1925.

VICTORIA.

STATE ELECTRICITY COMMISSION OF VICTORIA.

SIXTH ANNUAL REPORT

FOR THE

FINANCIAL YEAR ENDED 30TH JUNE, 1925;

TOGETHER WITH

APPENDICES.

PRESENTED TO PARLIAMENT PURSUANT TO SECTION 25 (*b*) OF STATE ELECTRICITY COMMISSION ACT No. 2906.

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SIXTH ANNUAL REPORT.

17th November, 1925.

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

SIR,

As directed by the *State Electricity Commission Act* 1918 No. 2996, section 25 (*b*), we have the honour to present our Report for the financial year ended the 30th June, 1925, together with Profit and Loss Accounts and Balance-sheet for that period.

PART I.—ADMINISTRATION.

Progress details of the works entrusted to the Commission will be found in Part III. hereof under the heading:- Design, Construction, and Operation, but at the outset the Commission desires to comment briefly on the principal works of power generation and on the briquetting installation at Yallourn.

POWER GENERATION.

At the close of the period under review the work involved in the first installation of 50,000 kilowatts of generating plant at Yallourn Power Station was practically complete, although certain items of the plant, more particularly in the boiler house, were still in the contractors' hands. As each turbo-generator was installed it was made available for service in meeting the demand on the system. The plant, as a whole, operated efficiently from the outset, although the burning of raw brown coal for large power-station purposes had not hitherto passed the experimental stage in this country. The Commission takes this opportunity of stating that, although the power station was not complete, and therefore was not operating for the whole of the year as a commercial unit of the State Electricity Scheme, the results of the operations of this station in conjunction with the Newport "B" Power Station clearly indicate that the Scheme will comply entirely with the major essential requirements, namely:—

(1) Certainty and continuity of supply.
(2) Capability of expansion.
(3) Economic soundness.
(4) Independence of sources outside Victoria.

BRIQUETTING PLANT.

With the coming into operation of the Briquetting Plant the sale of briquettes upon a commercial scale commenced early in February this year. From the outset the demand of the metropolitan household market throughout the winter months was heavy, and owing to the existing half-factory being of insufficient capacity to cope with all orders, many householders were unable to obtain supplies of this popular fuel.

The incidence of briquettes on the household market was twofold. Firstly, the recurrence of the firewood famine which has become almost an annual problem was averted; secondly, the fact that briquettes were available meant that a seasonal increase in the price of other fuels could not be imposed. Thus a further saving of over £40,000 on last year's firewood prices was gained by consumers.

Though the present half-factory is capable of supplying only 3 per cent. of the total fuel consumption of the State (or 5 per cent., excluding gas making and railway requirements), the Commission has been able to effect a very wide distribution, and already consignments have been dispatched to over 70 provincial centres throughout the State.

The object of the installation of this plant was to ascertain—

(*a*) whether a marketable briquette could be produced at Yallourn from Yallourn brown coal, and if so, at what cost;
(*b*) whether the fuel market would respond to this form of fuel for (1) industrial and (2) domestic use.

The comparatively short period of the year in which the factory was operating gave sufficient experience to show that a marketable briquette could be produced from Yallourn coal at a reasonable price for domestic use, and the above reference to the extent of the domestic demand shows that an adequate market is available for briquettes.

On the other hand, the demand for briquettes for industrial use, although encouraging at the present price, would be greater if the price could be reduced. At the same time many firms which have tested consignments acknowledge the superiority of the brown coal briquette, from a number of points of view, over all other classes of fuel. Our experience, however, indicates that the existing half-factory cannot produce briquettes at a price which will appeal to the industrial market in general, although there are numbers of such users who are now regular customers.

With a considerably increased output briquettes can be produced at a price which will attract most types of industrial customers. Such customers, with their regular and steady demand throughout the year, would be of material assistance in the operation of the factory, since the seasonal demand of domestic customers involves irregular output over the year.

Following its survey of the market, the Commission recommended to the Government that extensions be undertaken to treble the capacity of the present plant so as to give an output of 330,000 tons per annum. No difficulty is anticipated in disposing of this output.

It was recognized from the outset that a factory limited to the output of five briquette presses could not be regarded as a commercial unit, and provision was therefore made for the future expansion of every part of the factory. Consequently, the output can be more than trebled at little more than the cost of the existing half-factory, with a resulting material reduction in the cost of production.

The extensions proposed have considerable economic advantages in other directions. The increased production of coal from the open cut to supply the enlarged factory will have the effect of sensibly reducing the operating cost of coal winning. Again, the enlarged factory will offer the readiest means for the most economic consumption of the fine, or slack coal which is produced in the process of coal winning, and which is of less value to the Power Station than screened coal.

The present half-factory comprises 5 presses, 6 driers, 4 boilers, 3 crushing systems, and accessory plant with requisite buildings. The scheme proposed by the Commission involves the addition of 11 presses, 9 driers of somewhat larger capacity than those already installed, 6 additional but larger boilers, 2 crushing systems, and the necessary accessories, together with the extension of the existing buildings. Much of the present installation, such as the main supply rope haulage, the railway system, the workshops, offices, &c., will require only very minor additions to become adapted to the enlarged scope of operations.

The Commission's estimate of the cost of the extensions is £630,000. This has been based upon the actual cost of the present installation, during the erection of which much experience has been gained which should be productive of economy. The estimate includes interest during construction and all overhead expenditure. No reduction in the rate of interest has been assumed.

The proposed extensions, if authorized immediately, cannot be completed and put into commercial operation in less than three years.

A detailed description of the plant comprising the present half-factory is given in Part III. of this Report.

CURTAILMENT OF LOAN EXPENDITURE.

In October, 1924, the Government notified the Commission that along with other public bodies it would be required substantially to curtail its loan expenditure for the remainder of the financial year. As the Commission was by that time, with the knowledge of the Government, committed to a construction programme far in excess of the expenditure for which it was then intimated that Loan Funds could be provided, this instruction necessitated the immediate stoppage of many urgent and important works.

After considerable discussion the then Government agreed to permit those works to proceed on which the Commission had contractual commitments at the time of the instruction.

In giving effect to this direction it was necessary to dispense with the services of some 500 employees, and among the more important works held up were those following :—

(*a*) Completion of the Yallourn Power Station.

(*b*) The removal and disposal of overburden both in the new and old open cuts.

This will almost certainly have an adverse effect on the opening up of the new cut. Whilst no immediate difficulty was experienced in the coal-winning operations on this account, it is likely to be felt later, because the interval of time by which the overburden removal should precede the winning of coal has been reduced. In fact, in March of this year overburden removal had to be again commenced in the new open cut so as to avoid the certainty of serious curtailment of coal supply.

(*c*) Construction of houses, shops, roads, streets, drainage, &c., in the Yallourn township.

Only those houses and buildings to which the Commission was committed under contracts were brought to completion. The very necessary provision of further dwellings and the extension of shopping facilities to meet the demands of householders were two important works which had to remain in abeyance.

(*d*) The Sugarloaf-Rubicon Hydro-Electric Scheme.

Reference is made elsewhere to the postponement of this work.

(*e*) Extension of electric supply works in the country districts.

A construction programme for extensions to country centres served by the Commission's transmission lines had been prepared, but it was necessary to abandon the whole of the projected works and bring to completion only those works in hand at the date of the Government's instruction. Although by no means the only centre affected, one scheme which had to be postponed was that for the extension of the main line from Sale to Bairnsdale with extension to the town of Stratford. Within the districts under the control of the Commission practically no new extensions, whether large of small, were undertaken, although numerous attractive proposals came before the Commission. The capital works were confined to extensions to consumers' premises where only the erection of the actual services was involved. As a result, there has, of course, been considerable loss of revenue in the district undertakings.

Apart from losses which inevitably arise from the abrupt cessation of field works, and the consequent interference with carefully timed works programmes, a curtailment of capital investment at a critical juncture necessarily involves loss of revenues. In several of the cases above enumerated the capital already invested at the time of the cessation had to remain unproductive, and prospective consumers actually waiting to be supplied had to be neglected.

INQUIRY INTO THE OPERATIONS OF THE COMMISSION.

For the past four years the administration and projects of the Commission have been subjected to criticism.

Much of this criticism appears to be due to entire failure to fully appreciate the magnitude of the undertakings, and a tendency to ignore the potentialities of the schemes for the eventual benefit of the whole community. The steady development of the State's power resources, the growing independence from imported fuel supplies, and the consequent immunity from industrial troubles in which we have no direct concern—the broadcast distribution of electric energy throughout not only the greater communities, but also many of the rural districts, with the consequent raising of the standard of domestic and civic comfort and relief from unnecessary manual toil—these are objectives which are worthy of, and are receiving the utmost effort.

The capital investment involved is more than justified if the tariffs for the resulting services are, on the one hand, lower than heretofore, and on the other hand, adequate to meet all charges.

The Commission is so convinced of the entirely reproductive character of its investments, when the undertakings have had a fair period in which to naturally develop, that it challenges exhaustive and competent inquiry into its past and prospective activities.

Actuated by this belief the Commission has requested that such an inquiry should be undertaken, and has been notified of the decision of the Government to adopt that recommendation.

A copy of the Commission's letter on this subject is appended for record purposes :—

The Hon. the Attorney-General,
Melbourne.

29th July, 1925.

DEAR SIR,

For some time past this Commission has been subjected to much criticism in the Press and in Parliament upon the State Electricity Scheme and the Coal Winning and Briquetting operations. Allegations have been made from time to time that capital expenditure has been extravagant and unjustified, that works constructed or under construction do not or will not operate satisfactorily, that the brown coal deposits are unsatisfactory and not commercially useful, that the expenditure will not be reproductive, that burdens will therefore fall upon the taxpayer, that tariffs and charges are excessive and burdensome upon customers, that further expenditure recommended upon extensions of the generation and transmission of electricity is not necessary or not justified, and the like.

While it is realized that criticism of this nature is not unusual in the experience of those responsible for the conduct of public undertakings, and the personnel of the Commission is not unduly disturbed thereby, the Commission is nevertheless very much concerned in so far as such criticism is undoubtedly calculated to destroy public confidence in the Scheme and in its administration, and seriously to hamper its further successful development and operation. You are well aware that it is hopeless for the Commission to meet such criticism merely by means of contradictions or by explanatory statements prepared and issued by the Commission itself. It is felt, therefore, having regard to the magnitude and importance of the undertakings entrusted to the Commission, and to their potential bearing upon the progress and welfare of the State, that a searching inquiry into those undertakings and a review of the whole of the schemes, if conducted by some competent outside authority, would do much to satisfy the public mind, and thereby free the Commission from the inevitable embarrassment of a continuation of such criticism, which, it feels confident, such an inquiry would prove to be unjustified, and which would tend to the elimination hereafter of conditions inimical to the smooth and successful development of the undertakings.

The Commission would therefore greatly welcome action by the Government in this direction. The Commission desires and recommends that the Government should appoint some person or persons having unquestioned standing, authority, and experience in the realm of Modern Power Development on a large scale, and competent also to review both the power resources and the future power requirements of the State, with instructions to make an exhaustive and critical examination into the affairs of this Commission and into the whole of its past, present, and prospective works and operations. It is suggested that such an inquiry should be directed mainly to the important and paramount questions whether the schemes undertaken and to be undertaken by the Commission are capable of paying their way without becoming any burden upon the general revenues of the State and capable of rendering necessary electric and other services to the public at prices which are fair and reasonable.

In making this request, the Commission assumes that it would be afforded the opportunity of laying its views upon every issue before the authority conducting such inquiry.

Yours obediently,

JOHN MONASH, Chairman.

(Sgd.) ROBERT GIBSON, } Commissioners.
D. ORME MASSON, }

MELBOURNE ELECTRIC SUPPLY COMPANY.

Reference was made in the Fifth Annual Report to the terms of the agreement entered into with the Melbourne Electric Supply Co., whose franchise under the Electric Light and Power Act for its Melbourne undertakings expires in November, 1925.

In December, 1924, Parliament passed the requisite legislation approving the agreement subject to later ratification by the company's debenture and share holders. Formal resolutions embodying this ratification were passed about March, 1925, thus making the agreement effective.

The net effect of the arrangements concluded with the company is that, for all practical purposes, it will undertake the management of the undertaking on behalf of and under the control of the Government, receiving as its remuneration for such management, and for the use of its share capital, only certain prescribed interest returns.

More important still, a fair basis of ultimate acquisition has been achieved, enabling the purchase price to be determined at the date of acquisition by simple accountancy methods, instead of by arbitration: and, further, it permits the urgent work of conversion to three phase in the industrial areas to be undertaken forthwith.

The *Melbourne Electric Supply Company Act* 1924, in ratifying the agreement, provides that the Commission will act as the representative of the Government in its supervision and control of the management of the undertaking during the period that the extension of franchise remains in operation.

The agreement applies to both the Melbourne and Geelong undertakings of the company.

Conversion of System of Supply.—The Commission, in close collaboration with the company, commenced the planning of the works of conversion from single to three phase supply. This work is particularly vital and urgent on account of the large industrial territories served by the company's system. It was determined that the works of conversion must comply with the electrical standards adopted for the State of Victoria.

The company's area is divided for the consideration of these works into two main sections –

1. The industrial section, comprising the municipalities of Collingwood, Fitzroy, South Melbourne, and, to a lesser extent, Richmond and the northern portion of Prahran.
2. Those residential sections forming the remainder of the municipal districts in the company's area, namely, the whole of the municipalities on the eastern side of Melbourne, with the exception of the Nunawading Shire.

Concerning the industrial section, it was decided to convert the system in these areas to a 4-wire three-phase 230-volt supply. Energy from the State scheme will be supplied from Sub-station "B" already in operation in Collingwood; from a sub-station to be provided at or near the company's generating station in Richmond, and from another sub-station to be established at South Melbourne. To these sub-stations energy will be conveyed at 22,000 volts for sale to the company.

It has been decided that no immediate change in the system of supply to the residential areas is necessary. Broadly, the bases of this conclusion are:

1. That a three-phase service for lighting and other residential purposes is not superior to a 3-wire single-phase supply.
2. That the advantages of three-phase transmission could be obtained by the residential districts taking their supply from the Commission's 22,000 volt sub-stations to be installed at suitable points. To these sub-stations the company's single-phase feeders would be connected.
3. That the consequential replacement of consumers' equipment and high-tension cables, acquisition of land to accommodate the larger sub-station buildings, re-winding of transformers and meters, re-arrangement of services and all the inconveniences caused thereby, are, at this stage, hardly warranted by any benefit to be derived from the immediate change of service.

Following the above decisions a commencement has been made with the Collingwood and Fitzroy District. For a section of this work an underground ring main is being laid from Sub-station "B," enabling the large industrial consumers situated within the range of this main sub-station to be transferred to the new system with a minimum of inconvenience, leaving the work of change-over of the remaining consumers in the territory, together with re-arrangement of the existing underground high-tension cables, to a later period when it can be more conveniently carried out. Situated at suitable points on this main are switching stations for the purpose of switching not only the ring main cables, but also distributors from these points to the lesser feeder centres: at this stage five switching stations will be constructed. The estimated cost of this main, together with switching stations, is £35,000. The Government has authorized this work.

Attention was being given at the close of the year to the conversion of the supply to industrial consumers in the South Melbourne area.

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

For a better understanding of the above opportunity is taken to summarize the position as at 30th June this year.

The Metropolis of Melbourne.

Electric Supply Requirements for all Purposes. Because of its direct bearing on the Commission's activities, particularly in the future, and with the object of indicating the present state of development in the demand for energy for all purposes in the metropolitan area, there has been included as an Appendix (No. 2) to this Report, a diagram showing the growth of demand since the year 1918, both as regards industrial (including tramways) load and that for railway purposes. The curves also show the growth of demand for industrial purposes as estimated by the Advisory Committee appointed by the Government in 1917, together with a revised forecast which has lately been prepared of the requirements for railways, tramways, and industrial purposes up to the year 1928. In these curves the domestic consumption is included in the industrial load.

A tabulation showing the actual growth and distribution of the demand in the seven years from 1918 to 1924 is also annexed. (Appendix No. 3.)

METROPOLITAN AREA.

Generation of Electricity in Financial Year 1924–25.

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

Consumption per Capita.

	Population.	Maximum Demand.	Demand per Capita.	
Inclusive railway traction	857,000	105,000 kw.	0·12 kw.	489 kw. hrs.
Exclusive railway traction		66,000 kw.	0·077 kw.	314 kw. hrs.

Distribution of Energy.—Within the metropolis the following undertakings are supplied from the State Scheme, viz. :—The Melbourne Electric Supply Co., the City Councils of Melbourne, Brunswick, Footscray, Williamstown, Coburg, the Shire Council of Nunawading (Box Hill), and H. V. McKay Pty. Ltd., Sunshine. Negotiations with the remaining electric supply authorities were in course at the end of the year, and arrangements were concluded later for the transfer to the Commission of the demands of the City of Northcote, Town of Preston, and Shire of Heidelberg.

In the case of the Melbourne Electric Supply Co. and the Melbourne City Council the Commission does not undertake the whole of the supply required to meet the demand on these undertakings, both still having generating plants in operation.

These two suppliers cannot, however, meet the entire demand on their undertakings by means of energy generated at their respective power stations, since both have long since reached the limit of their installed capacity.

Moreover, one of the principal objects for which the State Electricity Scheme was created, viz., to provide energy from a central power station at a price which would make it more economical for existing generating authorities to obtain their supplies therefrom than themselves to generate, has been achieved. Thus, these two most important Melbourne undertakings are so operating their plants that the greater proportion of their constant demand is being taken from the State Scheme, their own generating plants being used mainly to assist in meeting the demand during peak periods.

