		97,348 1 8		222,320 9 9		319,668 11 5
SOUTH-WESTERN DISTRICT—						
Transmission and Transformation System	137,651 17 1		916 3 6		138,568 0 7	
Distribution Systems	179,273 17 5		7,305 6 7		186,579 4 0	
		316,925 14 6		8,221 10 1		325,147 4 7
GIPPSLAND DISTRICT—						
Transmission and Transformation System	96,958 4 10		1,683 10 9		98,641 15 7	
Distribution Systems	94,062 3 6		4,338 2 7		98,400 6 1	
		191,020 8 4		6,021 13 4		197,042 1 8
METROPOLITAN SOUTH-WEST DISTRICT—						
Transmission and Transformation System	9,335 4 1		110 0 0		9,445 4 1	
Distribution System	13,449 3 9		2,464 11 9		15,913 15 6	
		22,784 7 10		2,574 11 9		25,358 19 7
EASTERN METROPOLITAN DISTRICT—						
Transmission and Transformation Systems	23,185 7 10		3,289 5 8		26,474 13 6	
Distribution Systems	48,826 3 10		54,877 19 5		103,704 3 3	
		72,011 11 8		58,167 5 1		130,178 16 9
ESSENDON AND FLEMINGTON DISTRICT—						
Distribution System	146,056 11 0	146,056 11 0	15,683 4 9	15,683 4 9	161,739 15 9	161,739 15 9
ALTONA DISTRICT—						
Distribution System	7,218 9 2	7,218 9 2	(*b*) 3,904 12 2	3,904 12 2	3,313 17 0	3,313 17 0
SUNBURY DISTRICT—						
Transmission and Transformation System	..		6,011 10 1		6,011 10 1	
Distribution System	..		5,087 11 0		5,087 11 0	
		..		11,099 1 1		11,099 1 1

SERVICE BUILDINGS AND EQUIPMENT—												
Head Office Building, Furniture and Fittings	117,663	8	0			1,897	13	0			119,561	1	0		
Footscray Store Buildings and Workshop	24,231	4	9			(c) 409	15	7			23,821	9	2		
Dandenong Store Buildings and Workshop	8,764	10	11			83	6	3			8,847	17	2		
South Melbourne Garage and Equipment	1,691	17	6			199	9	4			1,891	6	10		
Briquette Depot Equipment	..					2,147	14	11			2,147	14	11		
				152,351	1	2				3,918	7	11				156,269	9	1
MOTOR AND OTHER VEHICLES	24,359	11	6	24,359	11	6	(d) 833	0	8	833	0	8	23,526	10	10	23,526	10	10
ELECTRIC SUPPLY POWER SURVEYS	1,585	1	8	1,585	1	8	147	0	3	147	0	3	1,732	1	11	1,732	1	11
LOAN FLOATION EXPENSES	..			..			171,700	6	10	171,700	6	10	171,700	6	10	171,700	6	10
INTEREST DURING CONSTRUCTION	514,641	18	1	514,641	18	1	26,684	18	3	26,684	18	3	541,326	16	4	541,326	16	4
EXPENSES IN CONNEXION WITH INQUIRY BY AMERICAN EXPERTS	..			..			7,334	3	2	7,334	3	2	7,334	3	2	7,334	3	2
AMOUNT CHARGED TO COMMISSION BY TREASURY IN ACCORDANCE WITH DECISION OF CABINET 22ND JULY, 1922	62,023	6	8	62,023	6	8	..			..			62.023	6	8	62,023	6	8
	7,823,432	15	10	7,823,432	15	10	1,306,770	0	2	1,306,770	0	2	9,130,202	16	0	9,130,202	16	0

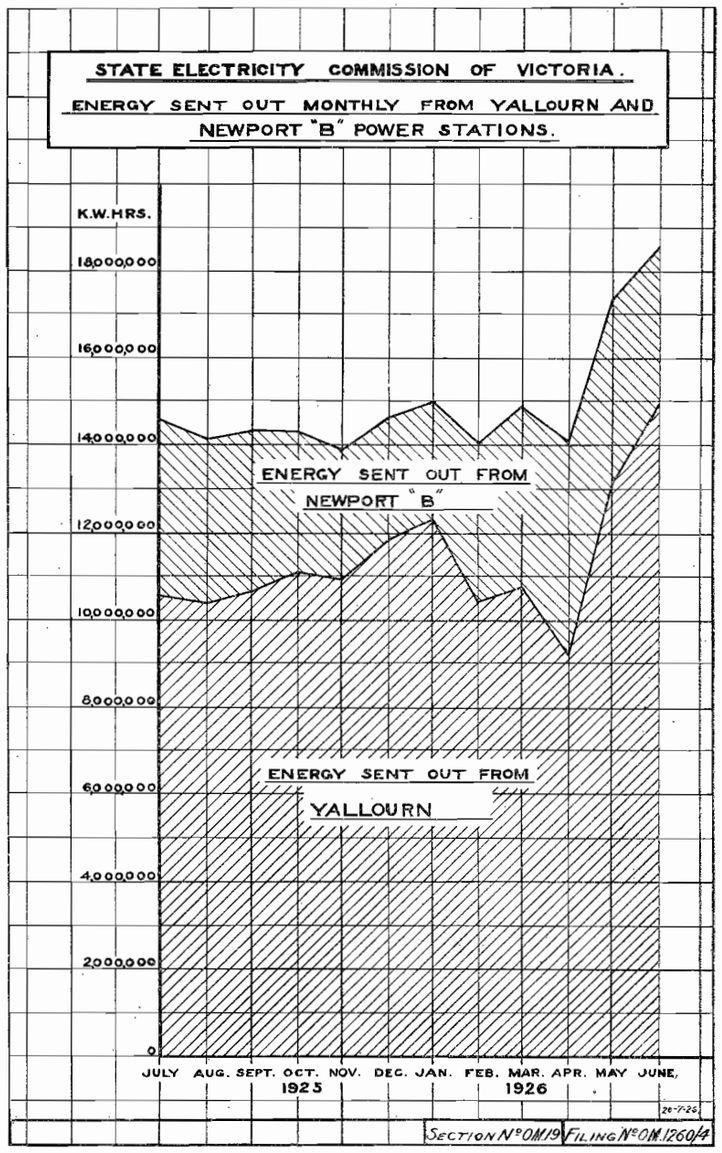
(a), (b), (c), (d) The amounts shown against these items represent reductions occasioned by transfers to other accounts.

APPENDIX 2.

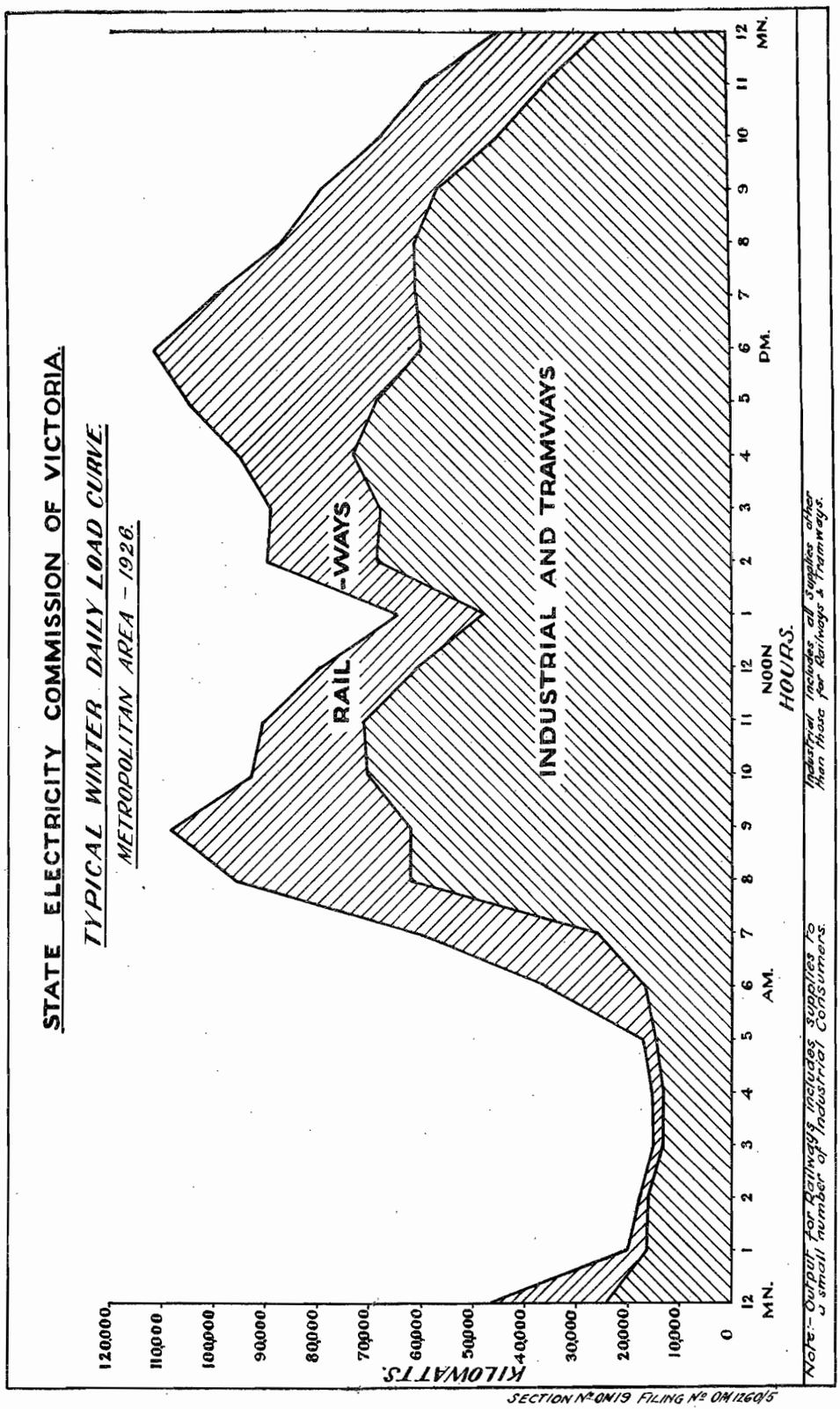
(a)



(b)



APPENDIX 2 (*c*).


STATE ELECTRICITY COMMISSION OF VICTORIA.
TYPICAL WINTER DAILY LOAD CURVE.
METROPOLITAN AREA – 1926.
RAIL-WAYS
INDUSTRIAL AND TRAMWAYS
KILOWATTS.
120000
110000
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
12 MN. 1 2 3 4 5 6 AM. 7 8 9 10 11 12 NOON 1 2 3 4 5 6 PM. 7 8 9 10 11 12 MN.
HOURS.
Note:- Output for Railways includes supplies to a small number of Industrial Consumers.
Industrial includes all supplies other than those for Railways & Tramways.
SECTION No ON 19 FILING No ON 1260/5

APPENDIX 3.

UNITS GENERATED AND DISTRIBUTED IN METROPOLITAN AREA 1918–1925.

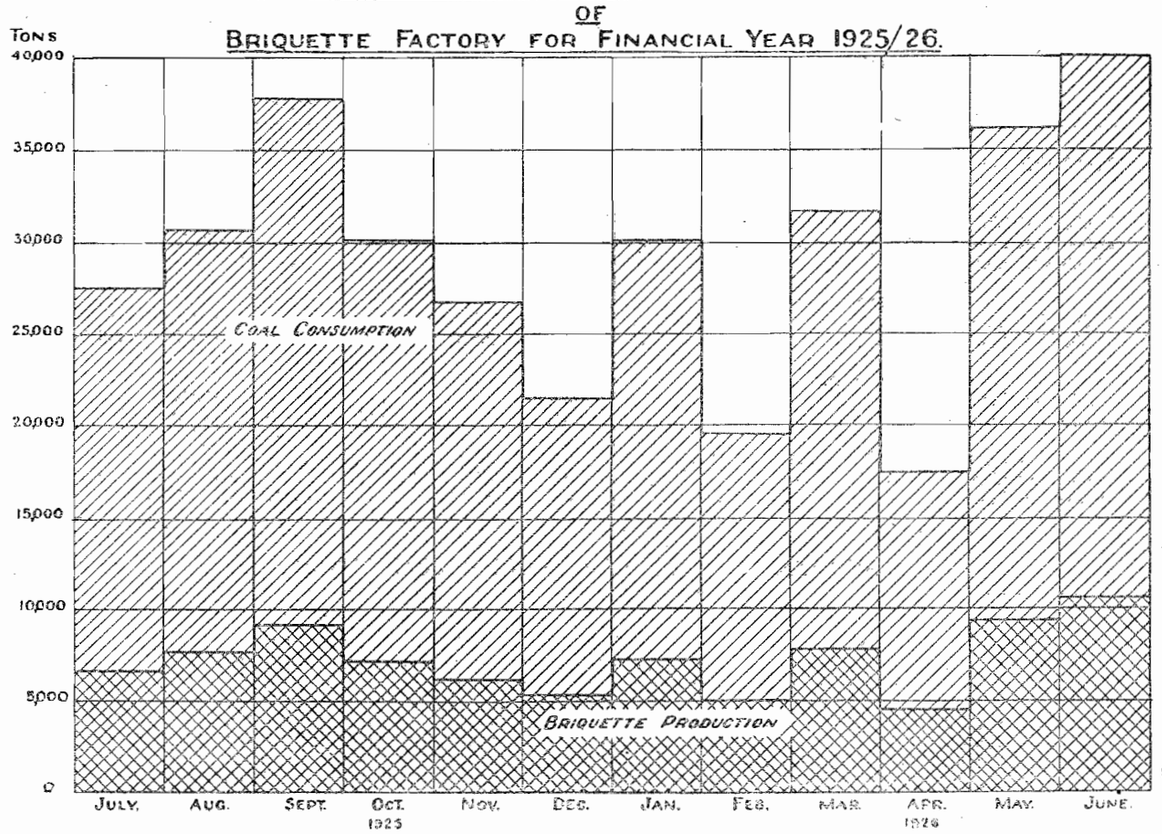
Year.	Newport A, Generated.	Melbourne City Council, Generated.	Melbourne Electric Supply Company, Generated.	Newport B, Generated.	Yallourn to Yarraville Terminal Station.	Newport A to Melbourne Electric Supply Company (25 Cycle).	Newport A to Melbourne City Council (25 Cycle).	Newport A to Yarraville Terminal Station (25 Cycle).	Yarraville Terminal Station to Newport A (25 Cycle).	Yarraville Terminal Station to Melbourne City Council.	Other Supplies from Yarraville Terminal Station and Losses.
	Kw. hrs.	Kw. hrs.	Kw. hrs.	Kw. hrs.	Kw. hrs.	Kw. hrs.	Kw. hrs.	Kw. hrs.	Kw. hrs.	Kw. hrs.	Kw. hrs.
1918	293,400	38,002,182	45,209,890	..	..	..	..	..	..	..	..
1919	19,091,723	39,974,648	50,811,070	..	..	..	..	..	..	..	..
1920	47,868,179	50,673,371	53,869,324	..	..	..	..	..	..	..	..
1921	80,397,774	55,517,920	55,289,970	..	..	9,025,350	..	..	..	..	..
1922	188,910,649	36,898,790	47,543,348	..	..	35,749,700	30,577,273	..	..	..	..
1923	266,532,672	37,348,870	41,542,034	16,448,300	..	65,714,900	19,741,295	10,524,055	392,700	20,500,000	6,079,655
1924	265,472,939	19,993,000	32,310,586	61,329,200	20,912,300	80,719,800	88,943	7,898,800	4,036,600	58,683,857	31,456,443
1925	251,318,843	17,679,440	28,574,875	38,228,900	107,548,364	72,232,600	..	182,700	2,705,900	59,522,500	83,731,564
1926 (6 mths., 1st Jan. to 30th June)	116,958,744	7,912,000	18,121,440	22,787,200	68,091,717	28,543,118	..	1,378,200	28,400	30,799,000	61,429,717

SUMMARY.