As regards the other undertakings mentioned, State-generated energy is being made available to them at prices lower than those which previously obtained.

The two supply authorities in the metropolis which do not receive energy directly from the State Scheme are the City Council of Port Melbourne and the Aspendale, Carrum, and Chelsea Electric Supply Co. By arrangement with the Melbourne City Council that body will continue to supply the Port Melbourne Council until electrical arrangements can be made for the transfer of the supply to the Commission. The Aspendale, Carrum, and Chelsea Electric Supply Co. is supplied by the Melbourne Electric Supply Co., and no transfer direct to the Commission is in contemplation in the immediate future, because this comparatively small demand is not situated in close relation to the existing distribution system of the main scheme, and would not in itself warrant extension in order to directly connect the load to the Commission's supply.

As explained in previous Annual Reports, the Commission itself controls the local distribution in the City of Essendon and a small portion of the City of Melbourne (known as the Hopetoun Ward). The results of these operations are dealt with elsewhere herein.

The towns of Werribee and Altona are administered from the Commission's District Office at Ascot Vale. One fact worthy of record is that, during the period, the local power station erected in 1906 by the North Melbourne Electric Tramways and Lighting Co. for the generation of direct current, was put out of commission. The whole of the demand in this district was thereupon transferred to Sub-station "D" in Ascot Vale, which forms part of the Commission's main distribution system. The generating plant thus thrown out of operation was dismantled and disposed of, and the land and buildings of the power station have been purchased by the Tramways Board.

The Commission also supplies a number of large industrial consumers with 25 cycle energy from Newport "A" Station (Railway), a portion of the supply of the Melbourne Electric Supply Co. being drawn from this source and afterwards converted by the Company to the frequency required.

Eastern Metropolitan District.—During the period this new district was created to deal with supplies to centres on the eastern outskirts of the Metropolitan Area, the Commission controlling the local distribution. The territory is served by a 22,000 volt subsidiary main running from Thomastown to Dandenong along the route of the main transmission line.

During the year the Government authorized the Commission to undertake local distribution in the following centres in this District:—Ferntree Gully District, Greensborough and Eltham, Ringwood, Croydon and Lilydale, Spring Vale and Noble Park.

The financial position precluded the Commission from acting upon all these authorities, those of Ferntree Gully and Greensborough and Eltham being postponed. In the case of Lilydale, Ringwood and Croydon, these undertakings were owned by the Shire of Lillydale, which requested the Commission to assume control. Negotiations resulted in the transfer of assets being agreed upon, on the basis of the Commission assuming responsibility for the whole of the liabilities, less certain losses incurred by the municipality. As no moneys were to be paid until the new financial year, the Commission was able to finalize this transfer. The works for supply to Spring Vale and Noble Park, where electricity was not previously available, were completed before the Government's instruction to curtail works, otherwise this extension would have been in the same position as those above referred to.

Country Districts.

The method of organization adopted for service to country centres is described in the Fourth Annual Report. This provides for the creation of Districts of suitable size; each of them to be under the control of a District Superintendent having full local authority. Thus, in the South Western District the whole of the towns served by the main transmission line from Geelong to Warrnambool, together with towns on the Bellarine Peninsula served by the line from Geelong to Queenscliff, are under the control of a small district staff.

A similar organization operates in the Gippsland District, where transmission lines extend eastward from Drouin to Sale and southward from Yallourn to Korumburra and Leongatha.

The above are the two main country districts in which the Commission controls the local distribution at present.

At the close of the year a new district was being organized to deal with towns in the North and North-East of the State which are to be served from the Sugarloaf-Rubicon Hydro-Electric Scheme. During the year there were being administered from the Head Office the undertakings at Shepparton and Echuca. On the coming into operation of the North-Eastern transmission line now under construction all centres served by this line will be placed under the control of the new district organization.

Negotiations are about to be commenced with the existing undertakers in regard to the change of control within the areas served. This action is in accordance with the direction of Parliament that the local distribution in the whole of the centres to be served from the Sugarloaf Scheme should be under the control of a single authority, the State Electricity Commission being named as that authority.

It should be noted that, until energy from the Sugarloaf-Rubicon Works is available, supply will be given from the Yallourn Scheme.

The Government, during the period, authorized the Commission to acquire the undertaking of the Leongatha Butter and Cheese Factory Co. Ltd., this acquisition resulting from a request of the Woorayl Shire Council that the Commission should undertake supply to Leongatha as part of its scheme for supply in Gippsland. This represented the only new scheme for country districts authorized by the Government during the financial year.

As the result of the insistent demands from the localities concerned a scheme was prepared for service to the district along the route of the main Gippsland railway line from Dandenong as far as Bunyip, the supplies considered being those for Berwick, Beaconsfield, Pakenham, Tynong, Garfield, and Bunyip. The high tension line designed to operate at 22,000 volts, was to run on the same poles carrying the telephone line which runs parallel with the main Yallourn-Yarraville transmission line. This would necessitate short branch lines to feed Berwick, Beaconsfield, Pakenham and Bunyip. The other townships referred to could only be considered if suitable guarantees were forthcoming to cover the charges upon the necessary branch lines.

The Commission's estimates showed that the revenue would fall short of the annual expenditure by about £600 in the first year, and since there are but a small number of consumers distributed over a large territory, it did not feel justified in recommending the proposals for the approval of the Government. However, it intended to discuss the whole question with the municipal authorities concerned, with a view to ascertaining whether a guarantee of sufficient revenue could be obtained to justify the Commission in proceeding with the work. The curtailment of loan funds had the effect of postponing such discussion.

TWO-PART TARIFFS.

During the period an important alteration in the method of charging for supplies of energy for both domestic and industrial purposes was made in the territories controlled by the Commission. This was effected on 1st January, 1925, the form of tariff then placed in operation being a two-part tariff.

The two-part tariff adopted consists of a service charge to meet the standing charges connected with making the supply available, and in addition a low energy charge for all units metered. It is somewhat similar to the method of charging adopted for the telephone, with its service or annual charge, plus a fixed rate for ordinary calls: indeed, one form of two-part tariff is often referred to as the telephone system of charging.

In the course of the investigation of this important question the practice of other countries received close attention. At the date of the Commission's decision to introduce a new form of tariff there were only two electric supply authorities in the Commonwealth who had made any definite move in a similar direction, viz., the Hydro-Electric Department of Tasmania and the Municipality of Albury. In the Northern Hemisphere this method of charging is, however, in operation in a very large number of electricity supply undertakings, and the general trend of development in England is towards its universal adoption in some form or other for domestic and small power consumers. During the past ten years no less then 85 supply authorities have introduced two-part tariffs in the United Kingdom.

The Commission's objective was to reduce the charge to consumers desirous of using electricity for the many domestic purposes in addition to lighting, such as cooking, heating, washing, cleaning, sweeping, &c., and to encourage them to develop the use of electricity in their homes or in their business. Of the many classes of two-part tariffs from which a choice could be made the Commission considered that the method of charging best suited to the conditions met with in its districts is that in which the service charges for domestic light and power are based upon the number of rooms in a residence: while in industrial power tariffs the service charges are governed by the rated horse-power of the motor or motors installed.

The Commission left it to the option of consumers whether they would remain on the old tariff or transfer to the new, but domestic consumers connected to the mains on and after the 1st January, 1925, were automatically charged upon the new basis.

The experience of supply authorities throughout the world who have introduced this class of tariff has been that consumers are reluctant to change from an existing system to a new one, no matter what the advantages, and particularly if the new charge is calculated upon an entirely different basis, as is the case with the tariff introduced by the Commission. Nevertheless, the new tariff quickly became popular among the Commission's consumers, and for the six months during which it was in operation at the 30th June, 1925, no less than 1,400 consumers had voluntarily changed to the new tariff—a particularly satisfactory result.

To exploit to the full the advantages derivable from the introduction of the two-part tariff electrical apparatus for household use, especially for cooking purposes, must be made available to consumers at prices which the average householder can afford. At present, in Australia, domestic electrical apparatus, irons and similar apparatus excepted, can be purchased only at a cost which does not encourage the prospective consumer to give close attention to the advantages which are solely available from the use of electrical apparatus for domestic use. The cost of the apparatus overshadows in the mind of the consumer the considerably increased service which results from the use of electricity.

This is a problem that is not, however, confined to the Commonwealth. Electricity supply authorities in the United Kingdom have recognized for some time the need for greater efforts, and, as a result, a rapid improvement is already manifest. It is to be noted, however, that the cost of apparatus in Australia is considerably greater than in the United Kingdom, thus accentuating the problem as applied to this country.

Following the introduction of the two-part tariff, designed to popularize the use of electricity for domestic use, the Commission is now turning its attention to the question of supply of electrical apparatus at reasonable prices, so that its consumers may obtain the full benefit of the attractive tariff now available.

Concurrently with the introduction of the two-part tariff, the Commission introduced the system of quarterly meter reading throughout all its districts; but, as in the past, large power consumers' meters and those installed upon commercial premises continue to be read monthly.

Full particulars of all two-part tariffs in force are furnished in Appendix No. 4.

NEW WORKS OF POWER GENERATION.

Sugarloaf–Rubicon Scheme.

It must be remembered that, owing to the relatively higher capital cost of water-power, as opposed to heat-power generation of electric energy, the more suitable load for the former is one offering a high load factor, or, in other words, a practically uniform demand during the 24 hours.

Since the Sugarloaf-Rubicon Scheme was reported upon in 1922 and approved by Parliament, the decision to proceed with it in preference to an extension of one or other of the heat-power stations has been justified, and the event has shown that load developments have been correctly forecasted, inasmuch as a load of the character above described and quantitatively equal to the capacity of the Scheme, will be available.

The period which has intervened since the authorization of this Scheme has been occupied in gathering further data, through the agency of survey parties, as to the flow of the streams and as to the location and designs of the races, flumes, pipe lines, and generating stations.

Upon the more complete information thus obtained the scheme for the hydraulic works as propounded by the Consulting Engineers, Messrs. J. M. and H. E. Coane, and recommended by the Commission to Parliament, was reconsidered, and the conclusion was reached that sufficient energy is available from these resources to warrant the expansion of the original installation of 25,800 h.p. to one of 40,250 h.p., or an increase of 54 per cent. The revised scheme includes an additional power station at Rubicon Falls of 400 h.p. capacity, making a total of six power stations.

The hydraulic works were formerly estimated to cost £354,870, but, as stated in the 1922 Report, this did not include interest during construction, which Parliament has since determined must be included.

Under the amended scheme the hydraulic works are estimated to cost £526,680, or an increase of £171,810, which is accounted for (*a*) by the installation of turbines of greater capacity, with consequent increase in the size of buildings and of hydraulic works; (*b*) by interest during construction: and (*c*) by the provision of an additional power station at Rubicon Falls.

The increase in capacity of the turbines affects the electrical equipment required. In 1922 the generators, exciters, switchgear, and transformers at the various power stations, together with certain short lengths of transmission line to interlink these stations, were estimated to cost £196,500. The considerable increase proposed in the capacity of the turbines makes necessary, in order to cope with the greater output, additional provision in the electrical apparatus. For apparatus of the increased capacity, and for interest upon the whole of the electrical works during construction, an amount of £80,500 must be added to the 1922 estimate, thus bringing the total estimated expenditure upon this section of the scheme to £277,000.

To summarize, the installation approved by Parliament in 1922 provided for plant of 25,800 h.p. at a total estimated cost for the whole of the hydraulic and electrical works of £551,370, *exclusive of interest during construction.* The amended scheme provides for an installation of 40,250 h.p. at a total estimated cost of £803,680, *inclusive of interest during construction.*

The economic results which are obtainable from the new proposal in comparison with the 1922 scheme are shown in the following tabulation :-

	1922 Scheme	1925 Scheme
Maximum Load (average year)	16,640 k.w.	25,000 k.w.
Estimated annual output (66,000 v. energy at Rubicon " A " Terminal Station)	115,000,000 k.w. hrs. (load factor 71 per cent.)	137,000,000 k.w. hrs. (load factor 62·7 per cent.)
Annual Charges	£59,182 (exclusive of interest upon interest during construction)	£76,936 (inclusive of interest upon interest during construction)
Annual cost per k.w. of Maximum Load ..	£3·56	£3·12.
Average cost per k.w. hr. (66,000 v. energy at Rubicon " A " Terminal Station)	0·137 pence	0·135 pence

Although the project in its present form is a substantial extension of that originally submitted, it is proposed to undertake at present only that portion of the amended scheme necessary to provide the output of energy on which the original scheme was authorized by Parliament. Therefore a section of the scheme, viz., that associated with the utilization of the Snob's Creek, will be held over until the growth of the demand justifies a recommendation that this section shall also be proceeded with.

During 1924 initial steps were undertaken to execute the construction of the scheme so that it could be in full operation by the winter of 1927, but this intention had to be abandoned owing to the curtailment of loan funds. This postponement was particularly regrettable, as the nature of the country at the site of the works is such that little construction work can be carried out during the winter months, and thus the valuable fine weather months of the year were lost.

While this delay gave opportunity for further detailed consideration of the amended proposals, it has proved, nevertheless, unfortunate, as the Commission now anticipates difficulty in meeting the winter demand of 1927 without the help of the Sugarloaf works.

A brief technical description of the proposed works is furnished in Part III. of this Report.

Future Extension of Power Stations.

Mention was made in our last Annual Report of the need for increasing the resources of generating plant in order to meet estimated demands during and after the winter of 1927. Considerable attention was given to this matter during the year, with the object of presenting a comprehensive recommendation as to the nature and extent of works for the purpose of generation and transmission of energy to be undertaken in the near future. Between the approval by Parliament of any such extensions and their actual execution ready for operation, a period of from two to three years must necessarily elapse. Inasmuch as the growth of the demand for electric services throughout the State is likely to continue, as in the past, at the rate of about 12,000 to 18,000 kilowatts per year, it will be obvious that it is the duty of the Commission to look well ahead, otherwise a serious shortage of generating capacity would inevitably arise, reminiscent of the very unfortunate experiences of this State in the earlier post-war years.

It must not be overlooked that the State Scheme *is a super-scheme* ; in other words, that it is already a combination of several self-contained schemes, and that it is on these lines alone that it can successfully develop in the future. The day of isolated power houses, each depending on a separate source of power and having no connexion with any other power house, is now past in all progressive countries. The grouping of schemes for electric supply into super-schemes, a process rapidly maturing in Great Britain, Canada, and the United States of America, is the only means of achieving the highest economy of invested capital, and the best guarantee of continuous and reliable service.

As related to this question, the Commission's Mechanical Engineer, Mr. C. T. Briggs, was instructed to proceed abroad in May of this year to make full inquiries into recent developments in power station design and operation, and he will also visit the principal power stations in the United Kingdom, Central Europe, and the United States of America. The information thus obtained will be invaluable in the preparation of the Commission's recommendations to the Government, and in the detailed design of the works of power generation to give effect to such recommendations.

The Engineer-in-Charge of Coal Supply, Mr. J. M. Bridge, left for Europe and United States of America early in the new financial year, and will collaborate with Mr. Briggs during the inspection of the brown coal fields in Germany. Both officers will work in close touch with Mr. Commissioner Swinburne, who has recently made a close inspection of the methods of operation and general conditions obtaining on the Continental brown coal fields.

ELECTRICITY SUPPLY IN MILDURA.

An electricity supply scheme of some importance came under the consideration of the Commission in the past year.

The Mildura Town Council, which is the undertaker under the Electric Light and Power Act for the Town of Mildura, intimated to the Commission that the existing plant was loaded to full capacity, and sought advice as to the best course to follow.

The Commission had previously noted this problem as one likely to arise, and had concluded that the needs of the district could be more economically met by the installation of a central generating plant. Such a station could deal not only with the demands of the electric supply consumers in Mildura and such centres as Redcliffs, Merbein, Birdwoodton, and Irymple, all of which had been clamoring for supply from the Council's undertaking, but also with the important pumping plants which serve these centres for irrigation purposes. In addition, power is required by the Water Trust at Mildura for the town water supply.

At the present time separate generating plants supply the requirements of the Town of Mildura, the pumping plants at the centres mentioned, and the Mildura Water Trust.

The Council engaged as Consultant, Mr. A. G. M. Michell, M.C.E., who prepared a scheme providing for the establishment of a modern steam turbine generating plant at Mildura capable of dealing with load up to 1,000 kilowatts in the next two to three years, and of expansion to meet further demands. Such a scheme, it was estimated, would cost approximately £100,000 in its first stage. The proposals also provided for the temporary installation of additional generating plant in the existing power station to ensure continuity of supply, and to deal with a certain amount of additional load until the larger station could be brought into operation.

Those centres remote from the proposed main station would be served by means of high tension transmission lines operating at 22,000 volts.

The first stage of the Scheme did not include the supply of energy to drive the various pumping plants under the control of the State Rivers and Water Supply Commission. It is clear, however, that with the co-operation of that Commission, much can be accomplished in this comparatively isolated yet highly important part of the State in the direction of ensuring that the State itself, in so far as its own undertakings are concerned, moves with modern power development, of which the proposed central power station is a concrete example.

The proposals submitted by Mr Michell were dealt with by the Commission under the powers conferred by Section 18 of State Electricity Commission Act, No. 3265, which requires that any extensions of existing generating plant for public supply be submitted to it. The Council, having been notified that the Commission was in entire agreement with the scheme as drawn up, then took the necessary steps to obtain authority to enable it to finance the scheme. This involved the passing of a special Act of Parliament in December last authorizing the Mildura Town Council to borrow up to £100,000 for this purpose.

INDUSTRIAL.

At the 30th June, 1925, there were 2,594 men in the Commission's employ distributed over the following activities :—

	Permanent Operation.	Construction.
Yallourn Works	767	613
Brown Coal Mine (Old Open Cut)	385	..
Metropolitan Works	104	275
Transmission Lines	..	335
District Undertakings	92	..
Water-power Investigations	..	23
	1,348	1,246

During the year four minor disputes occurred between the Commission and its employees, but none of these disputes had the effect of causing the cessation of the Commission's main operating activities.

ELECTRIC LIGHT AND POWER ACT 1915.

A number of electric supply undertakers made application during the year for authority to increase their charges for electrical energy, and after close investigation of the merits of each application the Commission decided to recommend to the Governor in Council that increases be approved in the following cases :-

Supply Authority.	Ruling Price	Price recommended by Commission.
Federal Milk Pty. Ltd., Cohuna	9d. per unit	Lighting 1s. per unit Other purposes, 9d. per unit
Casterton Electric Supply Co. Ltd., Casterton	10½d. per unit	1s. per unit
Inglewood Borough Council, Inglewood ..	10d. per unit	1s. per unit
Coleraine and Western District Butter Factory Co., Coleraine	1s. per unit	1s. 2d. per unit
Castlemaine Electric Supply Co. Ltd. ..	Lighting, 9d. per unit	Lighting, 1s. per unit
	Power, 4½d. per unit	Power, 5d. per unit
Winchelsea Shire Council, Lorne	1s 3d. per unit	1s. 3d. per unit with minimum monthly charge of 4s. 6d.
Commonwealth Electric Co. Ltd., Rochester	Lighting, 9d. per unit ..	Lighting, 1s. per unit
	Power, 6d. per unit ..	Power 7d. per unit

Since the passing of the Electric Light and Power Act in 1896, 181 Orders in Council authorizing the supply of electricity have been granted. Of this number, 105 were issued to municipal councils and 76 to companies or persons. Thirty Orders in Council have been revoked, including a number covering electric supply undertakings that have now passed to the control of the Commission.

The following is a list of applications for Orders in Council recommended by the Commission during the year and approved by the Governor in Council :-

Name of Applicant.	Area.	Maximum Prices.	
		Lighting.	Power.
Korong Shire Council ..	Townships of Wedderburn, Korong Vale, and adjacent territory	1s. per unit ..	6d. per unit
Violet Town Shire Council ..	Portion of the township of Violet Town ..	1s. 3d. per unit ..	6d. per unit
Hepburn Springs Electric Supply Co. Ltd.	Township of Hepburn and Hepburn Springs ..	1s. 3d. per unit ..	10d. per unit
Lawloit Shire Council ..	Townships of Kaniva, North Lillimur, &c. ..	1s. 3d. per unit ..	6d. per unit

LICENSING OF ELECTRIC WIREMEN.

The following statement sets out the number of licences issued to 30th June, 1925, and also the number issued during the period covered by this Report :

Grade.	Number issued to 30th June, 1924	Number issued from 1st July, 1924, to 30th June, 1925	Total.
"A"	1,221	63	1,284
"B1"	..	59	59
"B"	600	94	694
"C"	769	127	896
Special Licences	27	6	33
Permits	1,838	331	2,169

Reference was made in our last Report to the Education Department having undertaken a revision of the syllabus for its Technical Schools' course in electric wiring, the object being to bring the work into line with the requirements of the Commission and at the same time make the course of greater service. The Department completed the revision during the period, and the revised syllabus was adopted by the Commission.

The Rules were amended to provide certain concessions to those technical school students who satisfactorily complete this revised course.

Experience with the administration of the Rules revealed anomalies in the existing procedure of requiring the same range of knowledge and proficiency in practice for "A" and "B" grade candidates, and in requiring these candidates to pass the same practical examination.

This factor, coupled with the inconsistency of such procedure with the syllabus as revised, caused the Commission to amend the requirements for "B" grade examinations, both in theory and practice. The amendment resulted in the examinations for this grade of licence being made to comprise all the knowledge and experience necessary for work pertaining to house wiring for lighting, for the installation of fans, radiators, small motors, and other uses generally, up to the limit of low pressure, 250 volts. Persons obtaining a minimum of 75 per cent. marks in both theoretical and practical examinations were permitted to undertake such work without the supervision of a holder of an "A" grade licence. Persons securing only sufficient marks for a pass in the "B" grade examination were permitted to work only under the supervision of the holder of an "A" grade licence or the more fully qualified holder of a "B" grade licence.

In the case of the "A" grade licence it was decided to adhere to the present requirements of full knowledge and ability to undertake electric wiring work of all description, including motive power in its larger application.

The Governor in Council approved of the amendment of the Licensing of Wiremen Rules to give effect to the above decisions.

During the year two examinations in theory and practice were held. An analysis of the results shows a slight improvement on last year's results, but the Board of Examiners reports that a considerable proportion of the candidates still lack the knowledge and training called for in the examinations.

YALLOURN TERRITORY.

Township of Yallourn.

Dwellings.—Contracts embracing 112 houses were brought to completion, making a total of 255 dwellings in the town. The whole of these are occupied. Although economy in construction necessitated standardization in the fittings and in the accommodation of the different classes of houses, the buildings are not wanting in variety. Most of the 45 types designed are represented in the town. The erection of the large number of dwellings at Yallourn, where the conditions differ widely from those of Melbourne and environs, has been most satisfactorily carried out under contracts providing for labour only, the materials being supplied by the Commission. These arrangements have been productive of economical results.

In the anticipation that there would be funds available for the prosecution of further township works, particularly in the erection of additional houses required to fulfil outstanding applications from operating employees, further designs of wooden houses of economical construction, but of comfortable design and equipment, were prepared, special attention being given to the provision of a class of house suited to the requirements of the lower-paid employee. These plans had to be indefinitely postponed, as well as essential road-making and drainage works, some of which it was particularly desirable to have constructed in advance of any new housing construction.

Other postponed works were those of the boarding-house for single men and of the hotel. While temporary measures enable the provision of accommodation for single men to be partly overcome, the absence of hotel accommodation means that there is no accommodation at all for persons having business in the town or for other visitors. Sly grog selling, of which the recent prosecutions are evidence, is considered to be a direct outcome of the fact that no hotel has been provided. This is a position which, cannot, in the best interests of the Commission's employees and of the town, be permitted to continue longer than can be avoided.

Halls and Civic Buildings.—During the period the Methodist Church erected an Assembly Hall in a central site allotted to that denomination, and the Presbyterian Church authorities had in hand the construction of a similar building.

The State School building, designed to accommodate 350 children, was brought to completion and occupied. The average attendance of scholars was 230. The school has its own septic tank sewerage system. At the 30th June, the branch office of the National Bank was completed and occupied, and the Post Office and the State Savings Bank were approaching completion.

At the request of the Railways Commissioners the Commission undertook the erection of the railway station and two houses adjoining the station for the use of the local staff. At the end of the year the work was well in hand.

The whole of the public buildings in the Town Square were connected to the recently-installed septic tank sewerage scheme.

Fire Brigade.—The erection and equipment of the Fire Station was completed during the year, thus affording further facilities towards better insurance against fire risk in the territory.

Parks and Gardens. -Tennis courts have been laid down and a pavilion erected in the recreation reserve, providing facilities for this branch of recreation. Welfare work of this nature is carried out on a co-operative basis, the residents providing free labour.

Up till recently the sports oval situated near the Eastern Construction Camp had been used for the major sporting activities, including football and cricket, but with the advance of overburden removal operations and the consequent dismantling of the Eastern Construction Camp, it became necessary to make other arrangements. The site allotted in the original layout of the town was accordingly made available. A commencement was made about the close of the year with the clearing of the new site, which is located on the side of the railway line opposite to the township, and adjacent to the brickworks.

In the recently established nursery, plants, shrubs, and trees have been propagated and acclimatized for use in the streets, public reserves, and private gardens. The first stage of the scheme for planting of trees in the reserves and streets was about to be undertaken at the close of the year.

Roads and Streets.—The road and street construction programme received a setback owing to the financial position, but certain road, street, and drainage work, which could not be postponed without serious detriment to occupiers of the houses, was undertaken. It is of interest that the majority of the streets in the town have been constructed of Cowwarr gravel, the main roads, however, being metalled and tar surfaced.

General Store.

With the growth of the township the large store established in the town increased its turnover, and, as forecasted in our last Report, extensions in the store's operations, and therefore to the buildings, were found to be necessary. The activities of the store now include groceries, wearing apparel, footwear, dressmaking, haberdashery, newspapers, and books; and further extensions are in contemplation to meet growing demands. Notable among the contemplated extensions are those for bakery and butchery establishments, which were ready to be proceeded with, but, as with other town works, had to be held in abeyance.

The retardation of the natural growth of the activities of the store is a matter for regret, as it has been the policy to undertake extensions to meet the increasing requirements of the residents.

A steady business took place at both the Construction Camp branch stores, but with the considerable diminution of construction work the business in these was not as large as in the preceding year. The future of the Eastern Camp Construction Store is definitely limited on account of the advance of coal supply operations.

PART II.—FINANCIAL AND COMMERCIAL.

ANNUAL ACCOUNTS.

The general Balance-sheet, together with summarized Profit and Loss Accounts, and the Balance-sheets of the various District Undertakings and of the other activities of the Commission are contained in Appendix No. 1 hereof.

Much has been said concerning the alleged failure of the Commission to produce a Profit and Loss Account and Balance-sheet of its operations, but such comment entirely ignores the fact that in each of the five preceding annual reports there has been incorporated a full statement of accounts. Now, however, with the commencement of operation of the major activities, it is possible to present comprehensive Balance-sheet and Profit and Loss Accounts for the whole of the undertakings. As will be noted from later comments, such undertakings cannot yet be considered as operating on anything like a full commercial scale.

Capital Expenditure.

The capital expenditure at the 30th June last amounted to £7,246,767 11s. 1d., excluding interest during construction, compared with £6,036,422 15s. 11d. at the 30th June, 1924.

The following tabulation shows the capital expenditure of the Commission since its inception to the date of this Report :-

1919–20	1920–21.	1921–22	1922–23.	1923–24.	1924–25.
£ 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

These figures do not include interest during construction.

Liability for Interest incurred during the Construction Period.

On the question of the Commission being called upon to carry the liability for interest during the construction of capital works we take the liberty of again bringing to your notice comments published in the Fifth Annual Report, as follows :-

> "By the provisions of the State Electricity Commission Act, No. 3239, Parliament has placed upon the Commission the liability for interest on expenditure on all capital works during the construction period.
>
> At the 30th June, 1924, this liability amounted to £356,697 13s. 3d., and it is anticipated that before the various activities can be brought into full operation an amount of at least £730,000 will have become involved. This will represent an addition to the operating expenses of the Commission of not less than £43,000 per annum. It must be emphasized that for all time this annual charge will continue as a heavy burden on the Commission's undertakings, unless some other method of treatment than that provided for by Parliament is arrived at. Obviously, this burden must affect the financial results of the Commission's operations.
>
> It must also be pointed out that this charge was not included in the preparation of the estimates of any of the schemes submitted to the Government and presented to Parliament prior to August, 1922.
>
> On the contrary, the Commission's published reports on all these schemes specifically state in every case that in the estimates submitted no provision has been included to cover interest during construction.
>
> Furthermore, this was, up to the date named, done consistently, because there is no instance within the knowledge of the Commission in which such a burden has been placed on any State undertaking throughout Australasia."

At the 30th June, 1925, the total of the Commission's liability for this item was £514,641 18s. 1d. It has progressively increased to this amount from £183,042 16s. 10d. at 30th June, 1923, when this decision was first given effect to.

On the Sugarloaf-Rubicon Hydro-electric Scheme it will represent an amount of not less than £56,000.

The above reference to £43,000 per annum as an addition to operating expenditure for interest upon the amount of this liability cannot be taken as representing the limit of the anticipated additions to operating expenses due to this decision.

With the development of the generation and distribution of electricity, and the manufacture of briquettes, the cost of operation will include these additional interest charges. This increment must, of course, be carried by the customers for such services.

Our object in again referring to Parliament's decision on this question is to make known its effect on the Commission's finances, for it represents a vital alteration to the form in which the schemes were approved by Parliament and entrusted to the Commission.

The factors mentioned are of material importance to future operations, and are regarded by the Commission as furnishing ample grounds for the review of this decision by Parliament before the item of interest upon the capitalized interest during construction becomes too burdensome.

Results of Operations for the Year.

Electricity Supply.—It must be realized that in a business of the nature and magnitude of the State Electricity Scheme it cannot be expected that the revenues which such a scheme is ultimately capable of earning will be collectable within the first year of operation.

On the one hand, various groups of generating plant necessarily become available, one by one, at intervals spread over a considerable period. On the other hand, the load which these plants are capable of carrying cannot be placed upon them in a single process. It is the consumers, and they alone, who determine the load to be carried from day to day; and consumers cannot take supply until they have been "connected-up." The period occupied in the process of connecting of consumers is governed partly by financial considerations, and partly by the availability of the necessary equipment and labour, and involves extensive works in transmission and reticulation (both high and low voltage) in sub-stations, in conversion to modern standards and the like.

In the case of the present scheme, it is estimated that the process in question will occupy, from first to last, a period of two and a half to three years (of which period only one year has elapsed) before the present available generating capacity of 65,000 kilowatts will be fully loaded; and until that juncture arrives the revenues from the sale of bulk energy cannot reach their full development.

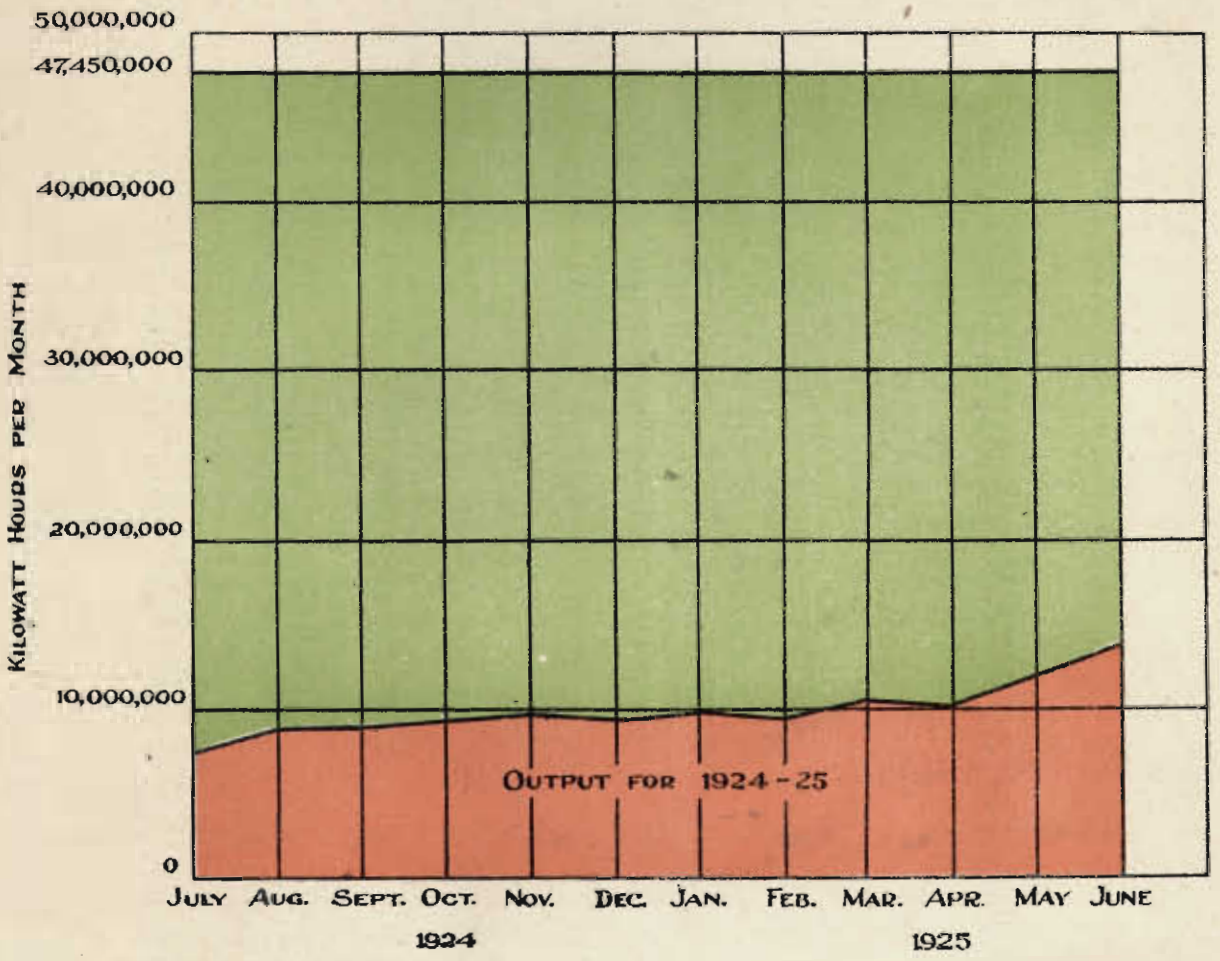
During the period of such development the interest on the capital investment commences from the outset, and it therefore follows that during the developmental stage the Profit and Loss Account must show a loss as between operating costs and revenue collected. As it would not be sound finance to defer this interest burden, or to charge same to construction, the Commission decided to debit to operation expenses the full interest charge of each group of plant as it became available for service. This applies equally to coal winning, electric supply, and briquetting plant. It was, in consequence, inevitable that, in the first year of operation, a substantial loss would result, which loss will, however, as is shown hereunder, be gradually eliminated as production, and therefore revenue develops.