Year.	Total Units Generated or Supplied to Metropolitan Area.	Utilized for Railway Traction and Minor 25-cycle Supplies.	Utilized for General and Tramway Purposes.	Total Output from Newport A (Generated), plus Supply from Yarraville Terminal Station.	Total Outpnt from Yarraville Terminal Station (Losses included).	Total Output from Melbourne Electric Supply Company.	Total Output from Melbourne City Council.
	Kw. hrs.	Kw. hrs.	Kw. hrs.	Kw. hrs.	Kw. hrs.	Kw. hrs.	Kw. hrs.
1918	83,505,472	293,400	83,212,072	293,400	..	45,209,890	38,002,182
1919	109,877,441	19,091,723	90,785,718	19,091,723	..	50,811,070	39,974,648
1920	152,410,874	47,868,179	104,542,695	47,868,179	..	53,869,324	50,673,371
1921	191,205,664	71,372,424	119,833,240	80,397,774	..	64,315,320	55,517,920
1922	273,352,787	122,583,676	150,769,111	188,910,649	..	83,293,048	67,476,063
1923	361,871,876	170,945,122	190,926,754	266,925,372	26,972,355	107,256,934	77,590,165
1924	400,018,025	180,801,996	219,216,029	269,509,539	90,140,300	113,030,386	78,765,800
1925	443,350,422	181,609,443	261,740,979	254,024,743	145,959,964	100,807,475	77,201,940
1926 (6 mths., 1st Jan. to 30th June)	233,871,101	87,065,826	146,805,275	116,987,144	92,257,117	46,664,558	38,711,000

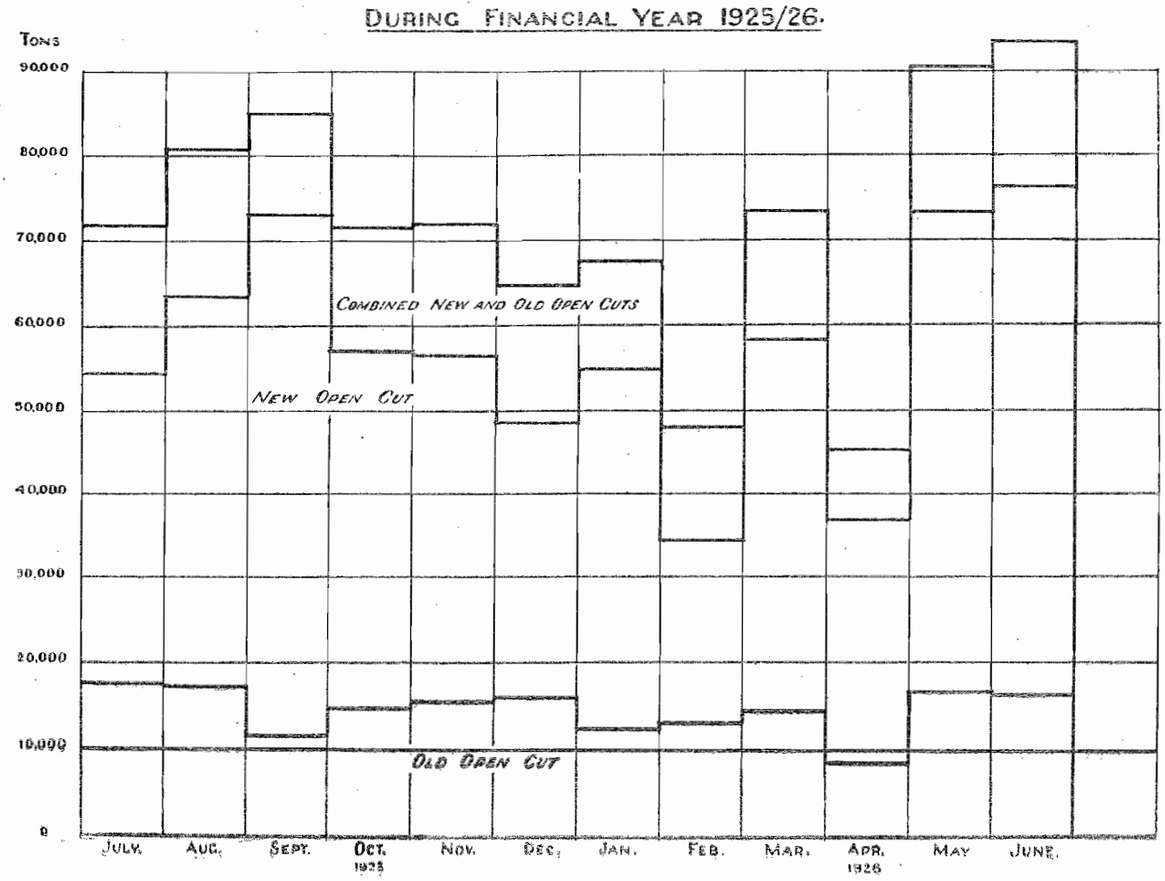
APPENDIX 4 (*a*).

BRIQUETTE PRODUCTION AND COAL CONSUMPTION
OF
BRIQUETTE FACTORY FOR FINANCIAL YEAR 1925/26.



APPENDIX 4 (*b*).

COAL WON AT YALLOURN NEW AND OLD OPEN CUTS
DURING FINANCIAL YEAR 1925/26.



APPENDIX 5.

TRANSMISSION LINES—OVERHEAD.

District.	Erected prior to 30th June, 1925.		Erected during Year ending 30th June, 1926.		Total Erected.	
	Route Miles.	Miles of Cable.	Route Miles.	Miles of Cable.	Route Miles.	Miles of Cable.
132,000 Volt Line	110	660	..	..	110	660
NORTH-EASTERN.						
66,000 Volt Line	..	..	171·7	540·1	172	540·1
22,000 Volt Line	..	..	98·8	427·5	98·8	427·5
6,600 Volt Line	..	..	3	9	3	9
WESTERN.						
44,000 Volt Line	116	348	..	..	116	348
6,600 Volt Line	103	266·5	26·9	70·0	129·9	336·5
GIPPSLAND.						
22,000 Volt Line	105·4	346·2	..	..	105·4	346·2
6,600 Volt Line	45·1	127·4	1·3	4·0	46·5	139·4
METROPOLITAN AND EXTRA METROPOLITAN.						
22,000 Volt Line	93	279	13·9	91·6	156·9	370·6
6,600 Volt Line	30·4	91·2	46·5	137·7	76·9	228·9

SUMMARY OF OVERHEAD LINE CONSTRUCTION.

Voltage.	Erected during Year.		Total Erected.	
	Route Miles.	Miles of Cable.	Route Miles.	Miles of Cable.
132 Kv.	..	..	110	660
66 Kv.	172	541	172	541
44 Kv.	..	..	116	348
22 Kv.	113	519	361	1,145
6.6 Kv.	78	219	270	751
Total	363	1,279	979	3,445

UNDERGROUND CABLE LAID.

Cable.	Prior to 30th June, 1925.	During Year ending 30th June, 1926.	Total to 30th June, 1926.
22,000 Volt	49·3	16·2	65·5
6,600 Volt	8·7	13·3	22·0
Pilot and Telephone	39·3	2·2	41·5
Low Tension	1·8	0·4	2·2
Miscellaneous	0·8	0·6	1·4
Total	99·9	32·7	132·6

DETAIL OF CABLE LAID DURING TWELVE MONTHS ENDING 30TH JUNE, 1926.

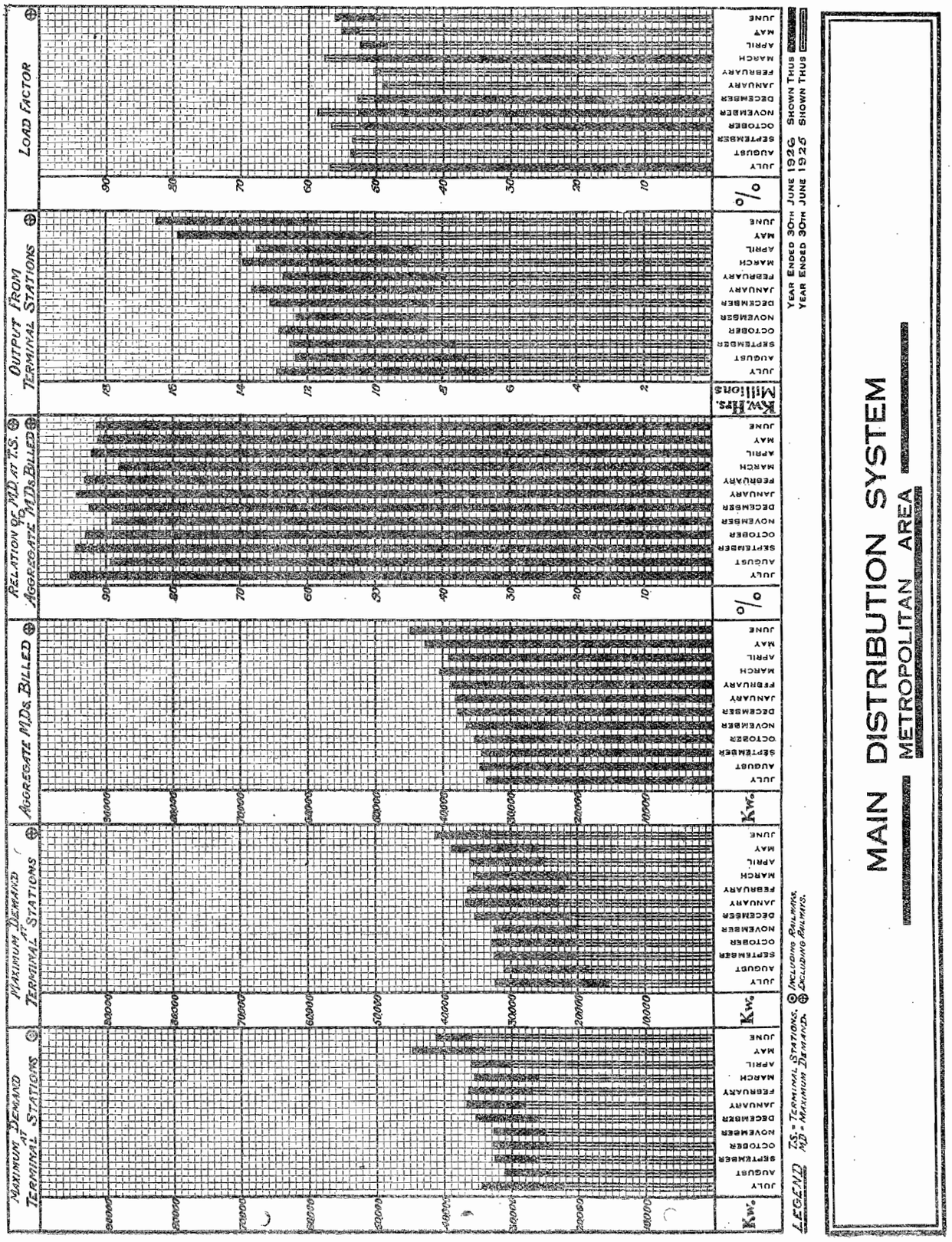
——	From—	To—	Length (Miles).
22,000 Volt	Sub-station "J"	Sub-station "B"	0·75
	Sub-station "G"	Y.T.S.	4·0
	Sub-station "G"	R.T.S.	9·5
	Sub-station "R"	Sub-station "H"	0·5
	Sub-station "R"	Sub-station "K"	0·5
	Sub-station "G"	Sub-station "J"	0·75
	11 Various	..	0·2
			16·2
6,600 Volt	Port Melbourne		1·0
	Collingwood Ring Main		5·8
	South Melbourne Ring Main		3·4
	35 Various		3·1
			13·3
Pilot and Telephone	Sub-station "J"	Sub-station "B"	2·00
	Various	.. ..	0·2
			2·2