The loss on the year's operations of the electricity supply undertakings amounted to £240,944 7s. 3d. As shown in the Profit and Loss Account for Metropolitan Bulk Supply system, the loss was incurred almost entirely upon these particular supplies.

The supplies comprised under this heading are those which are distributed from Yarraville Terminal Station, which is the main distribution centre in the metropolis. The reference to "purchase of energy" in the first item of the Profit and Loss Account is to energy generated at the Newport "A" Power Station of the Railways Commissioners for contracts made by that Department with large bulk consumers in the metropolis, such contracts having been transferred to and administered by the Commission as the sole statutory authority for the sale of electricity generated in State-owned power stations. The revenues from this source are paid to the Railways Commissioners, who have to bear the cost of production of the energy, and therefore such supplies are merely "book entries" in the accounts of the Commission.

We have explained elsewhere in this Report the extent of the supplies to large consumers in the metropolitan area, many of whom are municipal authorities engaged in the local distribution of energy. Bulk supply of energy to the Essendon-Flemington undertaking is included in this account, together with certain other districts, viz., the Eastern Metropolitan (Dandenong, Ringwood, Croydon, Lilydale, &c.), Werribee, and Altona.

Comparison of Actual Output for Financial Year 1924-25 with Maximum Available Output of Yallourn & Newport "B" Power Stations.



In order better to appreciate the bearing upon finance of the present initial or developmental stage of the undertaking as a whole, reference should be made to the subjoined diagram, which compares the actual demand on the Yallourn and Newport "B" Stations throughout the past year with the demand that it will be possible hereafter to meet from these stations when in full operation.

It will be apparent that a considerable increase in the load on these stations must arise before they can be regarded as operating under conditions approaching maximum load, and therefore the past year's figures do not present a reliable indication of the results to be achieved from the scheme.

A bird's-eye view of the position as regards the revenue from the sale of electricity for bulk supply may be obtained from the following brief analysis :—

	£
Gross revenue from bulk sales for 1924–25 was	492,224
Deduct purchased energy	211,112
Net revenue from sale of bulk energy generated by the Commission was	281,112

The amount of this bulk energy actually sold during the twelve months ending 30th June, 1925, was 101,000,000 kilowatt hours.

The amount of bulk energy which the system is capable of supplying at the present average load factor is 320,000,000 kilowatt hours, or a quantity roundly *three* times that actually sold last year.

The average sale price per kilowatt hour for the energy actually sold during the year was 0·665 pence.

Assuming that the full anticipated output, at present load factor, will be sold at no higher than above average price (i.e., disregarding the increases in load factor and in diversity factor which may reasonably be expected to accompany increase in output), the revenue from bulk supply, when the system is fully loaded, may be expected to reach £890,000, or a sum of £608,888 in excess of the past year's actual net revenue as above set out.

It should be noted that operating costs will not increase in anything like the same proportion, inasmuch as most of the "overhead" and "standing" charges are already at their maximum. The main "variable" item of operating cost is the coal, which is, however, small compared with the total of the fixed annual charges.

Brown Coal Mine—Old Open Cut.—The amount of sales, £92,684 5s. 1d., includes delivery of the coal to the main power station, in addition to the supplies of coal sent to the metropolis and elsewhere for industrial and household use.

Briquette Manufacture.—This factory was in commercial operation for only the last five months of the financial year, and during these months was being gradually brought to full output. In later months, however, the factory gave an output of over 9,000 tons in a month, thus confirming the output for which the plant was designed. During this initial period of operation it was being steadily brought to the efficiency for which it was planned.

In Germany, where new briquetting factories and open cuts are within a few hours' call of technical experts in every department of briquetting, the usual experience is that there expires a period of three months from the time of starting up a factory before marketable briquettes are manufactured.

With the factory at Yallourn, where there are no such advantages, and with no previous experience in the process of briquetting or the special treatment required for coal won from an entirely new field, a marketable briquette was produced within less than three weeks from the time of commencing operations. This would be regarded on the Continental brown coal-fields as a highly creditable performance, even with expert technical advice readily available.

In order to realize the full benefit in a commercial sense of the results obtained it is necessary considerably to increase the output. This can only be achieved by the extension of the factory on lines already recommended to the Government, and which have been fully dealt with elsewhere.

District Undertakings.

General.—Before dealing with the results in each district there should be noted the following features of the year's operations with respect to this phase of the Commission's electricity supply activities :—

(*a*) The total number of consumers connected to the mains increased from 12,787 at 30th June, 1924, to 20,230 at 30th June, 1925, an increase of 7,443 consumers for the year, or 58 per cent.

(*b*) No less than 23 new country or extra metropolitan centres of demand were served. Of the 53 towns in which the local distribution is controlled by the Commission 31 had no electric service until served from the State scheme.

(*c*) There are now 22 factories for the production of butter and milk products served by the Commission in the Gippsland and South Western District.

(*d*) Electric stoves and ranges already connected number 81, more than half of which are in country districts. No tally of the smaller heating and cooking appliances is available. However, the fact that there are known to be 50 grillers connected in the South-Western District alone is some indication of the development of the use of electricity for domestic use as a direct result of the operation of the recently introduced two-part tariff.

Detailed statistical information relating to each district appears in the tabulation herewith, and the following comments should be considered in the light of these statistics :—

Essendon-Flemington District.—Satisfactory financial results were achieved even after the substantial reduction in the tariffs, more particularly for industrial consumers, brought into operation concurrently with the two-part tariff on 1st January, 1925, and after provision was made for the writing off over a short period of the old direct current power station building and equipment taken out of commission upon the advent of transmitted energy from the State Scheme.

Important extensions of mains were those to supply Pascoe Vale and Glenroy in the northern part of the area, and to the west for the purpose of supplying the factories of the Defence Department in Maribyrnong.

South Western District.—The result of operations may be regarded as satisfactory when it is considered that there were connected during the financial year no less than eighteen centres of supply, ten of which were connected at varying times during the last eight months of the year. With these supplies included in the next year's operating results a decided improvement will appear in the financial position of the district.

The new centres comprised Alvie, Allansford, Birregurra, Barwon Heads, Bostock's Creek, Bullock Swamp, Dalvui Lane, Kolora, Larpent, Moolap, Nalangil, Noorat, Ocean Grove, Ryan's Lane, South Warrnambool, Winchelsea, Warrion, Wool Wool.

Gippsland District.—The surplus on operations is encouraging, especially taking account of the nature of the territory served by the Gippsland transmission lines which makes for decided difficulties in the administration of the territory, both from an operation and a purely commercial point of view. The results are the more satisfactory when it is considered that no less than ten of the centres now supplied were not linked to the system until after the beginning of the period, and of these the towns of Korumburra and Leongatha, which rank among the most important of the centres served in this district, were not supplied until December, 1924; the town of Maffra being connected in November of that year.

The new centres supplied were Heyfield, Drouin, Boolarra, Korumburra, Darnum, Cowwarr, Mirboo North, Maffra, Sale, Leongatha.

Eastern Metropolitan District.—As already mentioned, this is a new district created for handling those eastern centres adjoining the metropolitan area in which the Commission controls the local distribution. During the year six new centres were linked to the system, viz., Spring Vale, Noble Park, Ringwood, Croydon, Kilsyth and Montrose, and Lilydale. These last four were not transferred until April, 1925, and since Ringwood particularly is an important and growing centre, it would not be correct to form any conclusions on the figures appearing in the Profit and Loss Account, seeing that the undertakings mentioned were in operation, as far as the Commission's system was concerned, for three months only during the financial year.

Sufficient experience was, however, gained to justify the anticipation that entirely satisfactory results can be achieved in this territory.

Metropolitan South-western District.—The district comprises the local reticulation in Werribee and the bulk supply given to the Defence Department for the Aviation School at Point Cook. The year's results reveal a progressively increasing demand.

COMMISSION'S ELECTRIC SUPPLY UNDERTAKINGS FOR LOCAL DISTRIBUTION.

	Grand Total.		Essendon-Flemington District.		Eastern Metropolitan District.		Metropolitan South-West District.*		South Western District.		Gippsland District.		North Eastern District.†
	1924-25.	1923-24.	1924-25.	1923-24.	1924-25.	1923-24.	1924-25.	1923-24.	1924-25.	1923-24.	1924-25.	1923-24.	1924-25.
No. of Consumers ..	**20,230**	12,787	**9,897**	8,461	**2,246**	826	**497**	257	**3,683**	2,582	**2,881**	661	**1,026**
Sales of Energy—													
Lighting	**3,207,917**	1,744,521	**1,797,678**	1,408,397	**244,405**	88,725	**60,098**	10,223	**528,500**	192,852	**486,931**	44,324	**90,305**
Power	**6,886,148**	2,732,454	**5,097,832**	2,527,705	**140,887**	24,933	**532,313**	6,370	**646,510**	136,351	**440,866**	37,095	**27,740**
Public Lighting ..	**807,251**	304,427	**543,625**	235,424	**43,837**	14,122	**24,907**	2,841	**108,973**	41,278	**68,938**	10,762	**16,971**
Total Units Sold	**10,901,316**	4,781,402	**7,439,135**	4,171,526	**429,129**	127,780	**617,318**	19,434	**1,283,983**	370,481	**996,735**	92,181	**135,016**
Revenue from Sales ..	**£159,284**	£84,745	**£79,730**	£65,086	**£10,057**	£4,119	**£5,691**	£716	**£36,170**	£11,306	**£22,586**	£3,518	**£5,050**
Maximum Demand of District in k.w. ..	**4,313**	2,568	**2,462**	1,726	**300**	113	**131**	65	**732**	529	**532**	135	**156**
Total Connexions in k.w.	**22,382**	11,723	**11,824**	9,380	**2,410**	(Not available)	**628**	(Not available)	**3,815**	1,922	**2,980**	421	**725**
No. of Motors ..	**1,125**	599	**482**	386	**78**	30	**26**	18	**277**	146	**206**	19	**56**
Total h.p. of Motors ..	**7,178**	3,322	**3,413**	2,045	**683**	322	**307**	204	**1,311**	605	**1,227**	146	**237**

* Including Altona district. † Operations were not commenced in this district until 1924-25.

Altona District.—This district includes supply to the town of Altona and certain bulk supply consumers, the largest being Commonwealth Oil Refineries Limited. Again the accounts do not give a true indication of the possible operating results, since Altona did not receive supply until December, 1924, and consumers were being connected to the mains gradually for the remainder of the financial year.

North Eastern District.—Here the Commission is operating two isolated undertakings, in the sense that they are not yet linked to the Commission's transmission system, each having its own small generating plant. Supply was commenced in Echuca in November, 1924.

In the case of Shepparton the Commission assumed control on the 1st January, 1925, the undertaking having been formerly owned by the India Rubber, Gutta Percha, and Telegraph Works Co. Ltd. This change in control was in accordance with an agreement entered into between the Government and the company, and was effected at the request of the local shire council, which did not desire to exercise its option of acquiring the undertaking, in view of the fact that early supply was anticipated from the Sugarloaf-Rubicon Scheme. This supply is expected to be available in Shepparton early in 1926.

The figures appearing in the Profit and Loss Account are not a true indication of a normal year's operating results, because they could not cover a full year. Nevertheless, entirely satisfactory results are revealed.

When the transmitted supply is available in these centres, the generating plants will be taken out of commission, and any loss thus incurred will be written off over a very short period. Both the municipal councils concerned realize that provision for this writing off must be made in the Commission's tariffs, particularly in the early stages of transmitted supply, and they have expressed their concurrence in this course.

PART III.—DESIGN, CONSTRUCTION, AND OPERATION.

COAL SUPPLY BRANCH.

YALLOURN OPEN CUT.

Description of Coal Supply Scheme.—As the principal activities comprising the Morwell Scheme as authorized by Parliament in 1919 were almost completed at the close of the year, the opportunity is taken to describe the extent of the development which has taken place with the open-cut operations. A commencement with these operations had necessarily to be made well in advance of the operation stage of the power station and the briquetting plant.

An appendix to the Commission's report of November, 1919, consisted of a report by Mr. Lindesay C. Clark, Consulting Engineer for Coal Supply, which recorded the results of his investigations of the cost of winning coal on the Yallourn field, and included a general arrangement for the layout of the open-cut operations. At that stage, of course, no detailed plans were made; a definite scheme for these works was, however, prepared at a later stage concurrently with the design of the power station, the site fixed for the latter plant determining to a great extent the point of opening up the field.

A commencement was made with the removal of overburden about June, 1922, as soon as the necessary plant had been obtained and erected on the ground, and coal-winning operations for supply to the power station were in their initial stages by June, 1924.

The paramount consideration is, however, coal production, and adequate time must elapse before ultimate normal operating conditions are reached, using the three coal faces as designed for the open-cut workings.

Following are described the more important features of the scheme and the larger items of plant at present in operation. For the ultimate development it will be necessary to bring into operation further plant than that mentioned hereunder:—

(*a*) *Overburden Removal.*—The area being worked is located close to the northern limit of the coal deposit, as determined by boring. The overburden varies from 20 feet to 40 feet, with an average of 28 feet in thickness, and consists of sand, sandy clay, and gravel. Stripping was started from the western end, the method of operation consisting of taking parallel strips 35 feet wide off the eastern side of the open cut, and on the completion of each north to south cut, the conveyors are moved 35 feet to the east, and the operation repeated.

The excavating machinery consists of one Bucyrus shovel, No. 175B, weighing 200 tons, equipped with a bucket of 3½ cubic yards capacity water level.

For overburden disposal conveying belts are installed in order to reduce the amount of time which would be lost in waiting for trucks, and in order to avoid trouble due to the presence of heavy weights on the green dump. As the steam shovel intermittently excavates and discharges large masses of material, which are quite unsuitable for transference by belt conveyor, it was also necessary to install "feeders" to take the discharge from the shovels, reduce it to a suitable size for the belts, and feed it to them in an even stream.

The spoil dump is up to 60 feet in height, and the required capacity is obtained by swinging the conveyor stacker in an arc of a circle in order to widen the top of the dump, and obviate unduly increasing its height. Its normal width on the ground surface is 435 feet, and 255 feet at the crest.

An early commencement is also to be made with the expansion of the open cut in a southerly direction.

(*b*) *Coal Winning and Supply.*—The coal is continuous throughout the area, and varies from 120 feet to 180 feet in thickness. It is excavated by one Ruston electric shovel, weighing about 420 tons, capable of dealing with approximately 2,500 tons in an 8-hour day. The bucket can cover an area of 98-ft. radius against a 75-ft. coal face, and excavates and loads about 6 tons of coal at each bite.

One 150B Bucyrus steam shovel similar to that in use on the overburden, but of smaller size, is also used.

A travelling loader takes the discharge from the shovel and delivers the coal direct to the trucks of an endless ropeway haulage system after it has been reduced in the loader to a suitable size.

This haulage leaves the open cut at the south-west corner, and rises on a 7½ per cent. grade to the screening house, where it dumps the coal into the receiving hoppers.

The screening plant is situated over the railway sidings, and is capable of delivering the coal at will (*a*) to the railway trucks, (*b*) to the haulage to the power plant, (*c*) to the haulage to the briquetting plant, (*d*) to concrete storage bins.

From the receiving hoppers the coal is fed to vibrating screens, which separate the medium size coal of from ¼ inch to 2½ inches in size from the remainder of the product.

To offset possible irregularities in delivery and transport, storage bins with a capacity of 2,500 tons are provided to the east of the screening plant: the coal which goes to the storage is elevated from the screens by inclined belt conveyors delivering the various sizes to the required storage pocket. The material is delivered from these bins to the same points as the direct delivery from the screens.

The medium sized coal from the screens is delivered to the automatic loaders of a haulage system similar to that used for the transport of the unscreened coal, and the coal is automatically dumped into the receiving hoppers of the power station. The large coal and slack goes to separate automatic loaders, is transported by separate haulage, and delivered into the receiving hopper at the briquetting plant.

Operations of Open Cut for 1924–25. -The removal of overburden extending the open cut eastwards was carried on during part of the period, only one power shovel operating on a two-shift basis being employed.

The shovel and the conveyor disposal apparatus worked satisfactorily, removing and dumping 240,510 cubic yards of overburden, place measurement. The total quantity of overburden removed since operations commenced is 1,142,040 cubic yards, and the area of the surface of the coal thus exposed is now 29 acres.

Preparations were in hand at the close of the period for the commencement of overburden removal on the south side of the open cut already referred to.

Coal excavation was carried out by one power shovel during the whole of the year. The large electric shovel manufactured by Messrs. Ruston and Hornsby was erected and brought into operation at the latter part of the period.

The travelling coal loader, the electric shovel, and the rope haulages from the open cut to the screening house, and from the screening house to the power station and briquetting plant, were all brought to completion and put into successful operation in conjunction with the screening plant.

The total output of coal for the year was 442,560 tons, all of which passed through the screening house.

The haulage between open cut and screening plant was extended into the open cut in order to take the coal directly from the shovel through the loader.

The installation of the coal crushers, with transporting belts and scrapers, for recrushing the large lump coal was almost completed.