APPENDIX 5—*continued.*

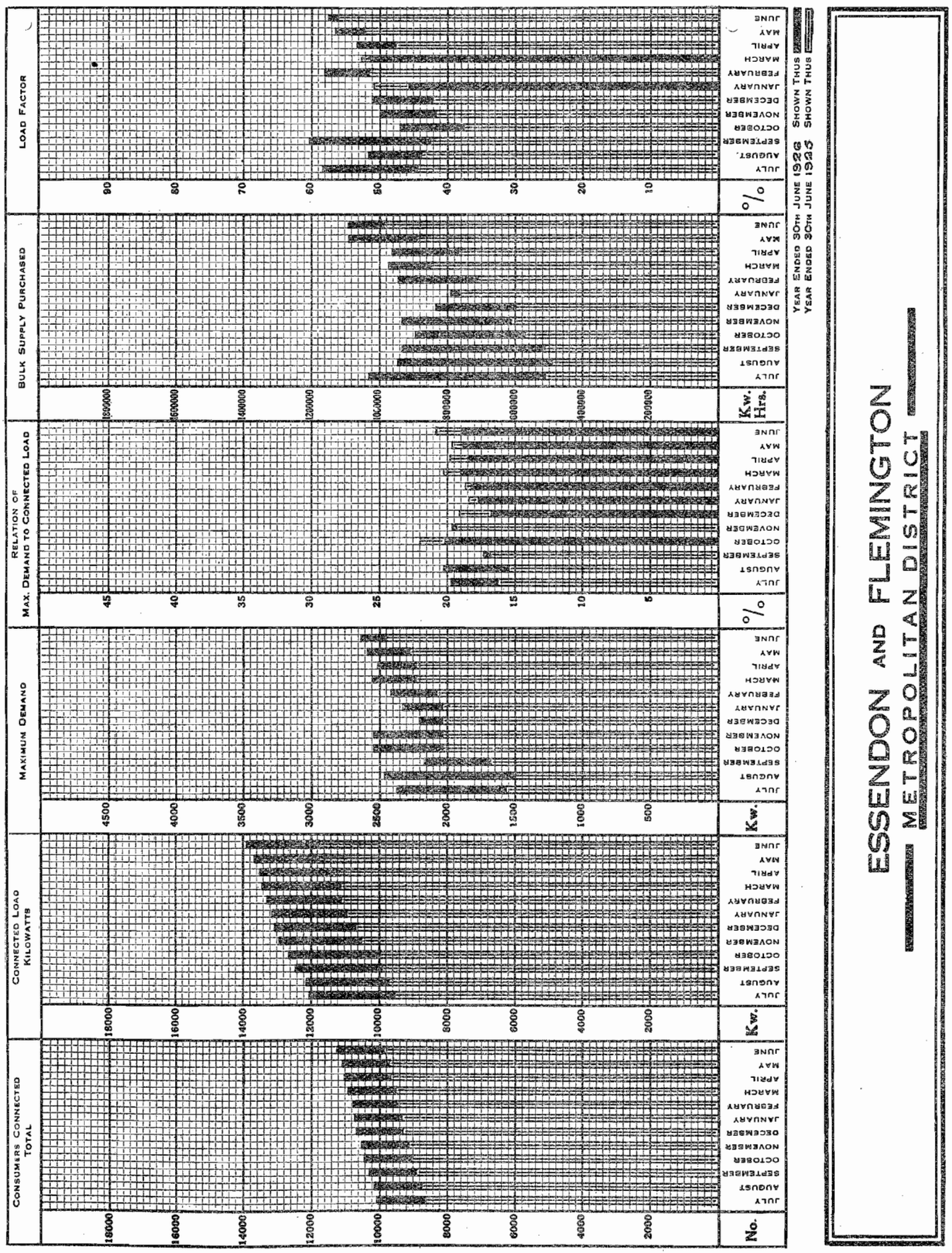
TABLE SHOWING NUMBER AND CAPACITY OF SUB-STATIONS TO DATE AND INCREASE FOR YEAR ENDED 30TH JUNE, 1926.

District and Stations.	Total Installed at end of Year—				Increase for Year 1925–26.	
	1924–25.		1925–26.			
	No.	Kva.	No.	Kva.	No.	Kva.
METROPOLITAN TERMINAL STATIONS	1	60,000	2	73,500	1	13,500
Main Distribution Sub-stations	4	39,000	5	63,000	1	24,000
Distribution Sub-stations at Line Voltage	9	11,000	15	15,050	6	4,050
Transformer Distribution Sub-stations	22	4,870	24	6,400	2	1,530
EXTRA METROPOLITAN.						
Main Distribution Sub-stations	4	5,500	5	5,600	1	100
Transformer Distribution Sub-stations	28	4,010	46	5,405	18	1,395
WESTERN DISTRICT.						
Main Distribution Sub-station	5	2,850	5	2,850	..	..
Transformer Distribution Sub-stations	44	1,791	53	2,024	9	233
GIPPSLAND DISTRICT.						
Main Distribution Sub-stations	3	800	3	800	..	..
Transformer Distribution Sub-stations	31	1,164	35	1,545	4	381
NORTH-EASTERN DISTRICT.						
Main Distribution Sub-stations	..	..	5	5,750	5	5,750
Transformer Distribution Sub-stations	..	..	7	500	7	500
YALLOURN TOWNSHIP, ETC.						
Transformer Distribution Sub-stations	12	1,650	12	1,650	..	..
Total Installed	163	132,635	217	184,074	54	51,439

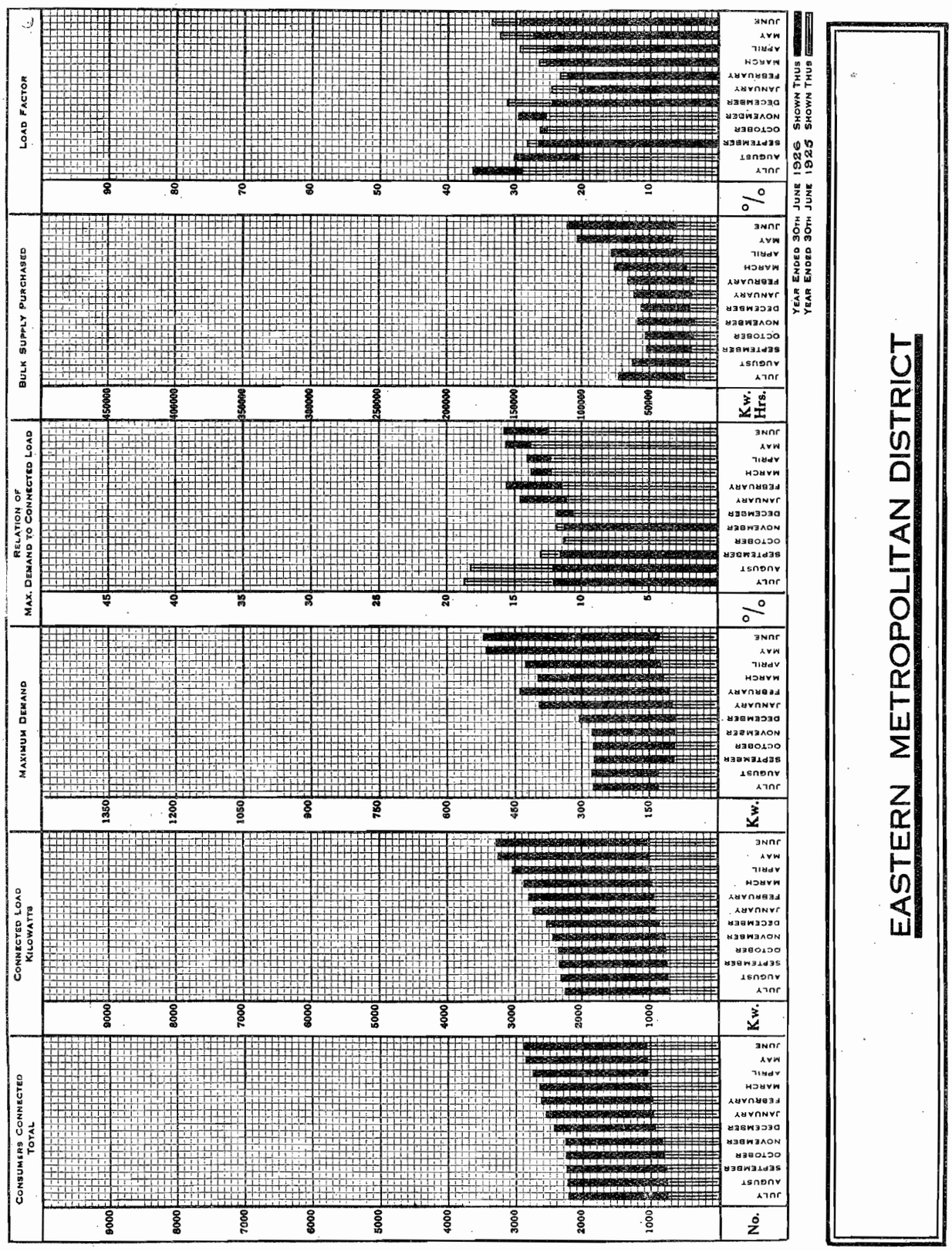
APPENDIX 6 (*a*).


MAIN DISTRIBUTION SYSTEM
METROPOLITAN AREA
LEGEND
TS. = TERMINAL STATIONS. ⊙ INCLUDING RAILWAYS.
MD. = MAXIMUM DEMAND. ⊕ EXCLUDING RAILWAYS.
YEAR ENDED 30TH JUNE 1926 SHOWN THUS
YEAR ENDED 30TH JUNE 1925 SHOWN THUS
MAXIMUM DEMAND TERMINAL STATIONS ⊙
MAXIMUM DEMAND TERMINAL STATIONS
AGGREGATE MDs. BILLED ⊕
RELATION % MD AT TS. AGGREGATE MDs. BILLED ⊕
OUTPUT FROM TERMINAL STATIONS ⊕
LOAD FACTOR
Kw.
Kw. Hrs. Millions
%
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE

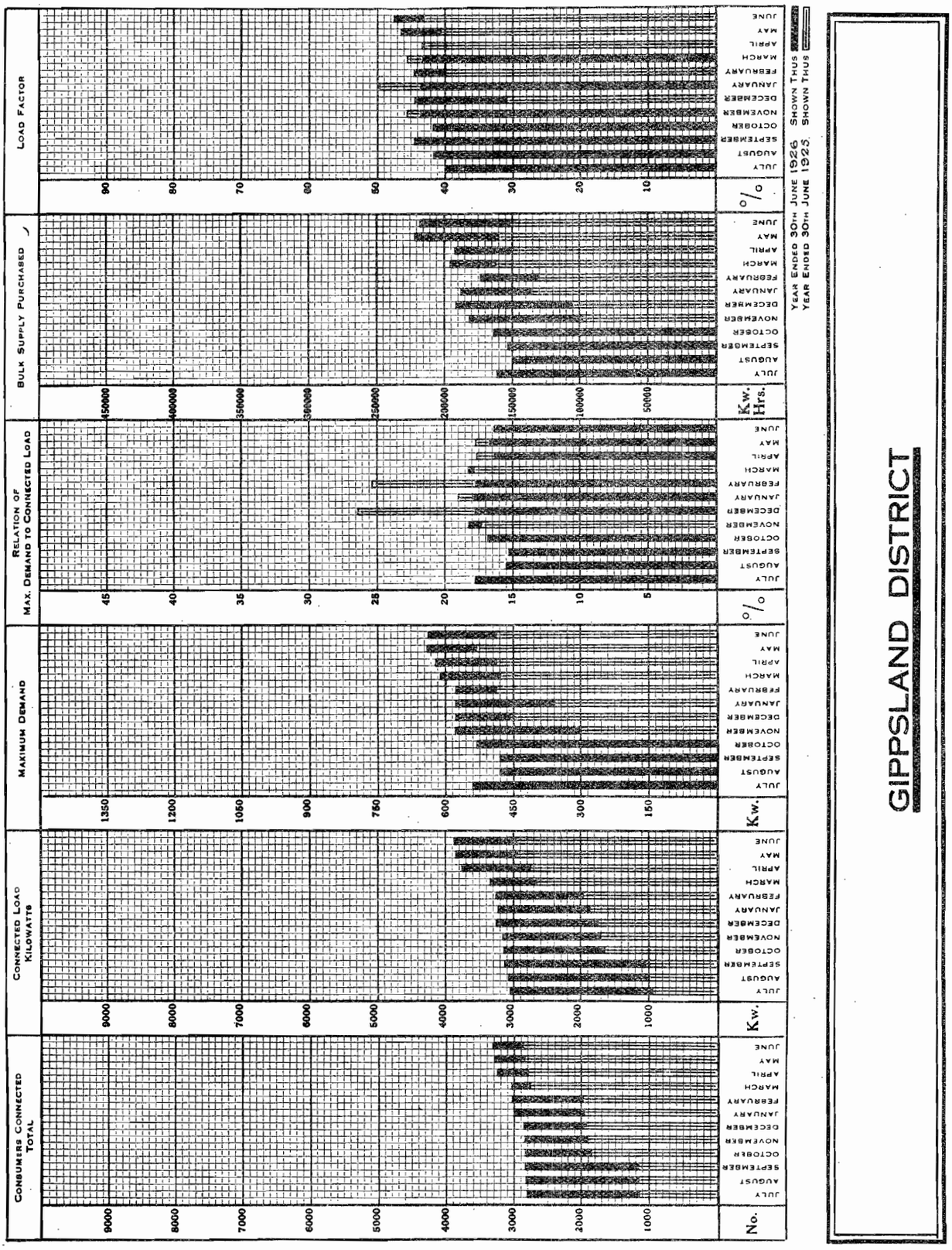
APPENDIX 6 (*b*) (1).