The erection of the reinforced concrete storage coal bins was completed and the conveyor belts installed for delivering the coal to the bins from the screening plant.

With the object of increasing the efficiency of operation initial steps were taken for the installation of reclaiming belts under the bins and for the extension of the screening house belts to bring all coal from the screens and from the storage bins to one central point for loading into the rope-haulage trucks.

Old Brown Coal Open Cut.

The total output of coal for the year was 170,966 tons, and the overburden removed 196,542 cubic yards.

As the available coal on the south side of the cut was limited in quantity and was being rapidly exhausted it became necessary to develop a further coal face, and work was commenced in March on the removal of overburden from the west side of the pit. There a good supply of coal is available with a relatively small amount of overburden.

The channel that was cut last year for the diversion of the Latrobe River proved satisfactory, and is now carrying the normal flow of the river.

ELECTRICITY SUPPLY.

Yallourn Power Station.

During the year the power station buildings were completed, and all outstanding items of plant and material were delivered on site, enabling four generators of the five 12,500 kw. sets which comprise the installation to become available for service. Of the twelve boilers provided for eight were put into service, and the remainder were close to completion at 30th June. The official tests on those boilers now in service undertaken prior to taking over from the contractors showed that the plant fully complied with the requirements of the Commission's specification. Practically all the auxiliary plant associated with the boiler installation was erected during the year.

The ash handling plant was placed in service in December, and the first section of coal telpher plant put into operation in October; the complete telpher plant was in commission by June of this year.

For the year ended 30th June, 1925, the coal consumption of the Yallourn Power Station totalled 263,800 tons, made up of new cut coal 187,235 tons, and old cut coal 76,565 tons. These two grades of coal are burned separately in different boilers, and are not mixed in any way for firing purposes.

The whole of the electrical gear at the power station, which has been completed for some time, operated satisfactorily.

In Appendix No. 5 is a detailed statement of the items of plant comprising this station.

The temporary power station continued to supply Yallourn territory and the Gippsland District until the 1st September, 1924, when the load was transferred to the main power station, and this temporary installation dismantled and disposed of.

One portion of the new installation, namely, the coal handling telpher plant, is of interest and calls for some brief description.

All coal from the open cut is delivered by haulage to the screening house, where it is graded into various sizes. From the screening house coal of a definite maximum size is automatically loaded into trucks and conveyed by a separate haulage to the power station, where it is automatically dumped into a 100-ton receiving hopper situated at one end of the boiler house and midway between the boiler house and coal store.

The capacity of the coal store is approximately 40,000 tons, and the power station bunkers 2,400 tons.

The coal handling plant consists of electrically-operated telphers travelling upon overhead runways supported upon a steel trestle structure. Four lines of telpher tracks or runways extending over the receiving hopper and coal store converge at the boiler house building into two tracks extending over the bunkers. A system of manually-operated track switches situated at the points of convergence enables the coal to be distributed to both wings of the bunkers from any one of the four tracks over the coal store and receiving hopper.

Only those telphers operating on the inner tracks are able to load from the receiving hopper, and each of these is provided for this purpose with an automatic loading skip for handling coal either to the coal store or bunkers as required. When it is desired to use an inner track telpher for reclaiming from the coal store, the skip is replaced by a grab. Outer track telphers are fitted with grabs only, as they are used solely for reclaiming purposes.

The telpher runways and supporting structure have been made sufficiently substantial to enable six telphers to operate at any one time, so arranged that a pair of telphers reclaim from store to bunkers on each outer track, while a single telpher on each inner track delivers to the coal store from the receiving hopper.

Two telphers are in operation at present, and a third telpher will shortly be installed to meet the growing requirements of the station. Each telpher has a capacity of 125 tons per hour when delivering by means of skip from receiving hopper to either coal store or bunkers, and 60 tons per hour when reclaiming to bunkers from coal store.

Yallourn–Yarraville 132,000 Volt Transmission Line.

This important link in the scheme, together with its operating telephone line, maintained supply from Yallourn to Yarraville Terminal Station throughout the whole of the period without notable interruption.

Yarraville Terminal Station.

This station was brought into operation in June, 1924. Both the large frequency changer and the two synchronous condensers operating on the main transmission circuits were in practically constant operation, and no operating trouble was experienced with the machines. The switchyard and control installation was likewise entirely satisfactory in operation.

During the year a 5,000 kw. frequency changer acquired from the Melbourne City Council was installed for use as standby to the larger frequency changer. When the necessary gear for the control of this frequency changer comes to hand it will be available to supplement the output of the larger machine.

Newport "B" Power Station.

This station was operated in parallel with Yallourn Power Station by the Railways Commissioners on behalf of the Commission.

After Yallourn Power Station came into continuous operation Newport "B" Station was placed in commission only at the time of peak demand, which means that it operated on a two-shift basis during week days and not at all during week-ends.

This distribution of the load accords entirely with the Commission's intentions as to the extent that Newport "B" would be called upon to assist in meeting the demand on the system, it having been erected to operate primarily as a "peak" load station.

A statement showing the main items of plant installed at this station appears in Appendix No. 5.

Sugarloaf Rubicon Hydro-Electric Scheme.

We have already discussed in this Report the increased capacity that the hydraulic section of this scheme has been found to offer, together with greater flexibility in operation. Design work, requiring the services of survey parties in the field, proceeded during the year upon the lines of the amended proposals, and, together with the preparation of specifications, had reached a very advanced stage at the close of the period.

The scheme is based upon the construction of a hydro-electric station at the foot of the dam now under construction by the State Rivers and Water Supply Commission at the junction of the Goulburn and Delatite Rivers, about 12 miles east of Alexandra, and roughly 70 miles from Melbourne in a direct line.

The storage works have been constructed with a view to impounding sufficient water to permit of outflow during the irrigation season at the rate of 450,000,000 gallons per day. Under the hydro-electric scheme this water will first be discharged through turbines, and the resultant energy absorbed into the State scheme.

The two 9,000 horse-power turbines to be installed in this power station will be designed to operate under a head of water varying from 113 feet down to a minimum of 60 feet, according to the storage level in the dam.

Although it is estimated that the total output from the station during an average year will be approximately 51,000,000 kw. hrs., the power generated will be variable during the year, and dependent upon the storage necessities as well as the head of water in the dam. For example, it may be found necessary by the State Rivers and Water Supply Commission to stop all outflow of water for a short period in the winter for the purpose of allowing the reservoir to fill in anticipation of the next irrigation period.

Since a station liable to these restrictions would not by itself be the most advantageous source of power for the State Electricity system, which experiences the heaviest demand in that portion of the year when the total restriction of output from the Sugarloaf Station would be likely to occur, it has been found desirable to associate in a group with the Sugarloaf Station five additional stations in the same district operating upon stream flow, with but a restricted amount of pondage.

These are known as the "Mountain Stream" stations, and have the characteristics that the maximum output is obtained therefrom exactly at the period when the restriction is likely to occur upon the Sugarloaf Station.

The combination of these relatively inexpensive stations, in which the heavy cost of storage work is not incurred, with the Sugarloaf Station operating upon the storage dam results in a scheme capable of a well-sustained output throughout the year.

The plans provide for the following stations, in addition to the Sugarloaf Station :—

	Approximate H.P. Installed.	Net Operating Head.
		feet
Snob's Creek Power Station	5,200 ..	1,800
Rubicon Power Station	12,000 ..	1,380
Lower Rubicon Power Station	3,600 ..	270
Royston Power Station	1,000 ..	245
Rubicon Falls Power Station	400 ..	285

The total output of energy from the combined Sugarloaf-Rubicon scheme will be approximately 137,000,000 kw. hrs. per annum at the despatching station of the group, known as Rubicon "A."

The plans of the electrical features of the scheme provide for the complete supervisory operation of the whole of the power stations from the Rubicon " A " despatching station, each station being provided with completely automatic protective features. The operations of starting, shutting down, and observing the vital indications of every station will be performed from the despatching centre.

The generating voltage at all stations is 6,600 volts, a direct transformation to 66,000 volts being effected at Sugarloaf power station, while the remaining stations feed into a 22,000-volt bus at Rubicon " A " through transformers at the three larger " Mountain Stream " stations and overhead transmission lines

At Rubicon " A " the duplicate circuit transmission lines between the hydro-electric group and the Melbourne system will terminate.

Progress.—Concerning the progress of that section of the scheme which is required to be in operation by the end of 1925 in order to commence supply of Yallourn energy to towns in the north and north-east of the State, and bulk supplies to Albury and Corowa, until such time as hydro-energy is available from Sugarloaf, the following works were in hand at 30th June :

(*a*) Thomastown Terminal Station. The designs of this station were prepared and contracts placed for the plant and materials for its construction and equipment. The station is required to be in operation by the end of 1925, and a commencement was made with its erection about the close of the period, the work being undertaken by day labour.

(*b*) For the sub-stations to be erected at Benalla, Wangaratta, Shepparton, Springhurst, Wodonga, and Wahgunyah designs were completed and orders placed for the principal items of equipment.

(*c*) The first transmission lines undertaken were the 66,000 volt line from Thomastown to Benalla and the 22,000 volt branch line from Benalla to Wangaratta, these works being divided into three sections for purposes of construction, the progress of the respective sections being as follows :—

Thomastown–Sugarloaf Section.—Work was commenced in August, 1924, and 60 per cent. of the structures to support the conductors were erected and approximately 50 per cent. of the telephone line constructed.

Sugarloaf–Benalla Section.—Work commenced in March, 1925, and about 20 per cent. of the structures were erected and the conductors strung on this length.

Benalla–Wangaratta Section.— Work started in March, 1925, and about 60 per cent. of the structures were erected and about 30 per cent. of the cable strung.

Amplifying this reference to the transmission line works, it is to be noted that from Thomastown almost to Benalla the line must traverse country which is among the most rugged and heavily timbered in this State, and, since the route is at no part in close proximity to the railway, the problem of transport from the various railheads was most difficult.

There were also the consequential difficulties of provisioning the construction camps and of the retention of men who had not been brought up in the bush and who had not available to them the ordinary amenities of more closely-settled districts.

The progress made up to the close of the financial year reflected great credit on the whole of the construction staff engaged in the erection of these important main transmission lines Time is an all-important factor for this work, because certain contractual commitments were made for the commencement of supply by the end of 1925, and the excellent progress made justifies the anticipation that a supply should be available about that time.

In Appendix No. 6 there are photographs which show the nature of the country followed by the transmission line. On the route from Thomastown to Strathewen the poles for the " H " structures, each weighing a little over 2 tons, were transported from Whittlesea railway to varying distances up to 8 miles, partly by wagon along the roads, and partly by dragging with teams over the country where no roads existed. In a similar way drums of cable, each weighing about $\frac{3}{4}$ ton, insulators, and ironwork were transported, and where no roads existed such material was taken in sleds. Over the section between Strathewen and Glenburn the transport difficulties were found to be much more onerous, and it was necessary to carry material from Whittlesea over a distance of about 18 miles, first by motor lorry, then by horse team, then bullock team, then caterpillar tractor, such forms of transport being extremely arduous and costly. The difficulties were increased owing to severe grades, the absence of metalled roads, and in many cases the absence of roads of any description.

On the section from Yea River to the Murrindindi River, which was served from Yea as a railhead about 17 miles distant, transport was effected by motor lorry as far as the roads would permit according to the weather conditions, thence for many miles by bullock and horse teams.

On the section from the Murrindindi River to the Acheron River, near Taggerty, transport difficulties were also met with, but were materially relieved by the use of a timber tramway connected with the Cheviot Railway Station. This section crosses the Black Range, which is covered by huge stately trees forming the Niagaroon Forest, and thus enormous labour was involved in clearing a belt sufficiently wide, in some instances up to 300 feet, to ensure that a falling tree will not foul the line.

No special difficulties occurred between the Acheron River and the Sugarloaf Dam.

On the section from the Sugarloaf Dam to Maindample occurred the greatest transport and construction difficulties for the whole route.

The initial difficulty was the conveyance of structural material up the face of the Sugarloaf hill, on which the gradient is in places 1½ horizontal to 1 vertical. It is on this section that occurs the large span of 4,726 feet, which is one of the features of the line. The structures were erected on Sugarloaf Hill for one side of the span, which crosses the dam itself, to foothills on the other side. Material for the terminal structures on the north side of the dam, and steel cables for the conductors, will have to be transported by water from the south side, necessitating the construction of a small barge for the purpose. Bullock teams had again to be extensively used in this section, where the railheads used were Bonnie Doon, Maindample and Mansfield.

In one particular section a camp, owing to lack of water, had to be placed in a gully, and each morning the men had to climb 1,000 feet or more before commencing work, and descend to camp each evening.

From Maindample northwards no special transport or construction difficulties were encountered.

Both the wood and steel structures were, generally speaking, erected with the assistance of caterpillar tractors; but, in some cases, it was necessary to use bullocks, since it was quite impracticable for the tractors to be taken to the site.

From Thomastown to Maindample a telephone line of single circuit was erected along the transmission line route, but in the section between Sugarloaf Dam and the patrolman's cottage at Maindample this telephone line was for the greater part erected on trees in order to avoid the cost of transporting poles to this most difficult section.

Main and Branch Transmission Lines.

South Western District.- The main 44,000 volt line from Geelong to Warrnambool, with 6,600 volt feeders to Cobden and Mortlake, operated satisfactorily throughout the period in meeting the demands of the extensive area that lies within their range.

Mention was made in the Fifth Annual Report of the intention to construct further 6,600 volt branch feeders, and during the period feeder lines were erected to serve Birregurra, Warrion, Alvie, Noorat, Allansford, South Warrnambool, Barwon Heads, and Ocean Grove.

Gippsland District.—The main and branch lines in operation at the commencement of the period satisfactorily maintained service to Morwell, Traralgon, Tyers District, Moe, Trafalgar, and Yarragon.

During the year the extension of the Yallourn-Yarragon line to Drouin was undertaken and placed in service at 6,600 volts, the line being insulated for operation at 22,000 volts. For serving further farming consumers the line to the Tyers River District was extended.

The extension from Traralgon via Maffra and Heyfield, referred to in the last Report, was continued to Sale in accordance with the supply scheme approved by the Government, this line operating at 22,000 volts.

The branch line from Yallourn to Korumburra, via Boolarra, Mirboo North, and Leongatha, was completed and put into service, the line operating at 22,000 volts as far as Leongatha, and at 6,600 volts from Leongatha to Korumburra.

Eastern Metropolitan District. This District is served from the Commission's 22,000 volt subsidiary main running from Thomastown to Dandenong along the route of the main transmission line.

As a first step in the service of the district plans were prepared for the construction of a 6,600 volt branch line from Ringwood to serve the Ferntree Gully area, but the work was postponed owing to financial considerations. With the transfer of the Lilydale Shire undertakings to the Commission arrangements were finalized for the change-over from single to three phase supply in Ringwood and Croydon, so that the work could be undertaken as soon as funds permit.

A scheme was also prepared to serve Greensborough and Eltham.

The extension of the Commission's 6,600 volt system from Dandenong for supply to Spring Vale and Noble Park was completed, and supply given in these two centres. The line has been so designed as to be capable of conversion to 22,000 volt operation for future interlinking with supply of energy from a sub-station or terminal station at Richmond.

During the period the bulk supply given by the Commission to the Mornington Shire Council was converted from single-phase to three-phase supply.

Transmission Line Design.

The experience gained during the last two years in connexion with transmission work constructed has been of great value. From the commencement of its transmission works the Commission has made extensive use of aluminium conductors steel reinforced, and although, as was anticipated, the experience of operation has disclosed a number of elements in the design capable of improvement, the service from these lines has been maintained with a very high degree of continuity, and this, allied with the economy in construction afforded by this class of conductor, justifies its continued use in the Commission's operations.

After the earlier experience of the 0·065 square inch aluminium cored steel reinforced circuit erected on 400-ft. spans and supported on pin insulators on the Geelong to Warrnambool line (120 miles), where it was found necessary to reduce the stringing tension to correspond with the maximum tension under working conditions in the conductor of 1,200 lbs., it was considered advisable to re-equip the whole of the line with special insulator clamps capable of allowing some freedom to the conductor at the support. Following this the whole of the Gippsland lines, which were constructed at a later period, were so equipped.

The failure of conductors by fatigue at points of rigid support in long span work is not peculiar to this State, having caused some anxiety abroad, particularly in California, where transmission line conditions are somewhat similar to those in Victoria. The experience abroad indicated that the metals used for conductors have a characteristic "fatigue limit" of strength, which is dependent upon a "limit of proportionality" and the ultimate strength. An approximate formula connecting the three quantities being available, care has been taken in the design of future long span work in the Commission's service to avoid exceeding this "fatigue limit."

In designing the transmission line between Melbourne and the North East particular care was taken to avoid "fatigue" trouble, and in view of the fact that, in the Commission's experience, this has been associated principally with pin insulators on long spans, the 22,000 volt lines between Wangaratta and the Murray River and Albury and Corowa were designed for the use of suspension insulators, the ruling span being 600 feet.

On the Melbourne to Sugarloaf 66,000 volt line, the number of dead-end points was reduced to a minimum for the dual purpose of reducing the number of insulators under heavy stress, and minimizing the liability to fatigue of conductors.

The whole of the transmission lines between Melbourne and the North Eastern District were constructed with supports of ironbark timber, with the exception of the section between Melbourne and Sugarloaf, where steel towers were used in strain positions.