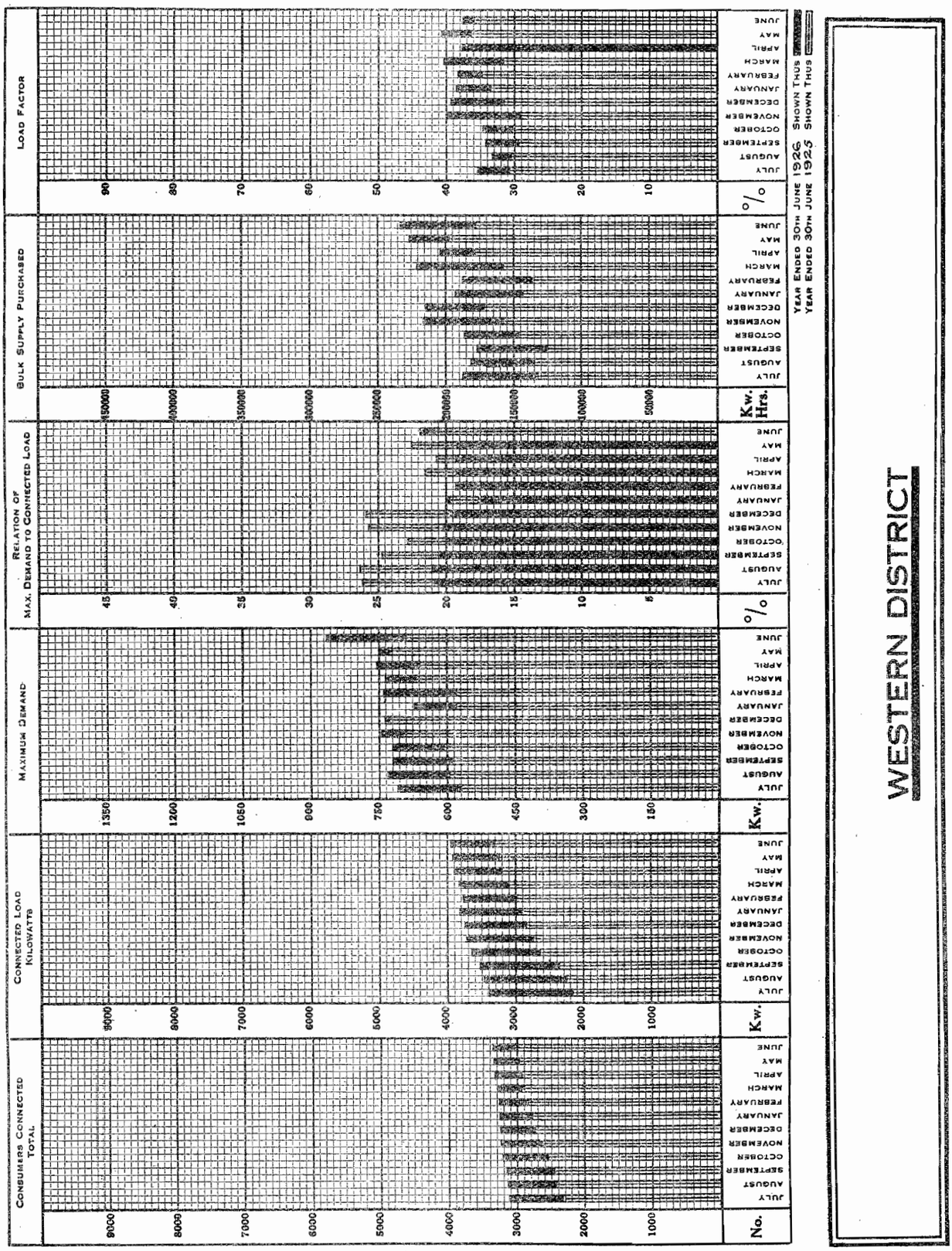
APPENDIX 6 (*b*) (2).



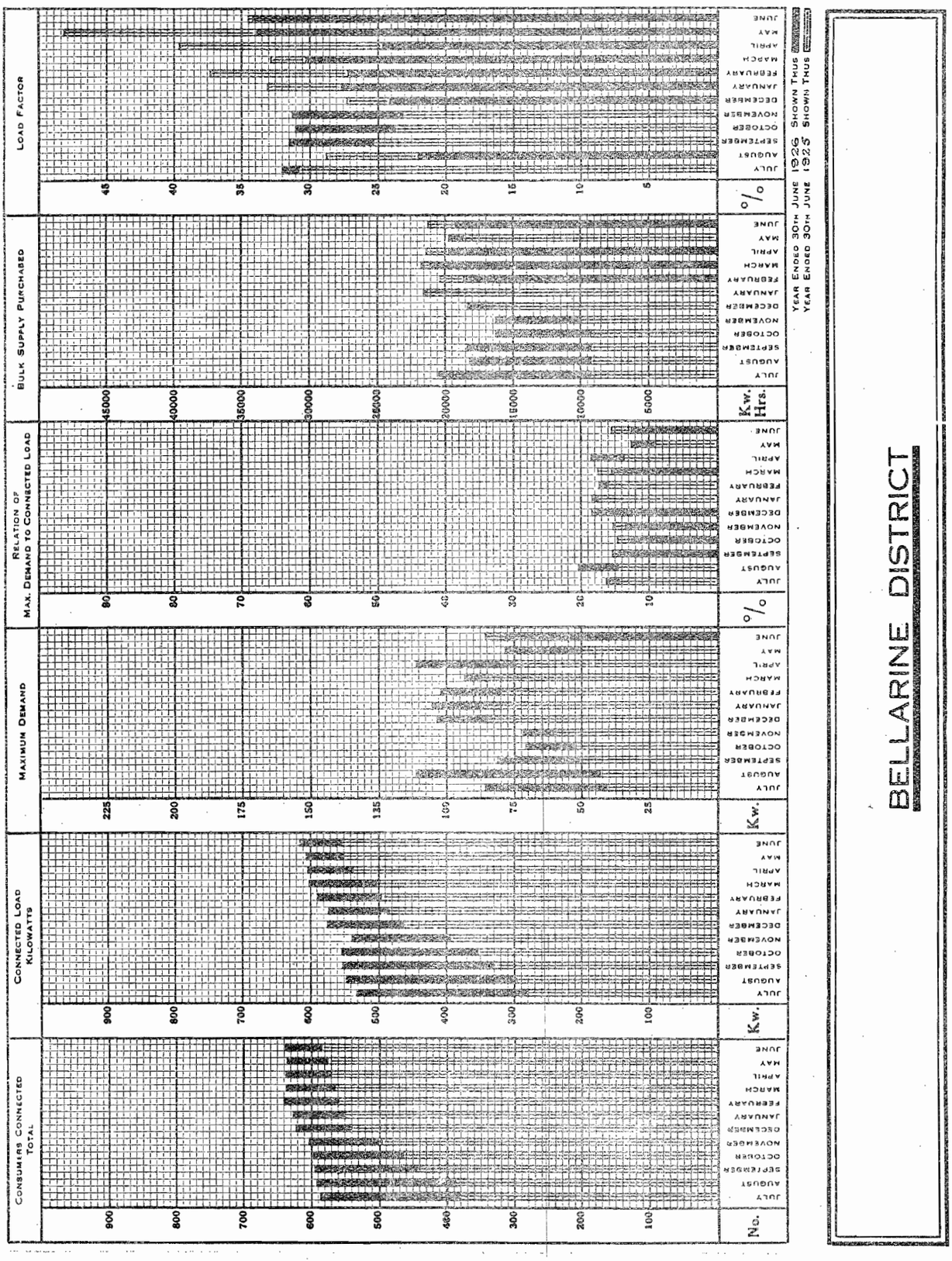
APPENDIX 6 (*b*) (3).



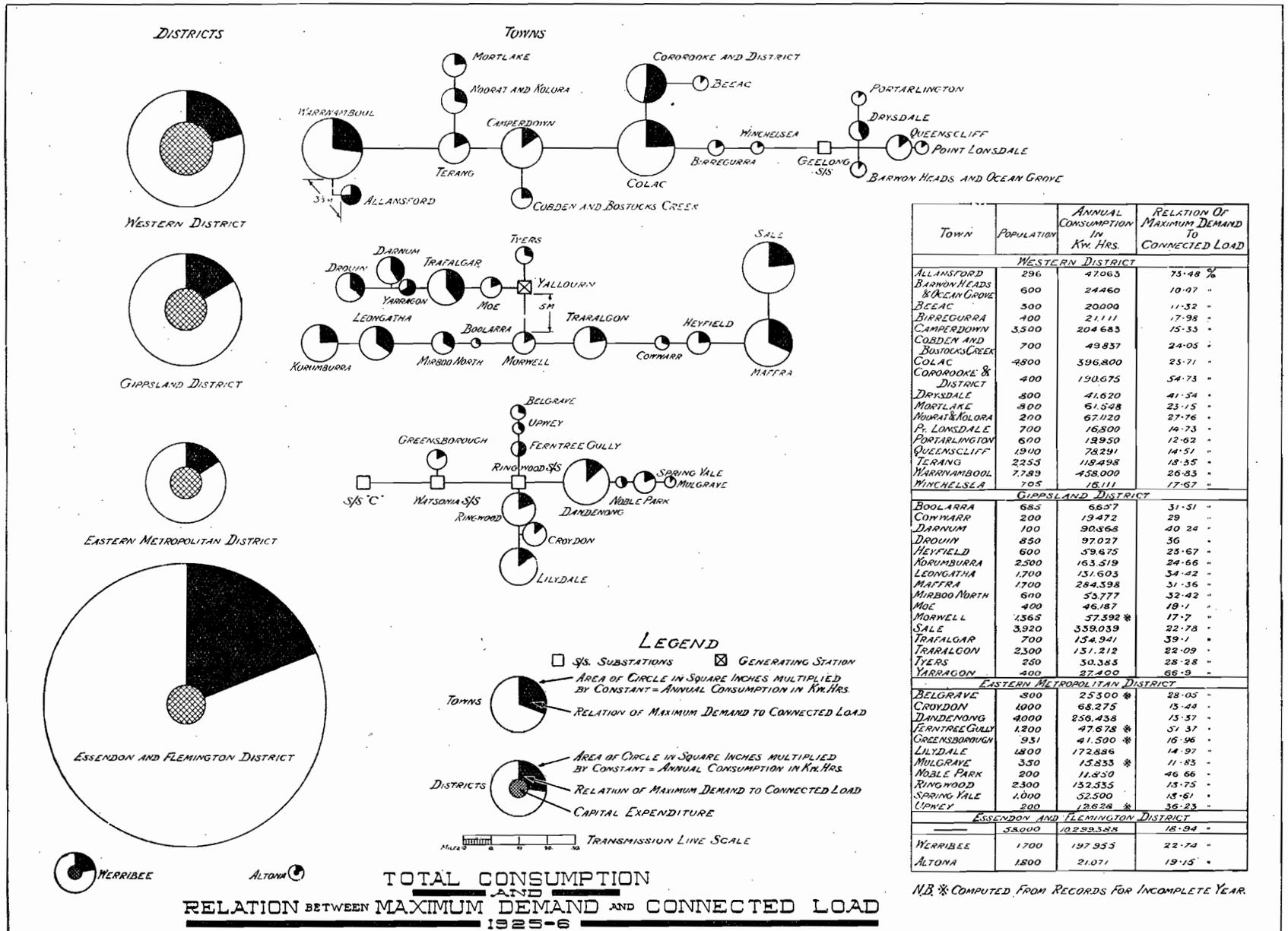
APPENDIX 6 (*b*) (4).



APPENDIX 6 (*b*) (5).