Except upon the main Yallourn to Yarraville 132,000 volt transmission line no overhead ground wires have been used anywhere on the Commission's system.

Metropolitan Distribution.

The principal features of the year's work under this heading were the construction of Sub-station "B" in the Collingwood area, with an installed capacity of 18,000 kva. in two transformer banks of 9,000 kva., and the construction at Ringwood, Preston, and Sunshine of outdoor transforming stations designed for an ultimate installed transformer capacity of 6,000 kva. With the completion of these works the Commission was enabled to make available bulk supplies to the whole of the metropolitan area and the area contiguous to the metropolis, with the exception of that part of the Melbourne Electric Supply Company's area not served by Sub-station "B."

This latter sub-station, on account of its importance as a bulk supply sub-station, was interlinked into the 22,000 volt underground cable network by the laying of two 0·15 square in. armoured cables to connect with Sub-station "J" in Spencer-street. Thereby the whole of this network from Yarraville Terminal Station to Sub-stations "D" (Ascot Vale), "C" (Brunswick), "B" (Collingwood), and "J" (Melbourne City Council Power Station, Spencer-street) back to Yarraville is operated as a continuous ring.

Plans were prepared for the provision of a three-phase supply in the industrial area of South Melbourne in lieu of the existing single-phase supply, the three-phase supply being based upon the installation at South Melbourne of a main 22,000 volt sub-station to be known as Sub-station "G," which will be served by independent circuits from the Yarraville Terminal Station. This sub-station will be interlinked with a 22,000 volt sub-station to be erected at the Melbourne Electric Supply Company's Power Station at Richmond, with a further link from Richmond to Sub-station "B."

To meet the increase in the number of bulk supply consumers in the metropolitan area a number of distribution sub-stations were added to the metropolitan 6,600 volt system, and are all in active operation.

Summary of Distribution Works for Electricity Supply.

Some conception of the extent of the distribution works associated with the State Electricity Scheme can be obtained from the appended statements, which show not only the works of transmission both overhead and underground and of sub-station provision undertaken during the period, but also the total extent of such works since the commencement of the Commission's activities.

One important feature of the year's operations was that of the very satisfactory service both as regards continuity of supply and regularity of voltage which was maintained throughout the extensive territory served by the Commission's lines. It is of interest to refer to the patrolling and maintenance of such lines, and to the design of the sub-station equipment.

Patrol and Maintenance of Transmission Lines.—An efficient system of patrol has been established whereby the whole of the high tension lines and sub-stations supplying power to distribution points located at centres of population are patrolled at regular intervals and all apparatus carefully examined. In this way incipient troubles are located and dealt with before they develop into faults affecting the supply.

On the main Yallourn-Yarraville transmission line patrolmen have each about 20 miles of route to patrol. Telephones are placed at intervals of approximately 5 miles, which enable the patrolmen to communicate with Yallourn, Yarraville Terminal Station, or the Head Office, so that advice of anything abnormal is rapidly transmitted.

On the transmission lines in the South Western District and throughout the Gippsland and other areas, each patrolman attends to the maintenance of approximately 80 route miles of transmission line and also to the numerous sub-stations connected to these lines.

Tools and material for rapidly effecting repairs are kept at suitable centres, and spare apparatus for replacing defective equipment is maintained at each district centre.

Developments in Sub-station Design.

The Commission's engineering staff has been called upon during the last three years to produce designs for sub-stations suitable for almost every class of service known in the electric supply industry, ranging from large metropolitan bulk supply sub-stations to the smallest rural or farm-type station.

For heavy metropolitan stations it is to be noticed that, starting originally with designs embodying open-air type switchgear and indoor transformers, all completely housed in a fairly roomy building (Sub-stations "C" (Brunswick), "D" (Ascot Vale), and "J" (Melbourne)), a departure was introduced in the design of the Collingwood or "B" Sub-station, in a dense industrial area, as a completely outdoor station, using open type switches and busses on the 22,000 volt side, and steel cased switches with open busses on the 6,600 volt side. The transformers in this sub-station are of the outdoor conservator type, fitted with tapping switches, and having ordinary porcelain bushing outlets. The relay and panel instruments are accommodated in a small single-room building. Photographs of this sub-station appear in Appendix No. 6. Although the sub-station has been built and completely equipped at a very satisfactory cost per kva. installed, a further departure was decided upon for this class of sub-station in designing new sub-stations for the southern and eastern portion of the metropolitan area.

Sub-station "G" (South Melbourne) is typical, and being identical in size with Sub-station "B" (Collingwood) forms an interesting comparison. The former will be equipped with outdoor type conservator transformers, having tapping switches, and arranged with cable sealing bell entries. Further, ready means of disconnexion will be provided on each of the 3,000 kva. single-phase transformers, so that rapid isolation of a faulty unit can take place without disturbing cable connexions.

The sub-station will be equipped with armour-clad switchgear throughout, this gear being accommodated in an inexpensive building. In aiming at the highest degree of service continuity, especially for important sub-stations serving large areas, the totally armoured installation, it is considered, offers the unquestionable advantage of reduced liability to accidental short circuits, more moderate space requirements, and considerably enhanced safety of the maintenance and operating staffs. The price at which this class of gear is now available has removed the one serious objection to its use, namely, expense in first cost.

In the sphere of smaller distribution sub-stations in the metropolitan area the Commission's practice is to use brick sub-stations and to eliminate all overhead entries, the connexions to both high and low tension mains being by underground cable.

Sub-stations accommodating up to two 250 kva. transformers are protected by fuses on both high and low tension sides. Above this size oil switch protection is installed. Up to the present time distribution sub-stations used as looping points for high tension mains have been equipped with open type oil switchgear, but it is probable that for the more important of these the ironclad construction will become standard.

In the outlying parts of the metropolitan area open air sub-stations fill all requirements, and attention has been directed to the economical design of such stations, especially for 22,000/6,000 volt step-down. The latest of these at Sunshine differs from previous designs in that the 6,600 volt oil switches are individually enclosed in sheet steel weather-proof lockers, thus saving the cost of a building and a considerable amount of assembly cost, the lockers being despatched from the workshops complete, with gear assembled.

The designs of the 66,000 volt sub-stations for the North East system are conventional outdoor types, care being taken to reduce structural costs on site by workshop preparation of material, and to dispense as far as possible with the expense of buildings. In most cases where considerable 66,000 volt buswork is necessary galvanized iron pipe is used in order to save insulating points, with their expense and hazard.

With respect to the lighter class of open air sub-station, the platform type has become standardized for sizes not exceeding 250 kva. Small town distribution is usually effected from such a sub-station, the whole of the low tension control being accommodated in a steel cubicle of small dimensions. Standardization of these sub-stations and gear, and their complete preparation in the workshop, have greatly simplified the construction work on site.

Where conditions permit and the risk of interference may be neglected use is made of a design providing for ground support of the transformers. This is particularly applicable to quarries—which are numerous in the outer metropolitan area—and to factories of considerable size in rural areas.

TRANSMISSION LINES—OVERHEAD.

District.	Erected up to 30th June, 1924.		Erected during Year ended 30th June, 1925.		Total Erected at 30th June, 1925.	
	Route Miles.	Miles of Cable.	Route Miles.	Miles of Cable.	Route Miles.	Miles of Cable.
132,000 volt line	110	660	..	..	110	660
South Western District, Bellarine Peninsula—						
44,000 volt line	116	348	..	..	116	348
6,600 volt line	82	220	21	46·5	103	266·5
Metropolitan and Extra Metropolitan—						
22,000 volt line	93	279	..	..	93	279
6,600 volt line	11·25	33·75	19·16	57·48	30·41	91·23
Gippsland—						
22,000 volt line	77	231	28·39	115·17	105·39	346·17
6,600 volt line	31	85	14·12	42·36	45·12	127·36
Total	520·25	1,856·75	82·67	261·51	602·92	2,118 26

UNDERGROUND CABLES (METROPOLITAN AREA).

Item—Three Core Cable.	Laid and jointed up to 30th June, 1924.	Laid and jointed during Year ended 30th June, 1925.	Total laid and jointed at 30th June, 1925.
	Miles.	Miles.	Miles.
22,000 volt	44·7	4·6	49·3
6,600 volt	5·4	3·3	8·7
440 volt	0·5	1·3	1·8
Composite Pilot and Telephone	34·3	5	39·3

SUB-STATIONS.

—	Installed up to 30th June, 1924.		Installed during Year ended 30th June, 1925.		Total installed at 30th June, 1925.	
	No.	Kva.	No.	Kva.	No.	Kva.
Yarraville Terminal Station ..	1	60,000	..	..	1	60,000
Main Sub-stations—						
Metropolitan	4	24,000	..	15,000	4	39,000
Extra Metropolitan ..	..	..	4	5,500	4	5,500
Western District	5	2,850	..	..	5	2,580
Gippsland	..	..	3	800	3	800
Distribution Sub-stations (at line voltage)—						
Metropolitan	3	5,000	6	6,000	9	11,000
Distribution Sub-stations (Transformer)—						
Metropolitan	13	4,110	9	760	22	4,870
Extra Metropolitan ..	15	2,300	13	1,710	28	4,010
South Western District, Bellarine Peninsula	20	889	24	902	44	1,791
Gippsland	15	410	16	754	31	1,164
Yallourn Territory	12	1,525	..	125	12	1,650
Total installed ..	88	101,084	75	31,551	163	132,635

WATER POWER INVESTIGATIONS.

In pursuance of the directions contained in the State Electricity Commission Acts, the Commission continued its investigations throughout the year into the hydrological features of the State in search for sources of water power capable of commercial development. Practically the whole State has now been covered by exploration, paving the way for systematic survey and investigation of those schemes possessing the most favorable prospects.

The surveys on the Murrindindi Creek, mentioned in our last Report, were brought to completion, and indicate a favorable source of power. An automatic stream gauge was installed, and this will supply the data necessary for a final decision. The possibilities of the Aire River, in the Otway District, referred to in our last Report, received further consideration, and continuous stream flow records were obtained throughout the year.

In the Gippsland District surveys were in hand on the Tanjil River at the end of the period, automatic recording stream gauges being installed on the upper reaches of that stream.

In the north-eastern portion of Victoria the whole of the region north of the Dividing Range and between the Kiewa and Murray Rivers was explored. The extremely mountainous nature of this country gives promise of hydro-electric possibilities, and gauging stations were therefore established.

The country adjoining Toora and Foster, in South Gippsland, was explored, and arrangements made for gauging to be taken on the Agnes River, which seems to be the only promising stream in this territory.

Explorations undertaken in the County of Croajingalong indicated that surveys in this district will probably be desirable at a later date, and the same may be said of explorations of the Mitchell River.

This exploratory work had to be undertaken almost wholly in regions which are among the most mountainous and inaccessible in the State, largely uninhabited, and often at great personal discomfort and risk to the staff.

Consideration was given, in conjunction with the other authorities concerned, to the question of the utilization of the outlets associated with the construction of the Hume Reservoir, on the Murray, for the future generation of power from this source.

One of the most important phases of these hydrological investigations is the collection and recording of accurate stream flow data. Special attention has been paid to this particular feature, and the Commission, at 30th June, 1925, had 25 gauging stations in various parts of the State, of which six were equipped with automatic recording gauges.

BRIQUETTING AND RESEARCH.

Briquetting Plant, Yallourn.

Description of Plant and Process.- With the completion of the erection of the plant and the commencement of operation it is appropriate to furnish a brief description of the installation and of the process of briquetting, especially as the process is being undertaken for the first time in the Commonwealth upon a sufficiently large scale to determine the commercial possibilities of this form of fuel.

In the first place, it should be noted that the plant at Yallourn is not a complete briquette factory. It is what is known as a "half-factory." A full factory constitutes one conveniently and economically workable commercial unit.

Briquettes manufactured at Yallourn are 10 inches long, about 2½ inches deep, and 1½ to 2 inches thick, with the top and the bottom sides indented so as to break readily into two pieces for domestic use, and four pieces for industrial use.

In the process of briquetting the coal is received from a rope haulage running from the main screening station, about 4,800 feet distant: then conveyed by a 40-in. belt in two stages—first to the boiler-house tower, a distance of about 200 feet, and then to the wet preparation house, a further 130 feet. The wet preparation house reduces the coal to a maximum size of about ⅛-in. diameter, and returns the woody portion and any further coal required for steam raising purposes to the boiler house by another belt conveyor. Boiler coal can also be diverted to the boiler house without passing through the wet preparation section. The fine coal passes by a belt conveyor to storage bins above the driers. After passing through the tubes of the driers, where it is steam-heated by exhaust steam from the presses, and from a 1,500 k.w. turbo generator, the coal is conveyed by enclosed worm conveyors to the cooling plant, wherein, during a slow descent through twelve parallel sets of staggered steel plate louvres, it is thoroughly mixed, cooled by exposure to the air, and then conveyed to the press house. Here it is distributed over the five presses, which extrude briquettes into steel launders, the presses push-convey them automatically to the storage shed, about 260 feet from the factory proper, to be there dropped direct into the railway trucks or stored under cover in the storage shed. Each press consumes about 150 h.p., run at about 100 r.p.m., and produces 80 to 90 tons of briquettes per day.

Complete provision for the extraction and settlement of extremely fine coal dust is a special feature of the works. Each drier has a separate flue, containing an exhaust fan above and a baffle wheel below. The fan draws the mixture of warm air, water vapour, and fine coal dust through the wheel, which collects a large proportion of the dust dry, and returns it to the conveyor to the cooling house. The fan has a water spray, which slimes the fine dust not caught by the wheel. All conveyors handling dried coal are connected by piping and an exhaust fan to a separate dust-extraction system.

Four Babcock and Wilcox boilers, each 4,510 sq. ft. heating surface, operating at 280 lb. absolute pressure, and superheat to 650 deg. F., provide steam for the installation. The boilers are fitted with half-gas step grates. Natural draught is provided by a brick-lined concrete stack, 330 ft. high and 11 ft. 6 in. inner diameter.

In the basement of the turbine house plant is installed to desuperheat the exhaust steam from the turbine to saturated steam temperature before it passes to the driers, and provision is also made for reducing steam taken straight from the boilers to saturated steam temperature at the pressure of two to three atmospheres used in the driers.

Operation of Factory during 1924–25.—The briquetting plant started test runs about the middle of November last, and after a testing period of about three months the manufacture and selling of briquettes on a permanent basis was undertaken.

The briquetting of raw brown coal, though simple in principle, involves somewhat elaborate process operations and a considerable mass of plant and machinery of varied character. Some difficulties were naturally encountered in the tuning up of the Yallourn factory. Excessive superheat in the steam from the boiler plant as first installed proved very troublesome in effective control of operating for several months; this disability was, however, remedied by alterations to the superheaters. The difficulties arising from excessive superheat of the steam were greatly aggravated by failure of the desuperheating plant to perform in accordance with the contractor's guarantees. Owing to bearing and other troubles the back pressure turbine was out of action on several occasions. Special plant for reducing steam pressure was provided in the installation so that high pressure steam from the boilers could be passed to the coal-driers at two to three atmospheres pressure, even during a shut down of the turbine; but the large reducing valves failed to operate efficiently. The turbine, desuperheater, boiler, and sundry other plant had not been taken over from the various contractors. Notwithstanding the real difficulties that arose out of the plant defects as described, temporary expedients enabled the factory to operate without any consequent serious diminution in output. Effective remedies for remaining defects will probably be found shortly.

The total output of briquettes up to 30th June, 1925, was approximately 36,500 tons.

Subject to the minor troubles above mentioned, the whole installation has, from an operating point of view, fulfilled all that was expected of it, and further experience in the complex processes of briquetting should result in even better results than those already achieved under stress.

Pulverized Coal.

The experimental coal pulverizing plant at Newport was operated in continuation of the experimental investigations on the uses of pulverized brown coal, conducted conjointly by the Railways Commissioners and the Commission. Throughout the year No. 23 boiler of Newport "A" power station worked on the pulverized coal on a commercial basis. Three different types of locomotives, viz., A2, C, and D were tried on numerous runs with the pulverized brown coal, and also an annealing furnace at the Newport Workshops. The locomotive experiments have been brought to completion for the time being. These experiments furnished the Railway Department with much valuable data on the possibilities of commercially utilizing pulverized brown coal for train haulage.

The stationary boiler tests at Newport "A" power station were brought almost to completion. The successful operation of No. 23 boiler with pulverized coal will no doubt be seriously considered in the design of any extensions of boiler plant at Newport. In addition to the tests on brown coal, some extensive runs were made on the stationary boiler with mixtures of black and brown coal.

The amount of brown coal treated at the pulverizing plant was 9,372 tons; of black coal, 2,274 tons; the total amount of pulverized coal produced was 8,924 tons, of which, after providing fuel for drying purposes, the net amount made available for the above experiments was 7,831 tons. The average moisture content of the brown coal treated was 48.5 per cent., and of the pulverized brown coal 17 per cent.

It may be said definitely that the joint investigations of the Railways Commissioners and the Commission on pulverized coal during the last two or three years have afforded a great deal of valuable information, which may have an important effect at a later date on the commercial activities of both bodies.

Fuel Research.

The erection of the pilot carbonizing plant at Yallourn was completed, and some preliminary tests made. As mentioned in last year's Report, the initial object of this plant is to ascertain the possibilities of commercial production of a solid fuel of high calorific value and a high grade gas suitable for town's use. Regular shift work on the pilot plant will be carried out during the year now entered upon. Considerable laboratory investigations were conducted at the fuel research laboratory at Yallourn as a basis for the more comprehensive experiments on the larger scale that are to be conducted on the pilot carbonizing plant.

CONCLUSION.

Personnel of the Commission.

During the period Commissioner the Honorable George Swinburne, acting upon medical advice, decided to make a visit abroad, and accordingly was granted leave of absence by the Government for a period of nine months from 15th January, 1925.

Commissioner Sir Thomas Lyle was also granted leave of absence by the Government to enable him to make a visit abroad on business of an urgent nature, the period of leave commencing on 12th May, 1925.

The Government appointed Sir David Orme Masson, K.B.E., M.A., D.Sc., to act as Commissioner until such time as either of these Commissioners returns from leave.

Staff.

Once again the Commission records its appreciation of the efficient services rendered during the year by its officers and employees. The work accomplished in the period, which can be truly regarded as the first year of operation, was of a very high standard indeed, having regard particularly to the many difficulties necessarily encountered in the initial stages of the operation of so large an undertaking.

We have the honour to be,

Sir,

Your obedient servants,

JOHN MONASH, Chairman.

ROBERT GIBSON, Commissioner.

D. ORME MASSON, Commissioner.

R. LIDDELOW, Secretary.

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, 1925. The values of the stores have been accepted on the certificates of the storekeepers.

J. A. NORRIS,
Auditor-General.
16th October, 1925.

STATE ELECTRICITY COMMISSION OF VICTORIA.

GENERAL BALANCE-SHEET AS AT 30TH JUNE, 1925.

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		
	£8,383,500		
EXPENDITURE UNDER ABOVE ACTS		4,217,406 4 9	
ADD EXPENDITURE UNDER TREASURY ACT No. 3274/3200		2,391,623 3 10	
ADD EXPENDITURE UNDER TREASURY ACT No. 3345/3200		1,045,349 11 2	
ADD AMOUNT ADVANCED BY TREASURY FROM PUBLIC ACCOUNT ON ACCOUNT OF LOAN		401,000 8 9	
LIABILITY ON ACCOUNT OF LOAN FUNDS			8,055,379 8 6
ADVANCED BY TREASURY FROM PUBLIC ACCOUNT (SECTIONS 5 AND 6, ACT No. 3239)			238,385 0 4
RESERVE ACCOUNTS—			
Depreciation		43,300 2 8	
Bad and Doubtful Debts		338 19 5	
General		296 16 11	
			43,935 19 0
SUNDRY CREDITORS AND ACCRUED CHARGES		228,691 4 1	
INTEREST ACCRUED		166,677 15 11	
			395,369 0 0
NATIONAL BANK OF AUSTRALASIA LIMITED		15,130 18 7	
LESS UNPRESENTED CHEQUES		38,787 19 6	
			23,657 0 11
TRUST MONEYS—			
Security Deposits		7,951 11 3	
Unclaimed Wages		754 6 7	
Consumers' Deposits		4,721 17 5	
Sundries		2,000 0 0	
			15,426 15 3

ASSETS.

	£	s. d.	£ s. d.	£ s. d.
YALLOURN WORKS—				
Power Station and Equipment	2,014,561	10 8		
Coal Supply Plant and Equipment	693,604	6 6		
Briquetting Plant and Equipment	493,145	10 9		
Township	336,589	14 4		
General Plant, Buildings and Equipment—Permanent	296,565	13 11		
General Plant, Buildiugs and Equipment—Temporary	111,270	4 6		
Township Lighting Undertaking	10,308	15 3		
			3,956,045 15 11	
METROPOLITAN SUPPLY SYSTEM—				
Power Station and Equipment—Newport "B"	753,925	0 3		
Main Transmission Systems	563,087	8 5		
Terminal Stations	470,180	9 10		
Main Distribution System	390,251	15 3		
Distribution System—6,600 Volt	56,521	13 3		
			2,233,966 7 0	
SUGARLOAF WORKS—				
Power Station and Works	25,094	9 8		
			25,094 9 8	
NORTH EASTERN DISTRICT—				
Transmission and Transformation System	71,117	0 11		
Power Stations and Distribution Systems—Echuca and Shepparton	26,231	0 9		
			97,348 1 8	
SOUTH WESTERN DISTRICT—				
Transmission and Transformation System	137,651	17 1		
Distribution Systems	179,273	17 5		
			316,925 14 6	
GIPPSLAND DISTRICT—				
Transmission and Transformation System	96,958	4 10		
Distribution Systems	94,062	3 6		
			191,020 8 4	
METROPOLITAN EAST DISTRICT—				
Transmission and Transformation System	8,952	12 2		
Distribution Systems	48,826	3 10		
			57,778 16 0	
METROPOLITAN SOUTH-WEST DISTRICT—				
Transmission and Transformation System	9,335	4 1		
Distribution System	13,449	3 9		
			22,784 7 10	
METROPOLITAN SOUTH DISTRICT—				
Transmission and Transformation System	14,232	15 8		
			14,232 15 8	
ESSENDON AND FLEMINGTON DISTRICT—				
Distribution System	146,056	11 0		
			146,056 11 0	
ALTONA DISTRICT—				
Distribution System	7,218	9 2		
			7,218 9 2	
SERVICE BUILDINGS AND EQUIPMENT—				
Head Office Building, Furniture and Fittings	117,663	8 0		
Footscray Store Buildings and Workshop	24,231	4 9		
Dandenong Store Buildings and Workshop	8,764	10 11		
South Melbourne Garage and Equipment	1,691	17 6		
			152,351 1 2	
				7,220,822 17 11

Motor and Other Vehicles		24,359	11 6
Electric Supply Power Surveys		1,585	1 8
Stores on Hand—			
Yallourn	135,841 11 11		
Footscray	186,286 10 1		
Melbourne	3,592 18 6		
Dandenong	69,191 5 1		
Stationery	1,754 2 0		
Garage	1,436 1 11		
Sugarloaf	9,942 18 0		
Thomastown	3,375 9 4		
Western District	5,682 1 5		
Gippsland	6,261 14 6		
Metropolitan East	814 6 2		
Metropolitan South-West	236 5 9		
Essendon and Flemington	4,074 7 6		
North-East, Echuca and Shepparton	1,068 15 1		
		429,558	7 3
Coal Stocks on Hand	4,494 2 10		
Briquette Stocks on Hand	675 0 0		
		5,169	2 10
Sundry Debtors—			
Head Office—Power and General	108,379 13 11		
Brown Coal	2,592 18 11		
Briquettes	9,667 2 11		
Yallourn	6,779 10 0		
Gippsland District	5,187 19 5		
Western District	10,627 7 5		
North-Eastern District—Shepparton and Echuca	1,977 13 4		
Metropolitan East District	3,355 18 10		
Metropolitan South-West District	880 6 4		
Altona District	579 13 8		
Essendon and Flemington District	14,309 12 10		
Metropolitan South District	1,951 11 6		
		166,289	9 1
Payments in Advance		2,649	15 8
Victorian Government Stock		2,482	9 0
Cash—			
At Branches	1,573 1 4		
Advances to Officers	2,114 18 0		
In transit from Branches	3,123 17 9		
Stamps on Hand	96 11 2		
		6,908	8 3
		7,859,825	3 2
Interest during Construction		514,641	18 1
Amount charged to Commission by Treasury in accordance with Decision of Cabinet, 22nd July 1922		62,023	6 8
Balance—Profit and Loss Account		335,662	16 1
	£8,772,153	£8,772,153	4 0

There is a contingent asset and liability in respect of securities lodged as bona fides under Contracts to the extent of £43,918 4s. 1d., and held by the Bank on the Commission's behalf.

Certified correct,
R. LIDDELOW, Secretary.

STATE ELECTRICITY COMMISSION OF VICTORIA.

DISTRICT UNDERTAKINGS.

Profit and Loss Accounts for Year ended 30th June, 1925.

	Essendon and Flemington District	South-Western District.	Gippsland District.	Eastern Metropolitan District (Dandenong, Ringwood, Croydon, and Lilydale)	Metropolitan South-West District (Werribee)	Altona District.	North-Eastern District (Shepparton and Echuca).	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Expenditure.								
To Balance 30th June, 1924	274 19 5	4,462 6 8	..	..	..	..	..	4,737 6 1
Generation, Purchase of Energy and Distribution	57,914 12 1	23,016 6 6	13,337 4 10	5,052 5 0	2,652 19 6	1,297 5 1	2,992 10 4	106,263 3 4
Interest	7,498 13 6	16,881 7 1	7,910 13 8	2,372 19 8	1,203 3 3	195 7 11	699 2 4	36,761 7 8
Depreciation	9,942 0 0	..	..	..	..	..	..	9,942 0 0
Bad and Doubtful Debts	100 0 0	15 0 0	26 19 11	12 11 0	5 11 0	1 11 2	6 6 4	197 19 5
Total	75,730 5 0	44,105 0 6	21,274 18 5	7,437 15 8	3,861 13 9	1,494 4 2	3,697 19 0	157,901 16 6
Income.								
By Balance 30th June, 1924	..	..	129 8 10	..	..	..	..	129 8 10
Sales	79,729 13 0	36,170 4 2	22,585 12 8	10,057 4 10	4,442 11 8	1,248 10 10	5,049 18 1	159,283 15 3
Total	79,729 13 0	36,170 4 2	22,715 1 6	10,057 4 10	4,442 11 8	1,248 10 10	5,049 18 1	159,413 4 1
Balance Profit carried to Balance-sheet	3,999 8 0	..	1,440 3 1	2,619 9 2	580 17 11	..	1,351 19 1	9,991 17 3
Balance Loss carried to Balance-sheet	..	8,234 16 4	..	..	..	245 13 4	..	8,480 9 8

BALANCE-SHEETS AS AT 30TH JUNE, 1925.

	Essendon and Flemington District.	South-Western District.	Gippsland District.	Eastern Metropolitan District (Dandenong, Ringwood, Croydon, and Lilydale)	Metropolitan South-West District (Werribee)	Altona District.	North-Eastern District (Shepparton and Echuca).	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
ASSETS.								
Generating Plants	.	..	..	..	..	..	7,577 12 9	7,577 12 9
Transmission and Transformation Systems	.	137,651 17 1	96,958 4 10	8,952 12 2	9,335 4 1	..	..	252,897 18 2
Distribution Systems	110,845 13 11	171,075 7 6	89,768 13 2	48,037 10 6	13,122 12 1	7,218 9 2	18,365 0 4	191,133 6 8
Interest during Construction	..	4,528 9 11	1,819 15 6	242 3 3	47 0 6	78 1 2	170 18 9	6,886 9 1
Tools, Instruments, Vehicles, and Office Furniture	5,210 17 1	5,198 9 11	4,293 10 4	788 13 4	326 11 8	..	288 7 8	16,106 10 0
Stores on Hand	1,071 7 6	5,682 1 5	6,261 11 6	811 6 2	236 5 9	..	1,068 15 1	18,137 10 5
Sundry Debtors	14,309 12 10	10,627 7 5	5,187 19 5	3,355 18 10	880 6 4	579 13 8	1,977 13 4	36,918 11 10
Payments in Advance	50 13 8	85 17 0	108 13 11	26 1 7	10 11 6	..	27 3 8	309 4 4
Victorian Government Stock	..	..	2,326 4 10	156 1 2	..	..	..	2,482 9 0
Cash at Bank and in Hand	103 1 5	108 8 1	43 11 6	61 5 9	8 16 6	..	10 0 6	335 4 0
Balance Profit and Loss Account	.	8,234 16 4	..	..	..	245 13 4	..	8,480 9 8
	164,594 6 5	346,192 14 11	206,768 8 0	62,434 15 9	23,967 11 5	8,121 17 4	29,485 12 1	841,565 5 11
LIABILITIES.								
Sundry Creditors and Accrued Charges	451 1 1	7,615 6 7	11,700 3 3	22,724 5 8	4,309 5 4	1 0 0	479 5 5	47,280 10 4
Accrued Interest	2,691 17 2	5,979 5 11	2,708 6 2	550 9 8	398 11 3	70 3 3	251 13 2	12,650 6 7
Consumers' Deposits	3,370 4 2	785 16 0	192 7 6	173 13 3	33 16 6	17 5 0	147 15 0	4,720 17 5
Reserves—								
Depreciation	10,540 0 0	..	65 15 2	..	.	..	..	10,605 15 2
Bad and Doubtful Debts	100 0 0	191 0 0	26 19 11	7 11 0	5 11 0	1 11 2	6 6 4	338 19 5
General	296 16 11	..	..	..	..	..	..	296 16 11
Balance Profit and Loss Account	3,999 8 0	..	1,440 3 1	2,619 9 2	580 17 11	..	1,351 19 1	9,991 17 3
Balance carried to General Balance-sheet	143,144 16 1	331,621 6 5	190,634 12 11	36,359 7 0	18,639 9 5	8,031 17 11	27,248 13 1	755,680 2 10
	164,594 6 5	346,192 14 11	206,768 8 0	62,434 15 9	23,967 11 5	8,121 17 4	29,485 12 1	841,565 5 11

STATE ELECTRICITY COMMISSION OF VICTORIA.

Metropolitan Supply System.

Profit and Loss Account for Year ended 30th June, 1925.

	£	s.	d.		£	s.	d.
To Balance 30th June, 1924	54,475	6	0	By Power Sales—			
Purchase of Energy	211,111	18	6	Commission's Undertakings ..	43,544	15	3
Power Generation	310,280	11	4	Private Companies and Municipalities	448,678	16	6
Transmission, Transformation, and Distribution	31,790	18	9	Miscellaneous Revenue	886	14	2
Interest	170,438	9	3	Balance	303,463	6	9
Depreciation	18,476	9	4				
	796,573	12	8		796,573	12	8

Brown Coal Mine—Old Open Cut.

Profit and Loss Account for Year ended 30th June, 1925.

Dr.				*Cr.*			
	£	s.	d.		£	s.	d.
To Operating and Maintenance Expenses	55,905	13	0	By Sales	92,684	5	1
Selling Expenses	1,215	19	0	Rents	474	11	4
Freight	34,898	9	0				
Interest	1,138	15	5				
	93,158	16	5		93,158	16	5

Briquette Manufacture.

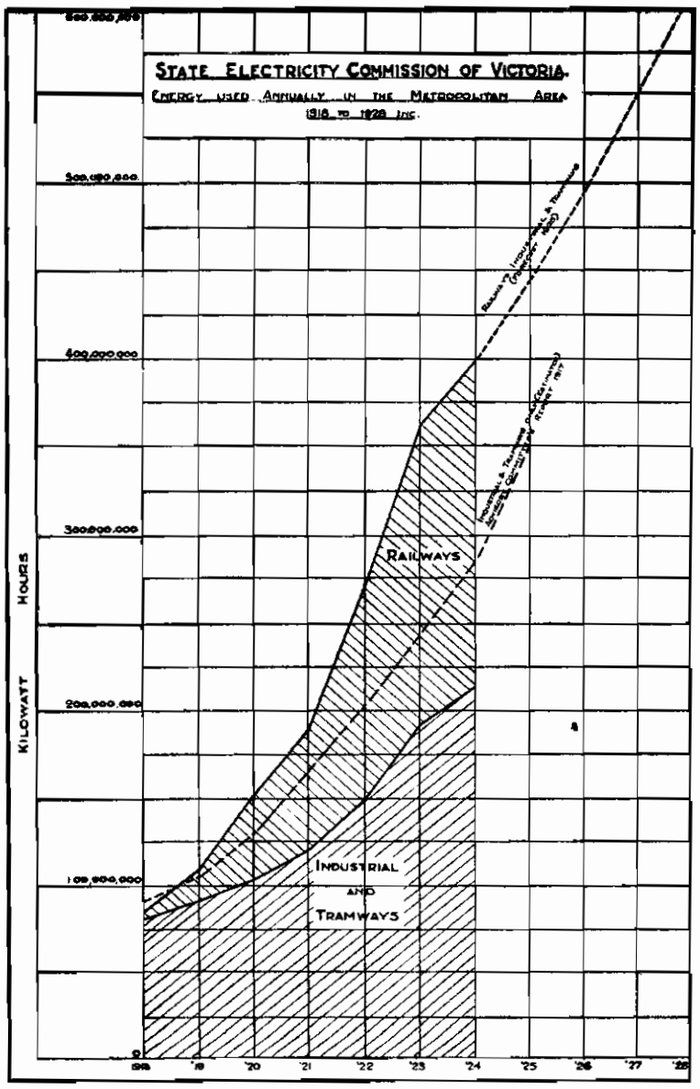
Profit and Loss Account for Period ended 30th June, 1925

Dr.				*Cr.*			
	£	s.	d.		£	s.	d.
To Operating and Maintenance Expenses	68,154	3	7	By Sales	47,058	12	8
Freight	35	4	2	Briquettes on Hand ..	675	0	0
Selling Expenses	997	1	11	Balance	36,257	7	6
Interest	14,804	10	6				
	83,991	0	2		83,991	0	2

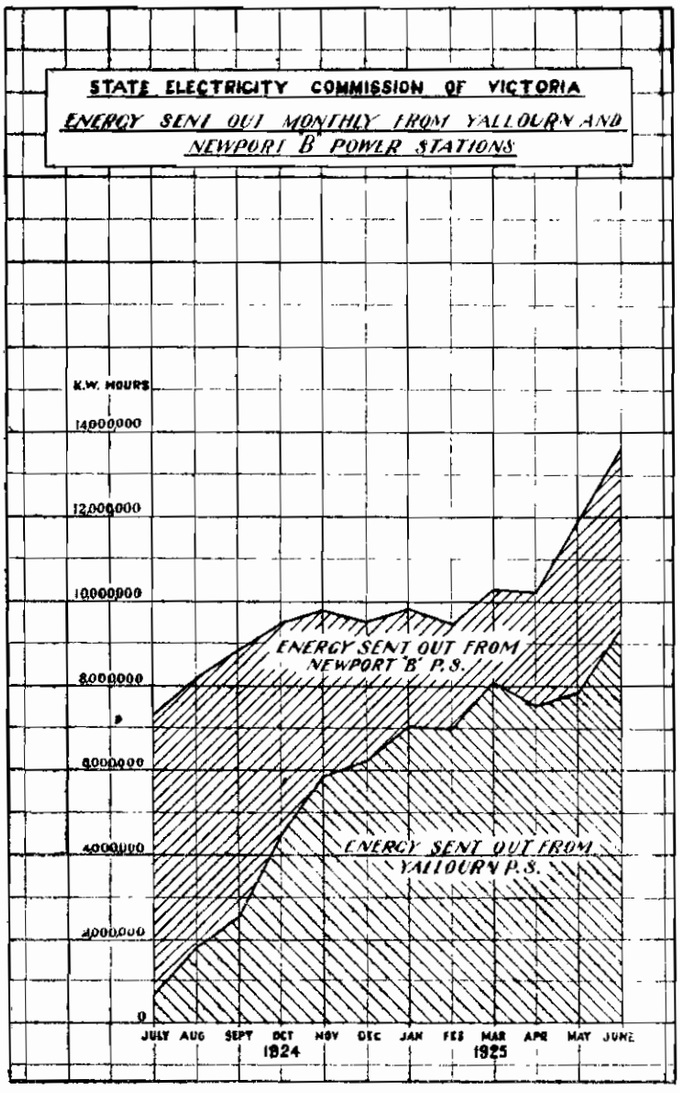
EXPENDITURE OUT OF CONSOLIDATED REVENUE 1st JULY, 1924, TO 30th JUNE, 1925.