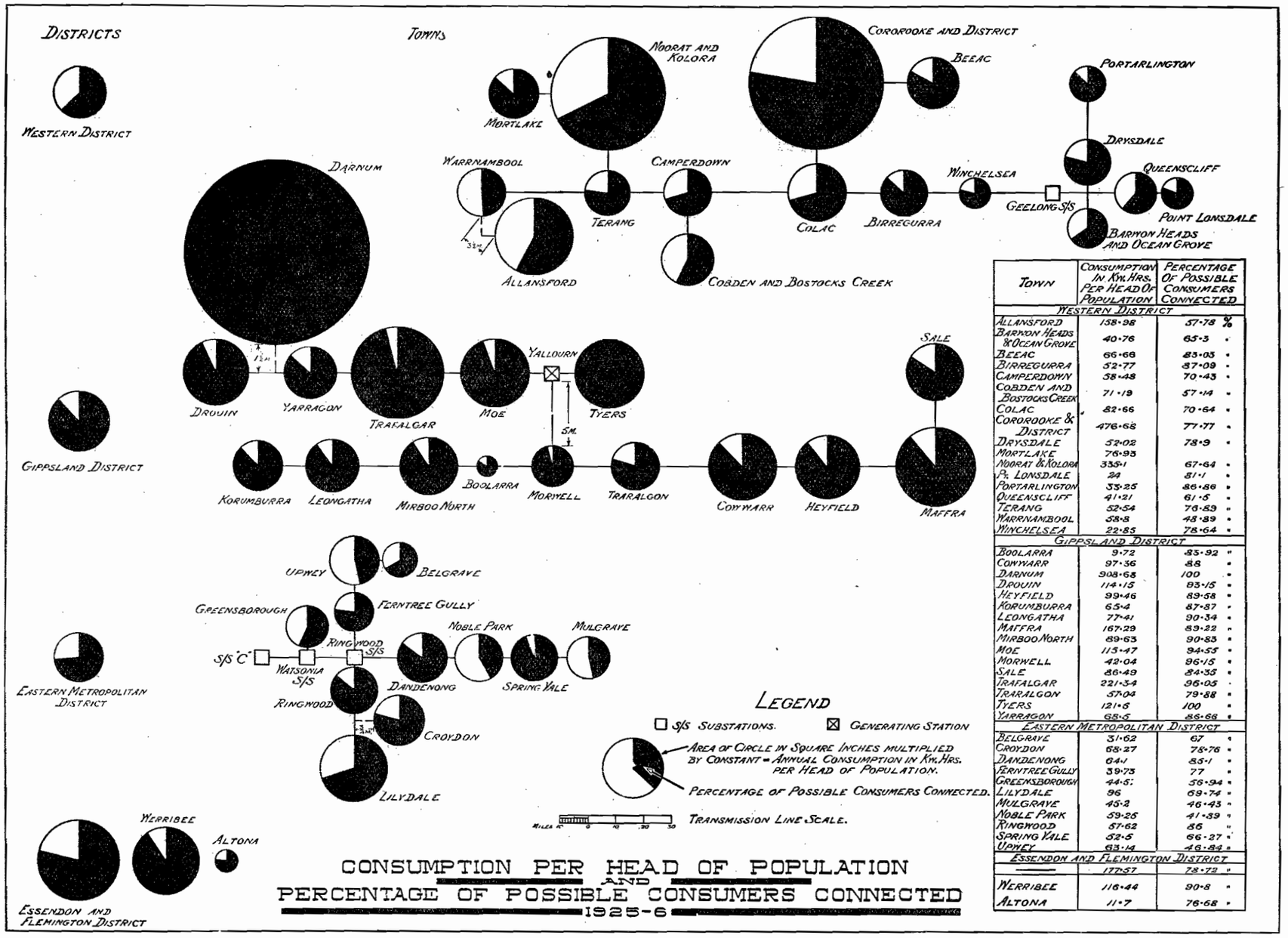
15045.—5



TOTAL CONSUMPTION AND RELATION BETWEEN MAXIMUM DEMAND AND CONNECTED LOAD 1925-6

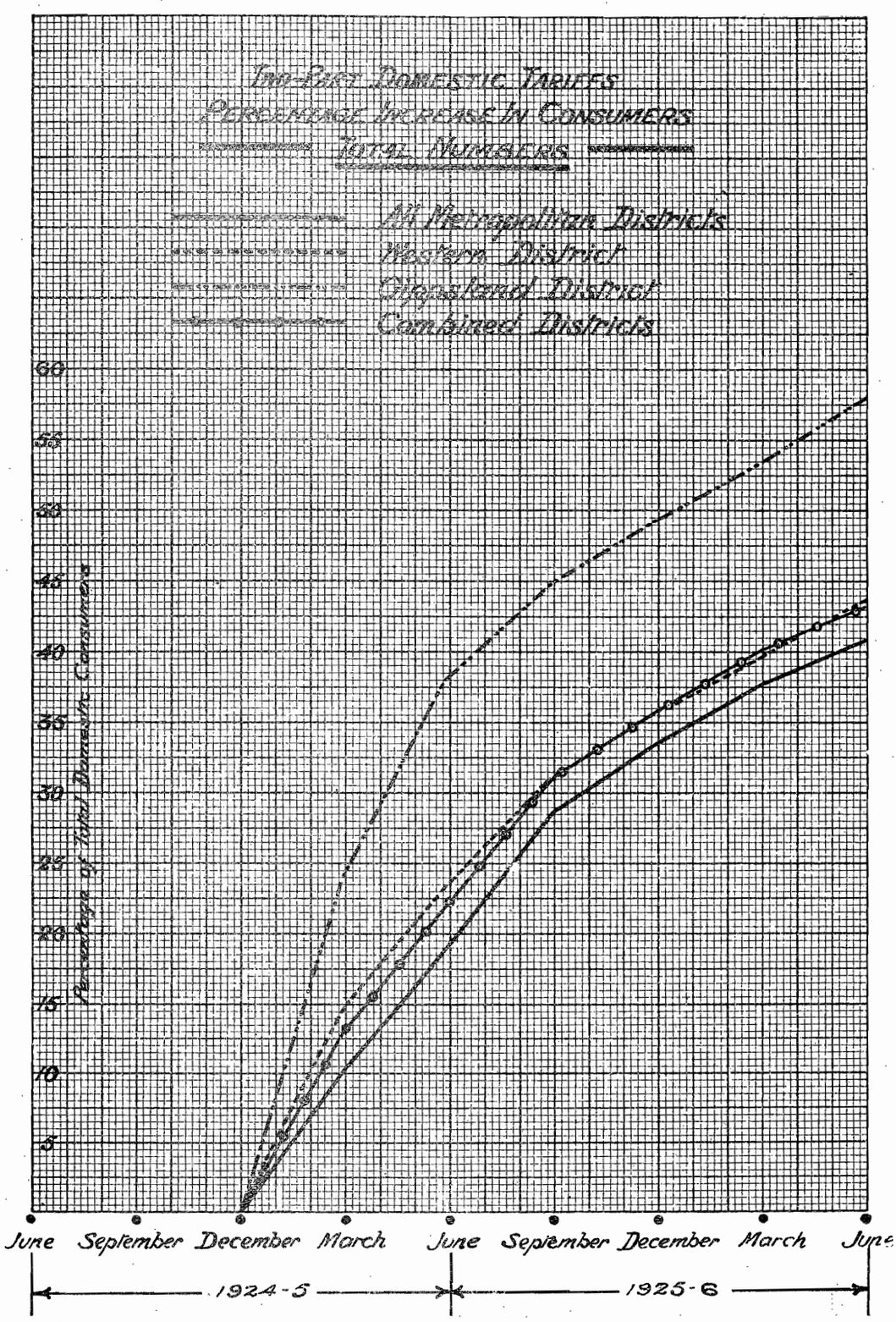
Town	Population	Annual Consumption In Kw. Hrs.	Relation Of Maximum Demand To Connected Load
Western District			
Allansford	296	47.063	75·48 %
Barwon Heads & Ocean Grove	600	24.460	10·07 "
Beeac	300	20.000	11·32 "
Birregurra	400	21.111	17·98 "
Camperdown	3,500	204.683	15·33 "
Cobden and Bostocks Creek	700	49.837	24·05 "
Colac	4800	396.800	25·71 "
Cororooke & District	400	190.675	54·73 "
Drysdale	800	41.620	41·34 "
Mortlake	800	61.548	23·15 "
Noorat & Kolora	200	67.1120	27·76 "
Pt. Lonsdale	700	16.800	14·73 "
Portarlington	600	139.950	12·62 "
Queenscliff	1900	78.291	14·51 "
Terang	2253	118.498	18·35 "
Warrnambool	7,783	458.000	26·83 "
Winchelsea	705	16.111	17·67 "
Gippsland District			
Boolarra	685	6.657	31·51 "
Comparr	200	19.472	29 "
Darnum	100	90.568	40 24 "
Drouin	850	97.027	36 "
Heyfield	600	59.675	25·67 "
Korumburra	2,500	163.519	24·66 "
Leongatha	1,700	131.603	34·42 "
Maffra	1,700	284.398	31·36 "
Mirboo North	600	53.777	32·42 "
Moe	400	46.187	18·1 "
Morwell	1365	57.392 ※	17·7 "
Sale	3,920	359.039	22·78 "
Trafalgar	700	154.941	39·1 "
Traralgon	2,300	131.212	22·09 "
Tyers	250	30.383	28·28 "
Yarragon	400	27.400	66·9 "
Eastern Metropolitan District			
Belgrave	800	25.300 ※	28·05 "
Croydon	1,000	68.275	13·44 "
Dandenong	4,000	256.438	15·37 "
Ferntree Gully	1,200	47.678 ※	51 37 "
Greensborough	951	41.500 ※	16·96 "
Lilydale	1800	172.886	14·97 "
Mulgrave	350	15.833 ※	11·85 "
Noble Park	200	11.850	46 66 "
Ringwood	2300	132.535	13·75 "
Spring Vale	1,000	32.500	13·61 "
Uppey	200	12.628 ※	36·23 "
Essendon and Flemington District			
——	58,000	10.299.388	18·94 "
Werribee	1700	197.955	22·74 "
Altona	1800	21.071	19·15 "

N.B. ※ Computed From Records For Incomplete Year.



Town	Consumption In Kw. Hrs. Per Head Of Population	Percentage Of Possible Consumers Connected
Western District		
Allansford	158·98	57·78 %
Barwon Heads & Ocean Grove	40·76	65·3 "
Beeac	66·66	83·03 "
Birregurra	52·77	87·09 "
Camperdown	58·48	70·43 "
Cobden and Bostocks Creek	71·19	57·14 "
Colac	82·66	70·64 "
Cororooke & District	476·68	77·77 "
Drysdale	52·02	78·9 "
Mortlake	76·93	
Noorat & Kolora	335·1	67·64 "
Pt. Lonsdale	24	81·1 "
Portarlington	33·25	86·86 "
Queenscliff	41·21	61·5 "
Terang	52·54	76·89 "
Warrnambool	58·8	48·89 "
Winchelsea	22·85	78·64 "
Gippsland District		
Boolarra	9·72	83·92 "
Cowwarr	97·36	88 "
Darnum	908·68	100 "
Drouin	114·15	83·15 "
Heyfield	99·46	83·58 "
Korumburra	65·4	87·87 "
Leongatha	77·41	90·34 "
Maffra	167·29	83·22 "
Mirboo North	89·63	90·83 "
Moe	115·47	94·55 "
Morwell	42·04	96·15 "
Sale	86·49	84·35 "
Trafalgar	221·34	96·05 "
Traralgon	57·04	79·88 "
Tyers	121·6	100 "
Yarragon	68·6	88·66 "
Eastern Metropolitan District		
Belgrave	31·62	67 "
Croydon	68·27	78·76 "
Dandenong	64·1	85·1 "
Ferntree Gully	39·75	77 "
Greensborough	44·5	56·94 "
Lilydale	96	69·74 "
Mulgrave	45·2	46·43 "
Noble Park	59·25	41·39 "
Ringwood	57·62	85 "
Spring Vale	52·5	66·27 "
Upwey	63·14	46·84 "
Essendon and Flemington District		
——	177·57	78·72 "
Werribee	116·44	90·8 "
Altona	11·7	76·68 "

APPENDIX 6 (*b*) (8).

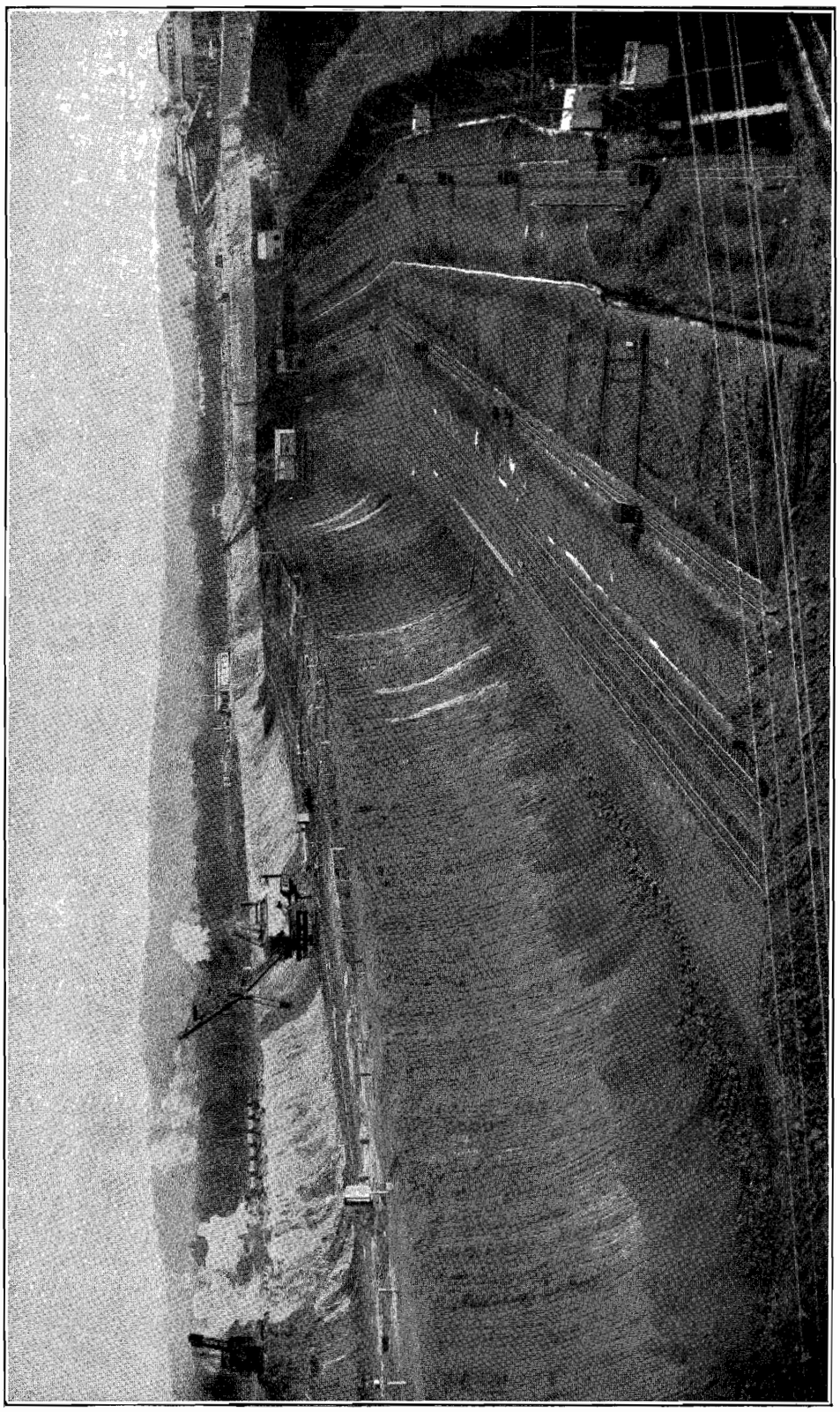


APPENDIX 6 (c).

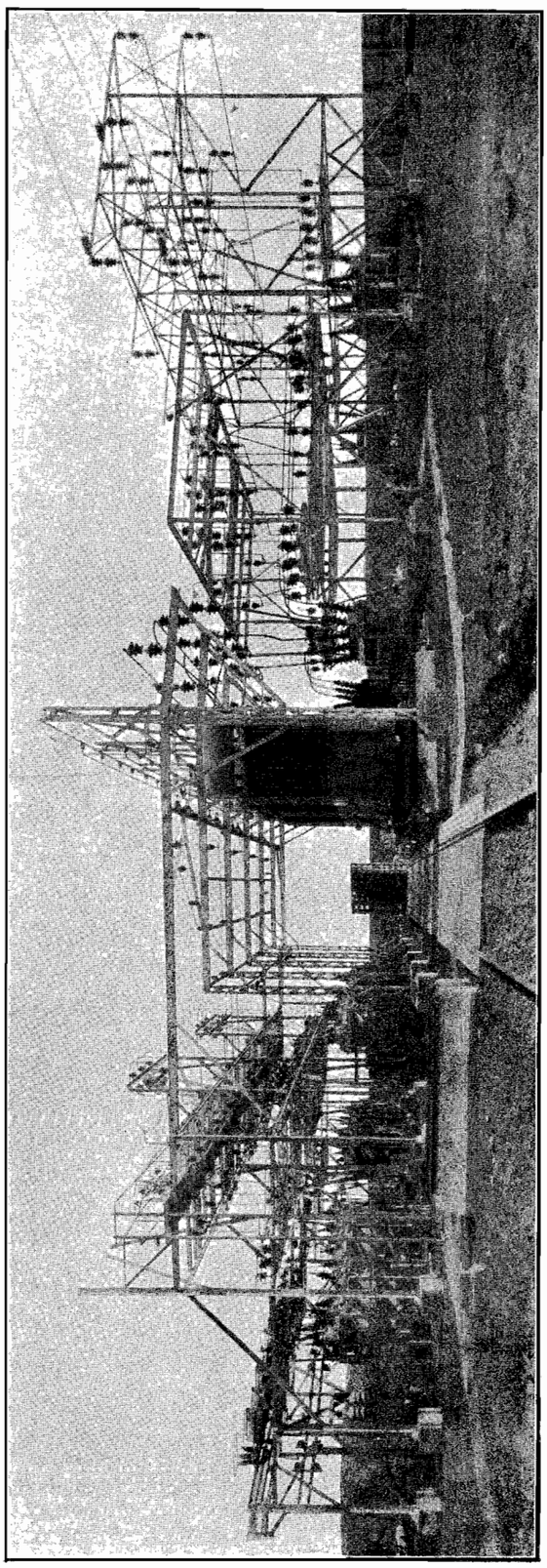
TOWNS AND LOCALITIES IN EACH DISTRICT SERVED BY THE COMMISSION'S SYSTEM AT END OF YEAR 1925-26.

Metropolitan and Extra-Metropolitan Districts.	Population.	South-Western District.	Population.	Gippsland District.	Population.	North-Eastern District.	Population.
North Essendon, Pascoe Vale, Glenroy, Flemington	58,000	Alvie	..	Boolarra	700	Benalla	3,000
Clayton	250	Allansford	300	Cowarr	200	Echuca	4,000
Croydon	1,000	Beeac	300	Darnum	100	Wahgunyah	400
Dandenong	4,000	Birregurra	400	Drouin	850	Shepparton	4,000
Eltham	700	Barwon Heads	600	Heyfield	600	Yarrawonga	1,650
Ferntree Gully	1,200	Bellarine and Moolap	50	Korumburra	2,500		
Greensborough	930	Colac	4,800	Leongatha	1,700		
Kilsyth	..	Cobden	700	Maffra	1,700		
Montmorency	300	Cororooke	300	Moe	400		
Lilydale	1,800	Camperdown	3,500	Morwell	1,370		
Montrose	..	Drysdale	800	Mirboo North	600		
Mulgrave	350	Kolora	50	Sale	3,900		
Noble Park	200	Larpent	50	Trafalgar	700		
Ringwood	2,300	Mortlake	800	Traralgon	2,300		
Spring Vale	1,000	Noorat	200	Tyers	250		
Upwey	200	Nalangil	100	Yarragon	400		
Belgrave	800	Ocean Grove	..	Yallourn	..		
Bayswater	450	Portarlington	600	Warragul (Railway Station only)	..		
Altona	1,800	Point Lonsdale	700				
Werribee	1,700	Queenscliff	1,900				
Sunbury	1,500	Ryan's Lane	50				
		Terang	2,260				
		Warrnambool	7,790				
		Winchelsea	700				
		Wool Wool	50				
		Warrion	100				

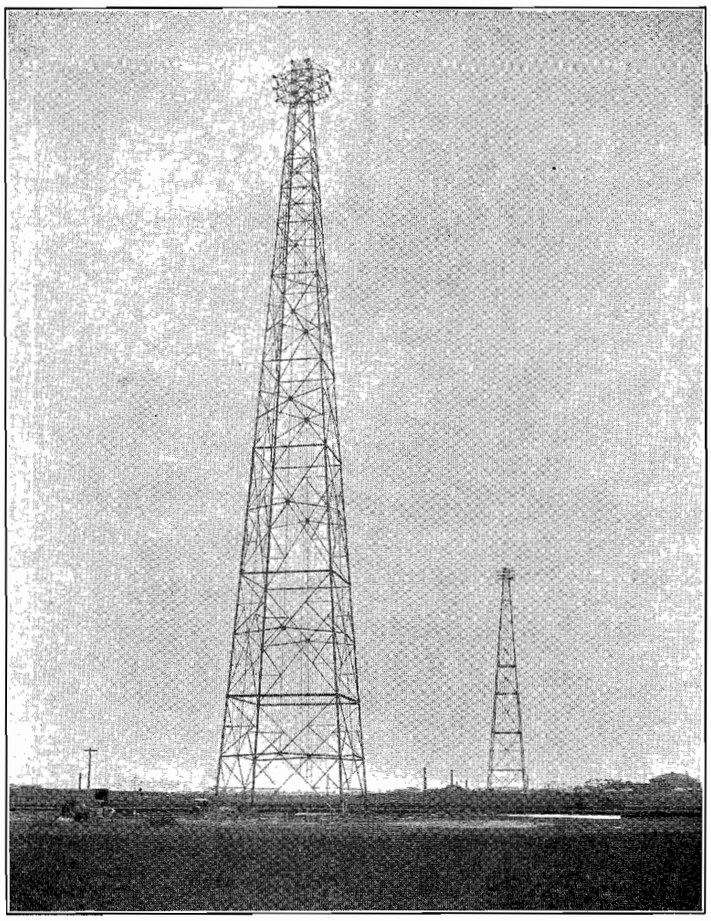
APPENDIX 7.

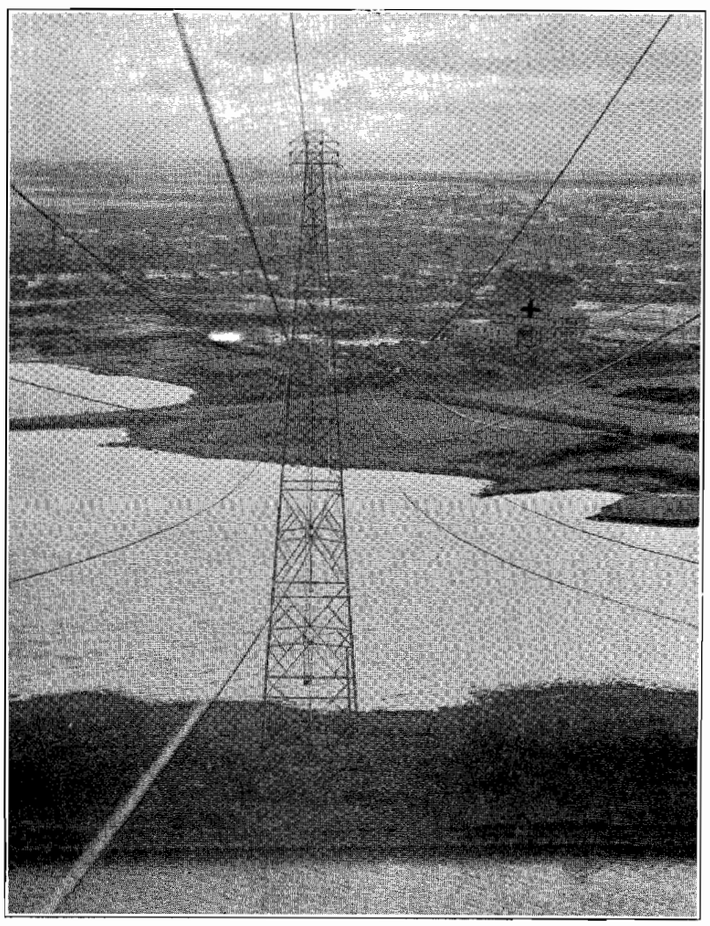


New Open Cut, Yallourn.

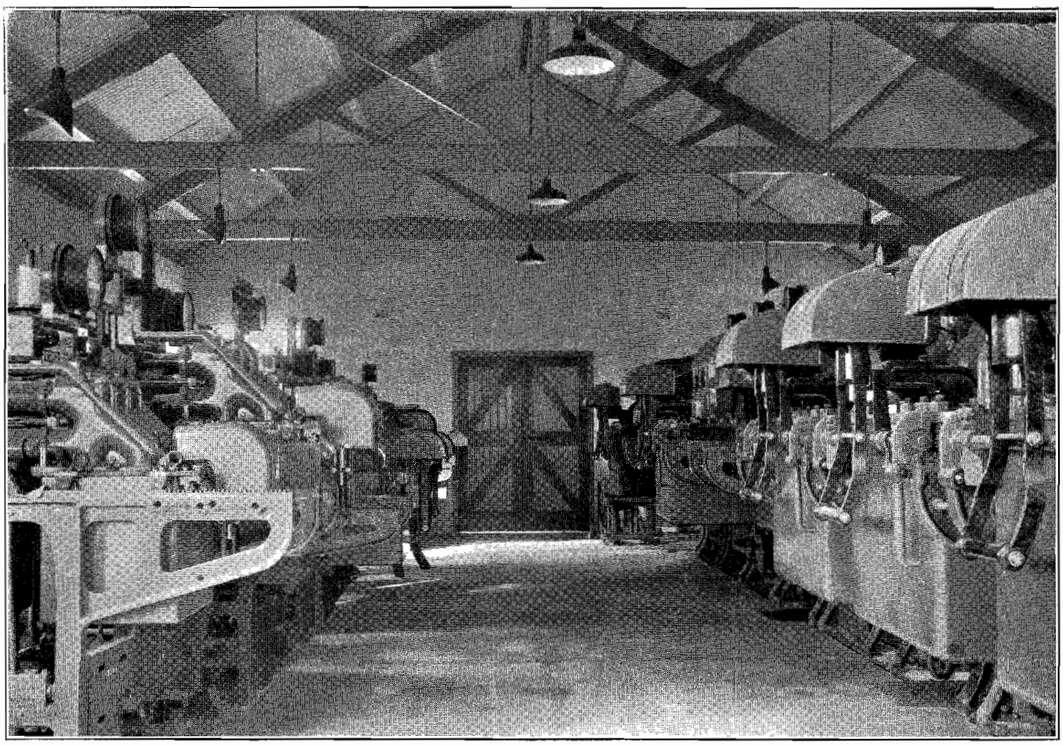


Switchyard, Thomastown Terminal Station.

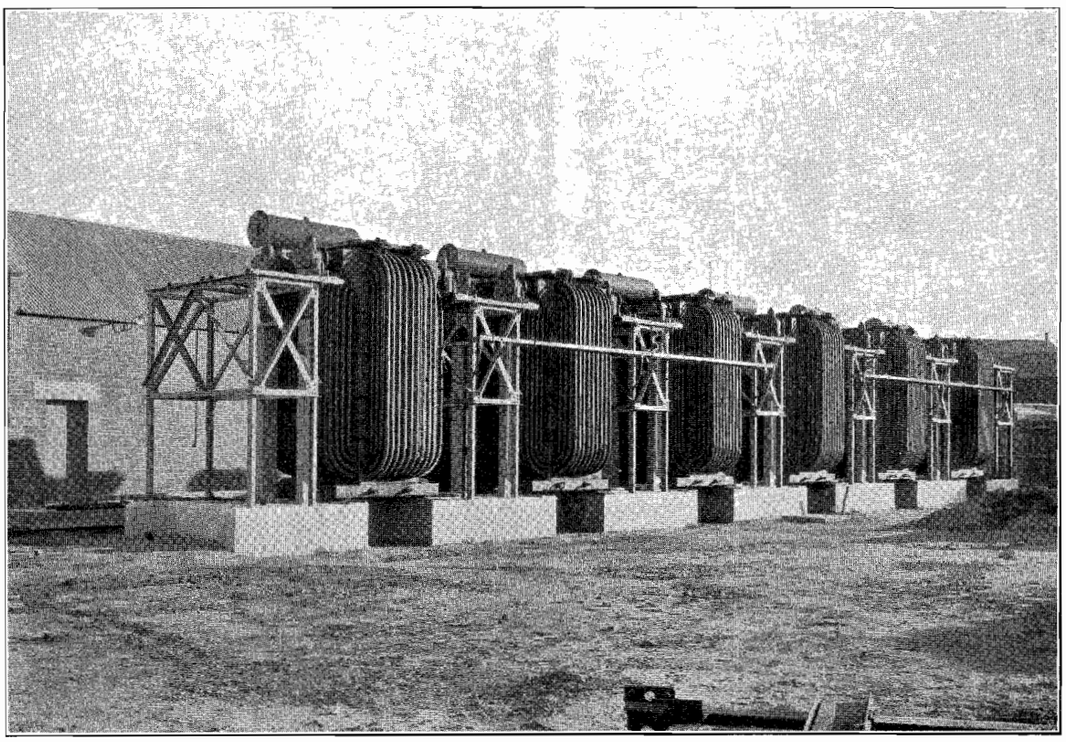




Crossing Yarra River, linking Yarraville (+) with Melbourne Electric Supply Company's Areas.

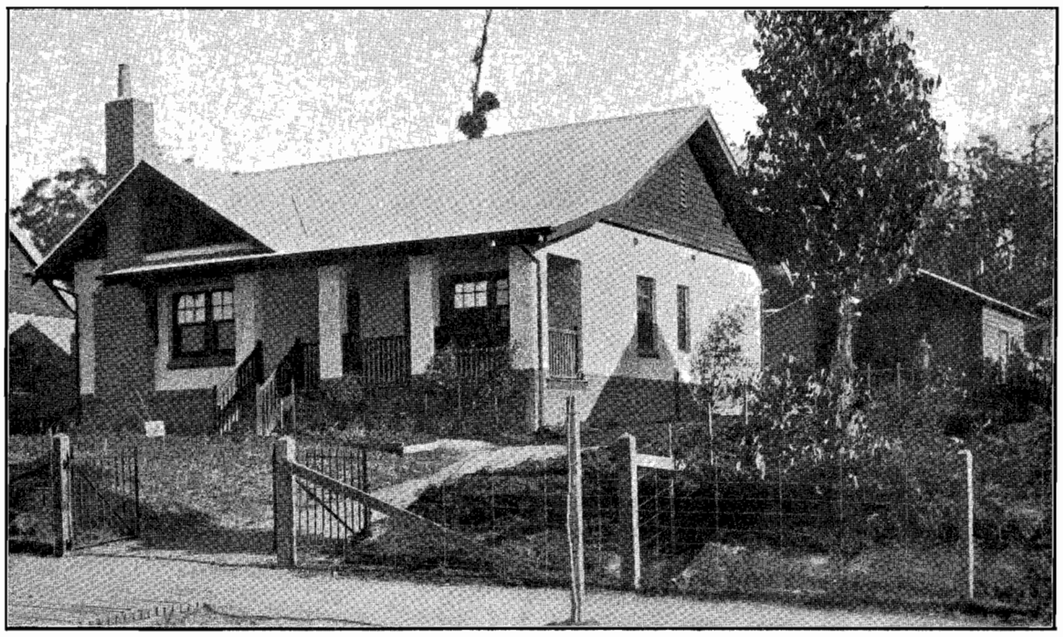


Sub-station "G," South Melbourne.



Transformer Bank at Sub-station "G."

HOUSES IN YALLOURN TOWNSHIP.



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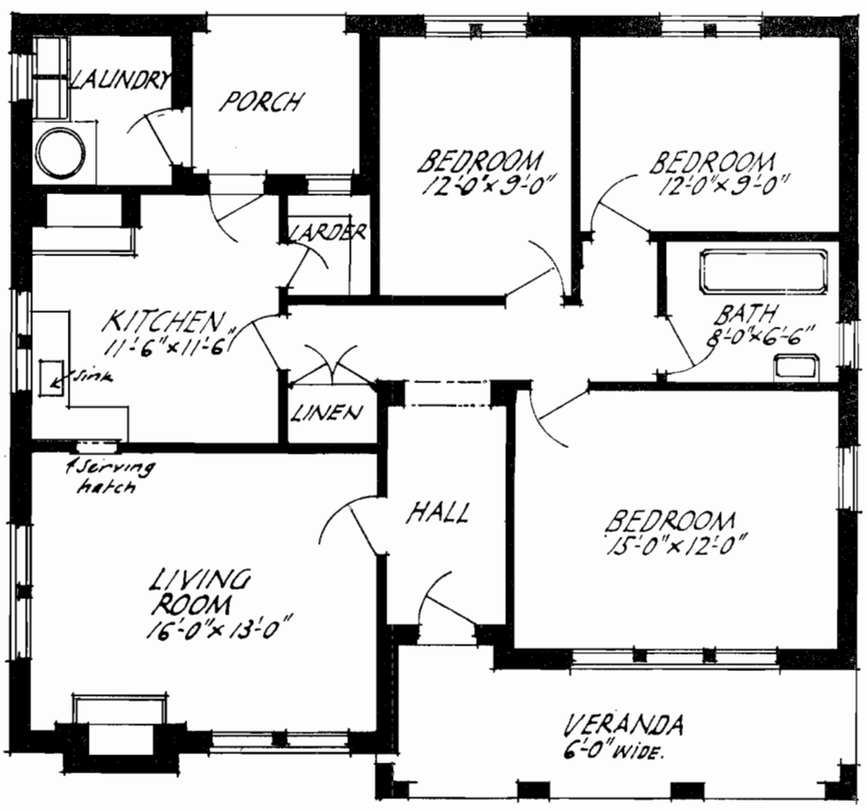

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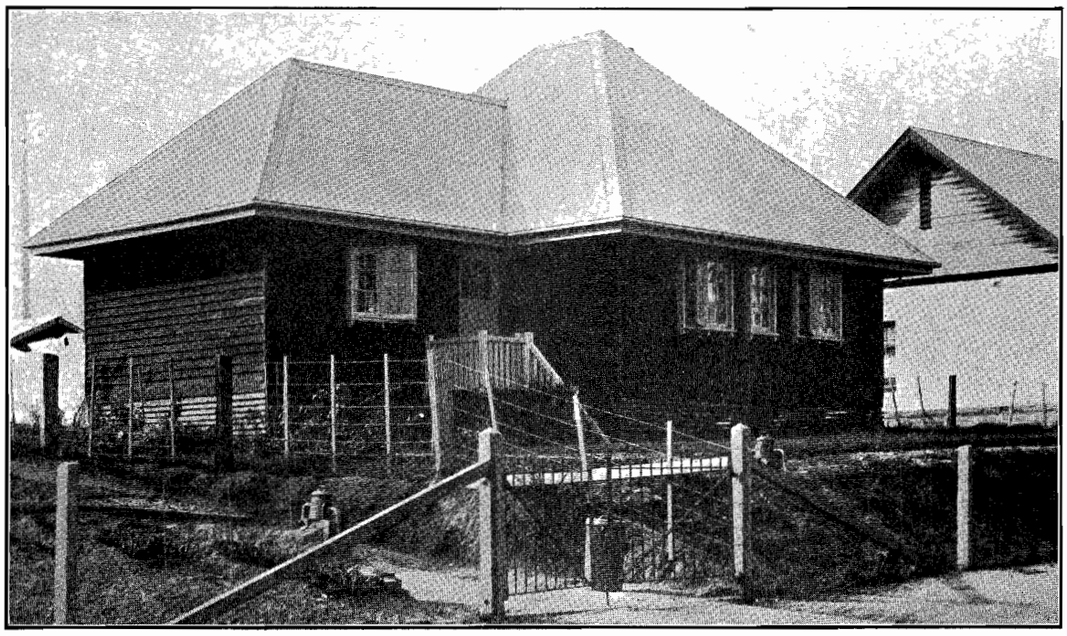

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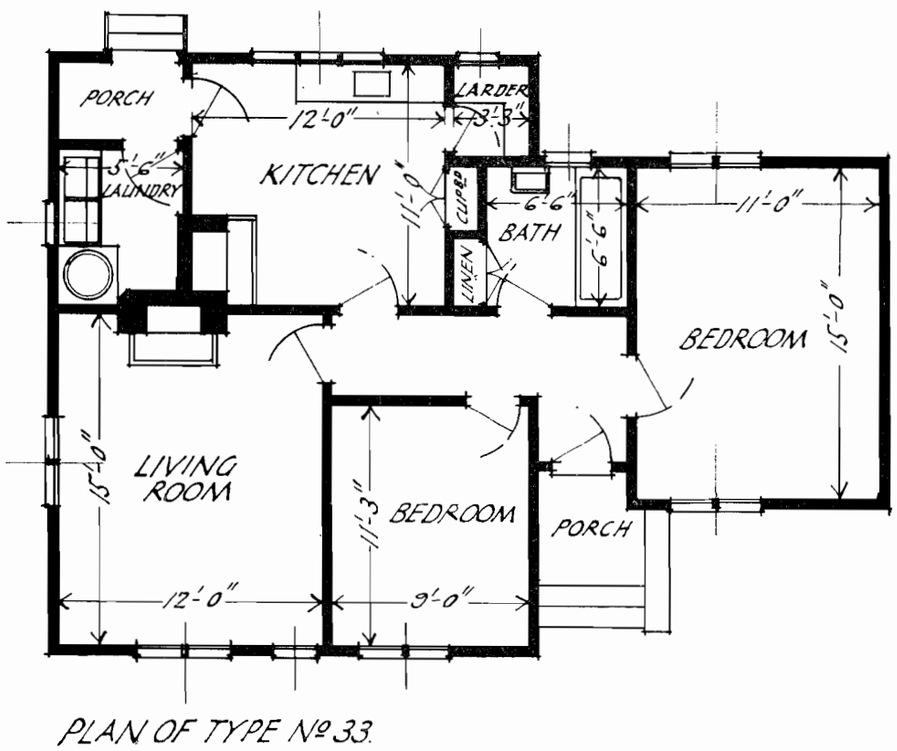

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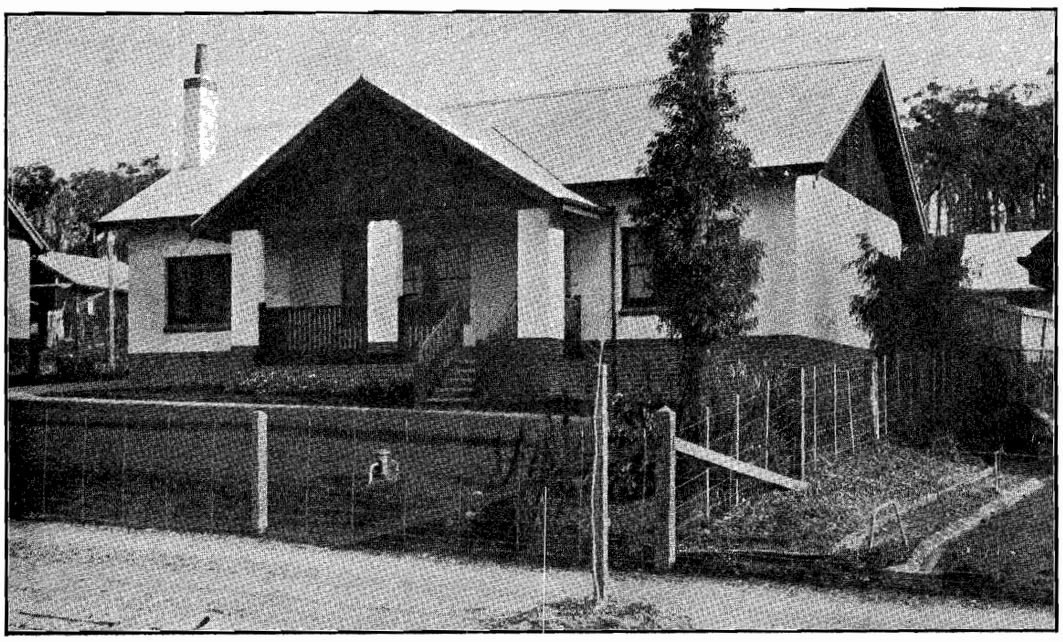

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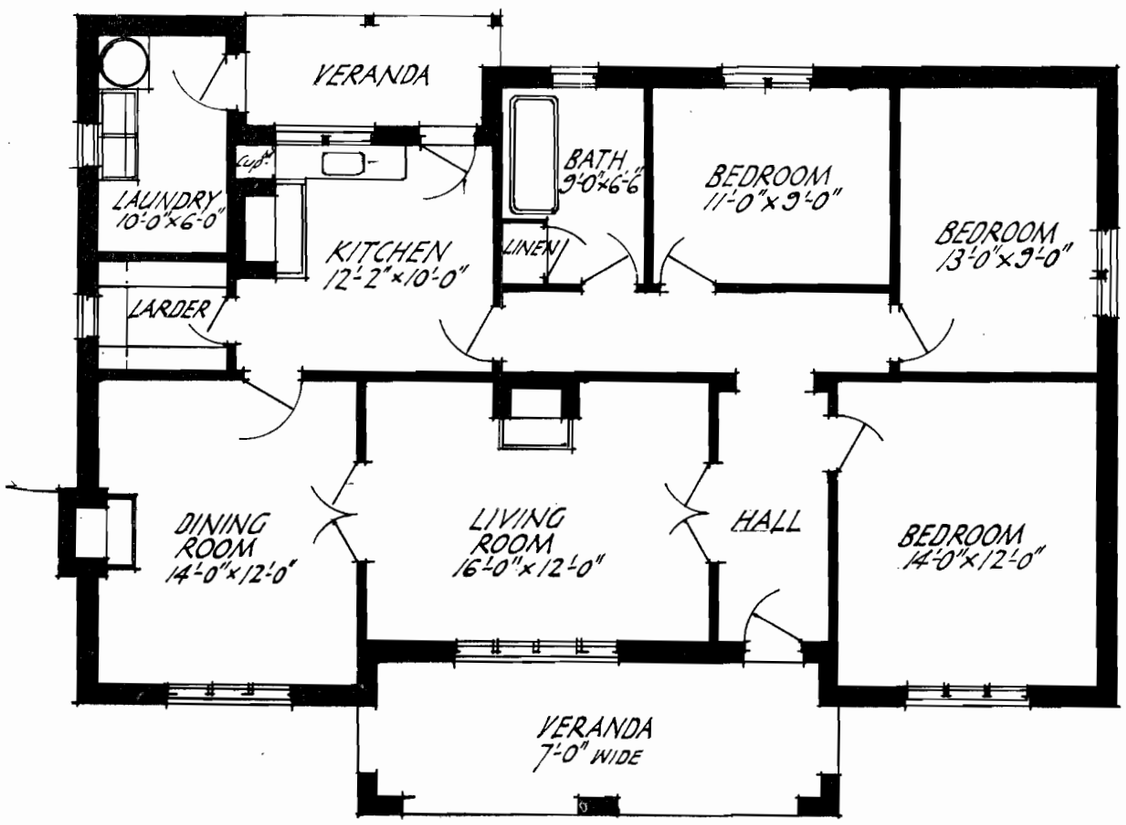

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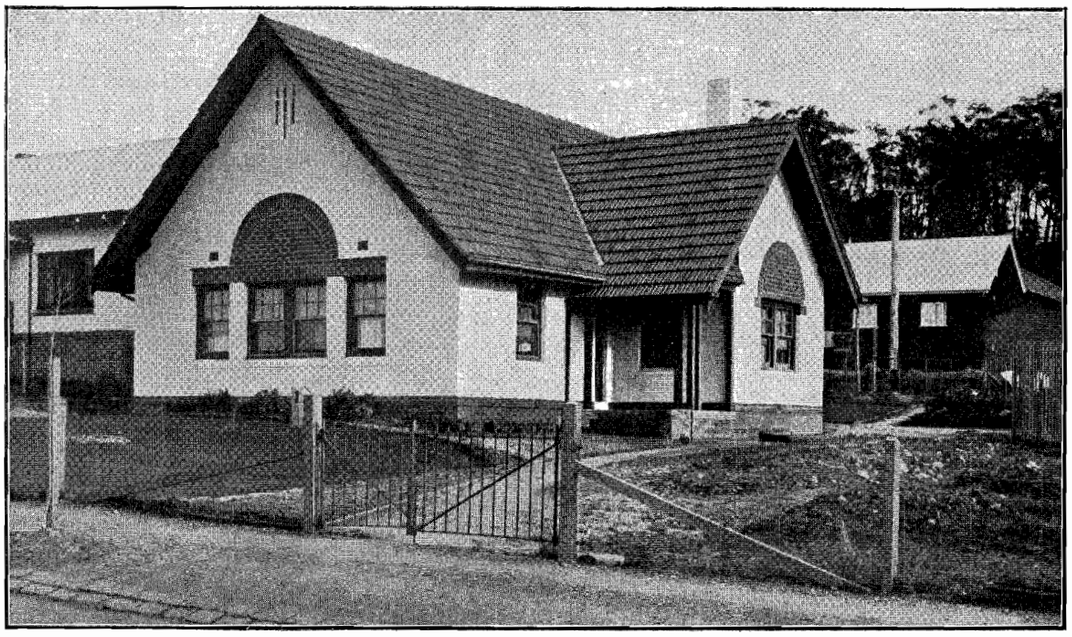

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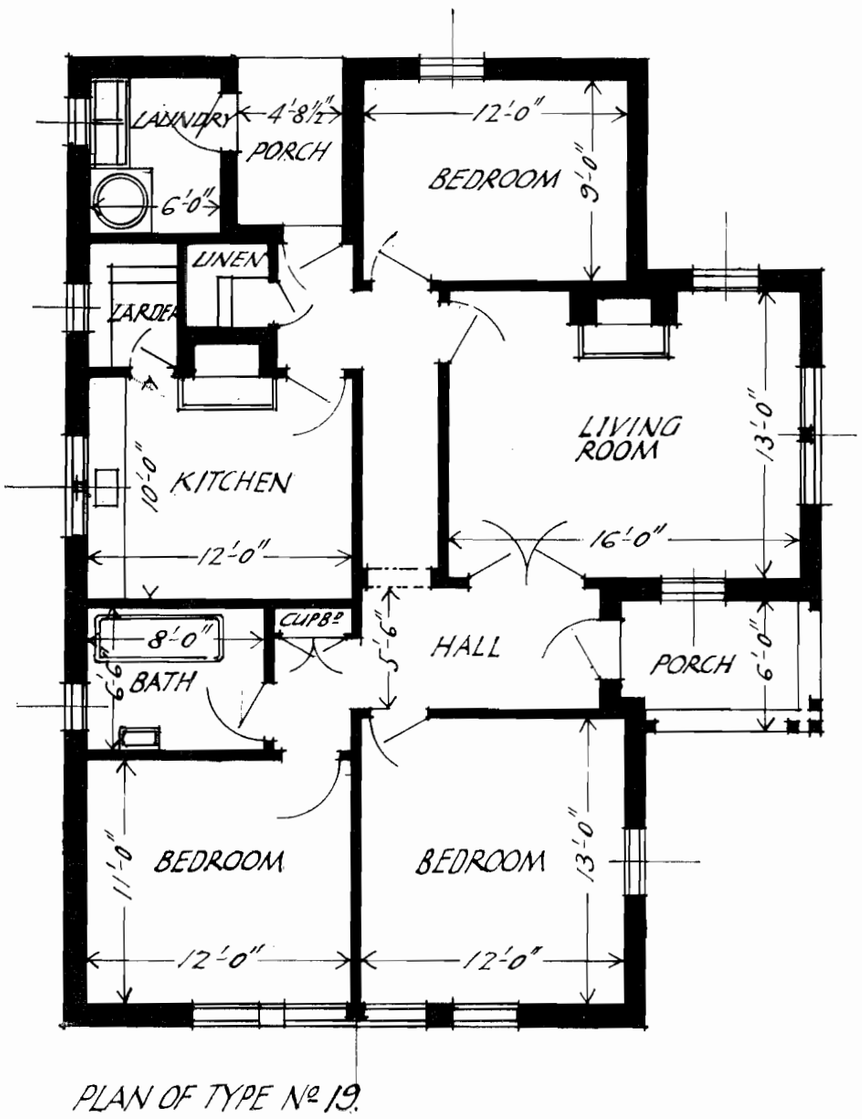

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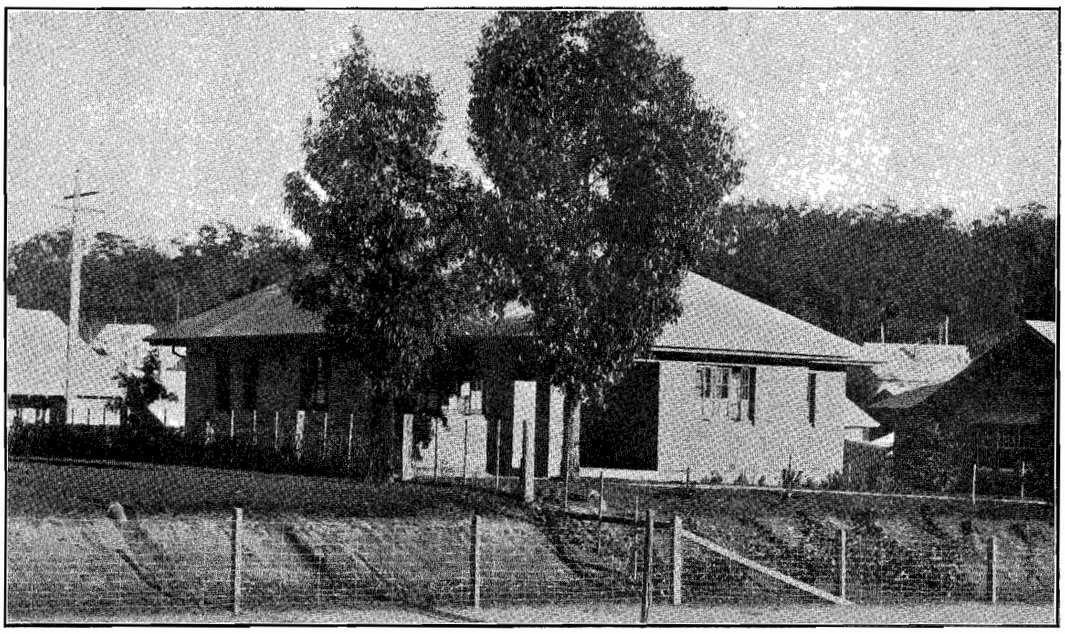

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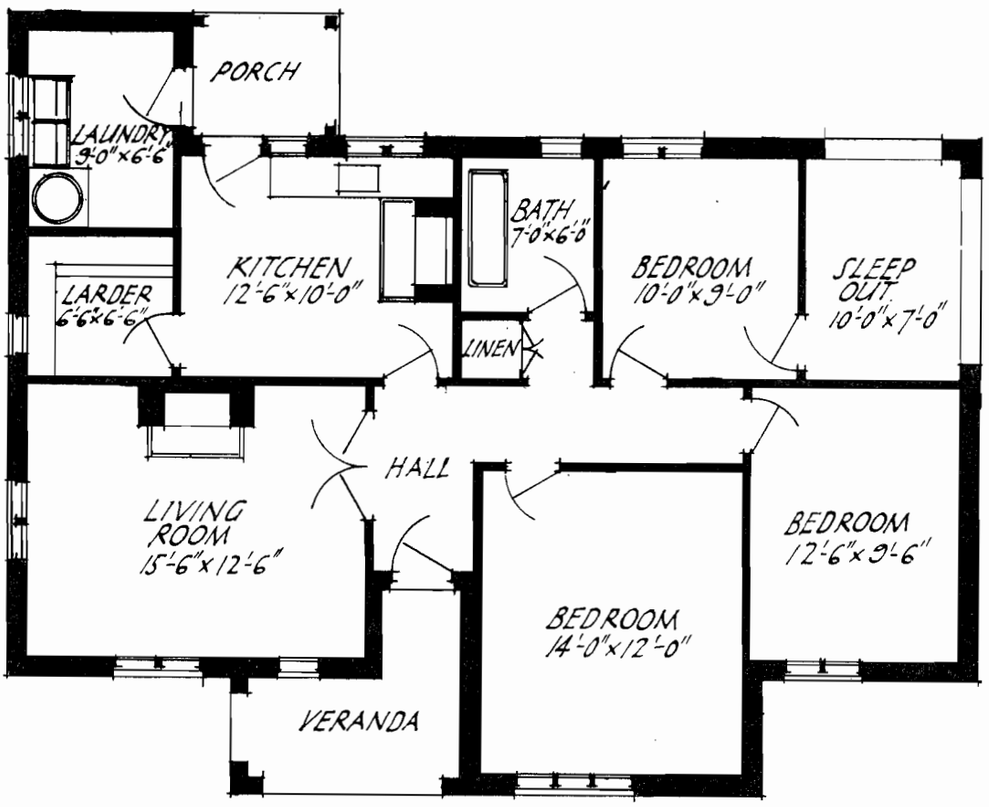

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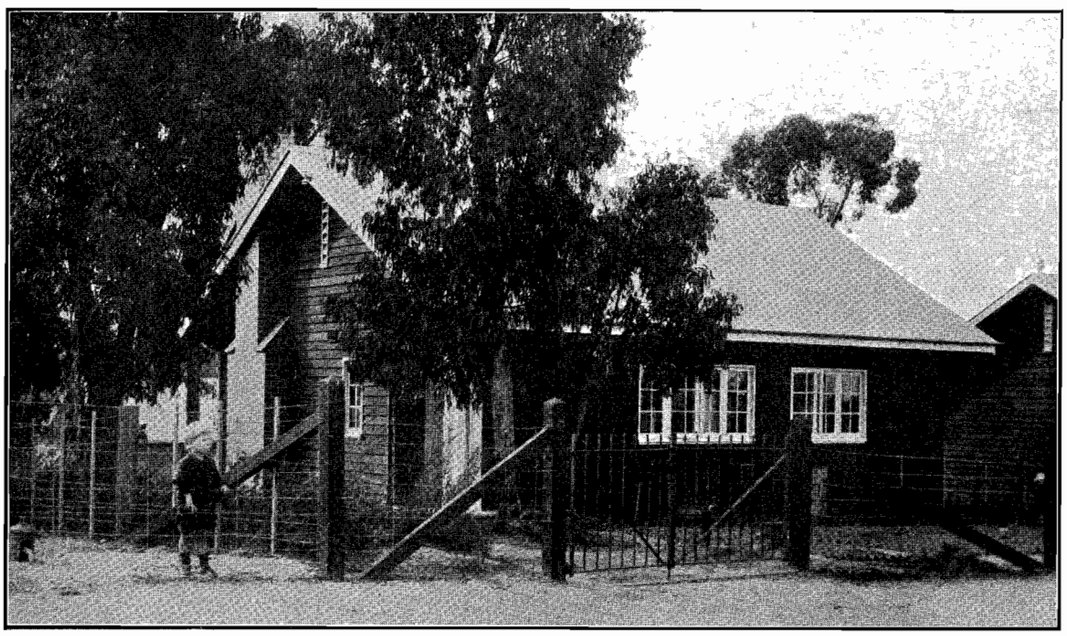

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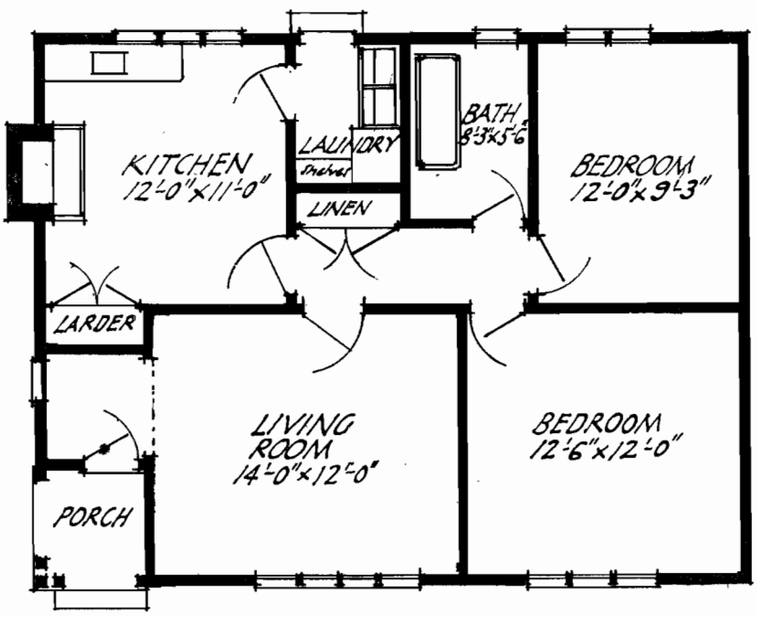

PLAN OF TYPE No 2

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