		£	s.	d.		£	s.	d.
To Expenditure —					By Treasury Account—			
Salaries		1,360	0	0	Division 70/1	5,090	0	0
Power Investigations—					Division 70/2	7,012	2	0
Surveys ..	6,345 4 1				Division 70/3	8,333	15	11
Power Requirements—					Division 70/4	500	0	0
Country Centres	30 0 0							
		6,375	4	1				
Licensing of Wiremen		1,194	16	11				
Electric Inspection		3,172	1	0				
Brown Coal Research		8,333	15	11				
Experimental Coal Pulverizing Plant		500	0	0				
		20,935	17	11		20,935	17	11

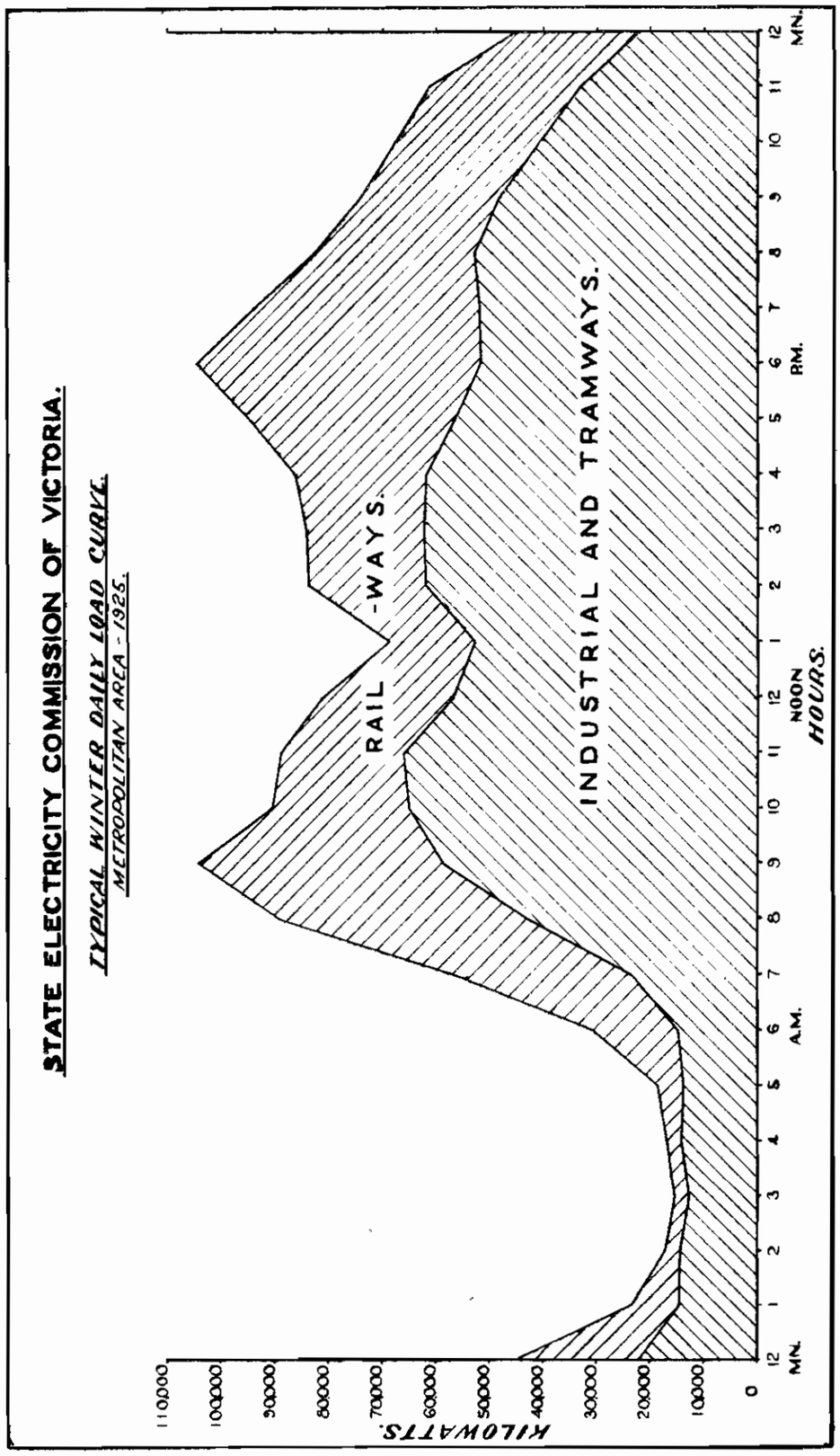
APPENDIX No. 2 (*a*).



APPENDIX No. 2 (*b*).



APPENDIX No. 2 (*c*).



APPENDIX No. 3.

(See also the Related Curve in Appendix No. 2 (*a*).)

UNITS GENERATED AND DISTRIBUTED IN METROPOLITAN AREA 1918-1924.

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.
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

SUMMARY SHOWING DISTRIBUTION OF DEMAND.

Year.	Total Units Generated or Supplied to Metropolitan Area.	Utilized for Railway Traction and Minor 25-cycle Supplies.	Utilized for Industrial and Tramway Purposes.	Total Output from Newport A (Generated), plus Supply from Yarraville Terminal Station.	Total Output from Yarraville Terminal Station (Losses included).	Total Output from Melbourne Electric Supply Company.	Total Output from Melbourne City Council.
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

APPENDIX No. 4.

TWO PART TARIFFS OPERATING IN COMMISSION'S DISTRICT UNDERTAKINGS.

Domestic Light and Power.

District.	Service Charge per Room per Month — Number of Rooms. 6 and under.	7.	8	9 and over.	Isolated Districts. Any number of Rooms.	Energy Charge per unit.
	s. d.	s. d.	s. d.	s. d.	s. d.	
Metropolitan .. .. Minimum / Maximum	1 0	1 3	1 6	1 9	..	1¼d.
Eastern Metropolitan .. Minimum	1 0	1 3	1 6	1 9	..	1¼d.
Maximum	1 6	1 9	2 0	2 3	..	1½d.
South-West Metropolitan .. Minimum / Maximum	1 4	1 7	1 10	2 1	..	1¾d.
South Western .. .. Minimum	1 3	1 6	1 9	2 0	2 6	1¾d.
Maximum	1 6	1 9	2 0	2 3		
Bellarine Peninsula .. Minimum	1 4	1 7	1 10	2 1	2 6	1½d.
Maximum	1 6	1 9	2 0	2 3		
Gippsland .. .. .. Minimum	1 3	1 6	1 9	2 0	2 6	1½d.
Maximum	1 6	1 9	2 0	2 3		

Commercial Light and Power.

(Applicable to Hotels and Boarding Houses with accommodation for at least twelve persons, and where all meals are cooked electrically.)

District.	Service Charge per Room per Month, Nine Rooms and over.	Energy Charge per unit.
	s. d.	
Metropolitan .. .. Minimum / Maximum	1 6	1¼d. less 20 per cent.
Eastern Metropolitan .. .. Minimum	1 6	1½d. less 20 per cent.
Maximum	2 0	1½d. less 20 per cent.
South-West Metropolitan .. .. .. Minimum / Maximum	1 10	1½d. less 20 per cent.
South Western .. .. Minimum	1 9	1¾d. less 20 per cent.
Maximum	2 0	
Bellarine Peninsula .. .. Minimum	1 10	1½d. less 20 per cent.
Maximum	2 0	
Gippsland .. .. Minimum	1 9	1½d. less 20 per cent.
Maximum	2 0	

Commercial Power.

District	Service Charge per H.P. per Month — Horse Power Installed. 1 to 50.	51 to 100.	101 to 200.	201 to 500.	Energy Charge per unit.
	s. d.	s. d.	s. d.	s. d.	
Metropolitan .. .. Minimum / Maximum	4 3	3 6	3 0	2 6	¾d.
Eastern Metropolitan .. .. .. Minimum	5 0	4 6	4 0	3 6	1d.
Maximum	6 0	5 6	5 0	4 6	
South-West Metropolitan .. .. Minimum / Maximum	5 6	5 0	4 6	4 0	1d.
South Western .. .. .. Minimum	6 0	5 6	5 0	4 9	1¼d.
Maximum	7 0	6 6	6 0	5 6	
Bellarine Peninsula .. .. .. Minimum	6 0	5 6	5 0	4 9	1¼d.
Maximum	6 6	6 0	5 6	5 0	
Gippsland .. .. Minimum	5 0	4 6	4 0	3 6	1d.
Maximum	6 0	5 6	5 0	4 6	

Commercial Power Restricted Hour Tariff is as above but with a discount of 10 per cent. off the Energy Charge.

APPENDIX No. 5.

YALLOURN POWER STATION.

MAIN ITEMS OF PLANT TO COMPRISE THE COMPLETE INSTALLATION OF 65,000 KW.

No. of Items.	Plant.	Capacity, &c., of each Item.	Maker's Name.
12	Boilers, each with integral superheater and 3 travelling grate stokers	Boiler heating surface—14,425 sqnare feet Superheater heating surface—2,320 square feet Total grate area—366 square feet Evaporation—70,000–75,000 lb. per hour Steam pressure—260 lb. per square inch Steam temperature—650° F.	Boilers and superheaters — John Thompson Watertube Boilers Ltd.; stokers — Underfeed Stoker Co.
4	Turbine-driven boiler feed pumps	70,000 gallons per hour	J. and G. Weir Ltd.
5	Main turbo-generators	12,500 kw.	Metropolitan Vickers Electrical Co. Ltd.
5	Condensing equipments, each including surface condenser, extraction and lift pumps, 3 two-stage inter-cooled Leblanc air ejectors, vertical circulating water pump, and motors	Condenser cooling surface—17,000 square feet Circulating pump capacity—800,000 gallons per hour at 43-ft. head	Condensers and circulating pumps—Thompson and Co. (Castlemaine) Pty. Ltd.; remainder—Metropoliton Vickers Electrical Co. Ltd.
1	Non-condensing house turbo-generator	600 kw.	Metropolitan Vickers Electrical Co. Ltd.
5	Main surface feed-water heaters	2 of 2,250 square feet; 3 of 1,450 square feet	Worthington Simpson Ltd.
5	Auxiliary surface feed-water heaters	390 square feet	Humble and Sons, Geelong
2	Groups of make-up water evaporators	Heating surface per group—2,200 square feet Duty per group—12,500 lb. distilled water per hour	Government Dockyard, N.S.W.
1	Electric telpher coal-handling structure serving coal store and bunkers, and carrying 2 telphers at present, but capable of carrying 6	Capacity of each telpher—125 tons per hour when delivering coal by skip from receiving hopper to either coal store or bunkers; 60 tons per hour when reclaiming by grab from store to bunkers	Robert Dempster and Sons Ltd.
2	Units of ash and dust automatic vacuum extraction plant	6 tons per hour per unit	Ed. Bennis and Co. Ltd.
	Transformers—		
7	Main, 11,000/132,000-volt	9,260 k.v.a.	International General Electric Company Inc., U.S.A.
13	Auxiliary, 11,000/400-volt	500 k.v.a.	
4	House turbo-alternator, 11,000/400-volt	250 k.v.a.	
4	Local Feeder, 11,000/2,200-volt	250 k.v.a.	
4	Local Feeder, 11,000/6,600-volt	250 k.v.a.	
	Switchgear (suitable for the control of the above transformers) and—		
2	132,000-volt outgoing transmission lines	27,780 k.v.a.	
5	Turbo-generators	13,900 k.v.a.	
1	House turbo-generator	750 k.v.a.	
2	22,000-volt outgoing feeders	750 k.v.a.	
4	6,600-volt outgoing feeders	750 k.v.a.	

NEWPORT "B" POWER STATION.

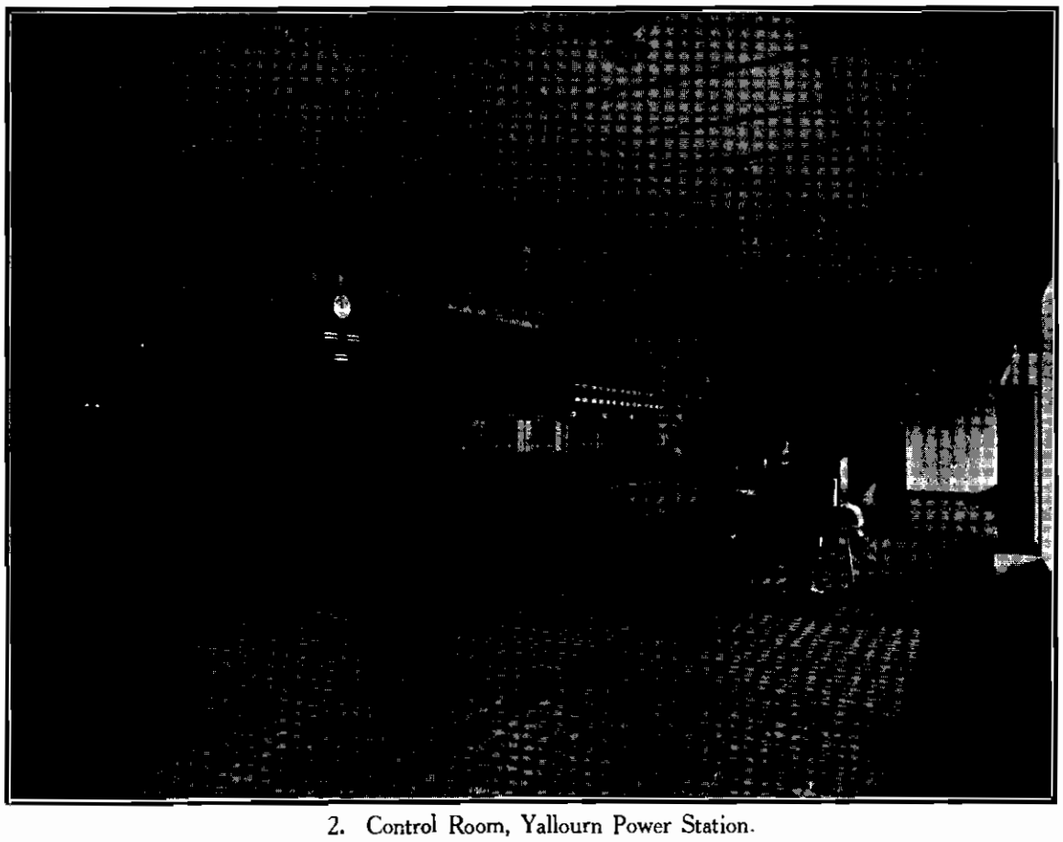
MAIN ITEMS OF PLANT.

No. of Items.	Plant.	Capacity of each Item.	Maker's Name
5	Boilers, each with integral superheater, integral air heater, and 2 travelling grate stokers	Boiler heating surface—8,348 square feet Superheating heating surface—2,400 square feet Total grate area—224 square feet Air heater heating surface—6,950 square feet Evaporation—43,000 lb. per hour Steam pressure—270 lb. per square inch Steam temperature—650–700° F.	Babcock and Wilcox Ltd.
3	Turbine-driven boiler feed pumps	24,000 gallons per hour	J. and G. Weir Ltd.
2	Turbo-generators	15,000 kw.	C. A. Parsons & Co. Ltd.
2	Condensing equipments, each including twin condenser, kinetic air pump, water extraction and force pump, vertical circulating water pump, and motors	Condenser cooling surface—21,000 square feet Circulating pump capacity—990,000 gallons per hour at 33-ft. head	Weymouth's Ltd.
1	Surface feed-water heater	Receives exhaust steam from a single feed-pump turbine	Babcock and Wilcox Ltd.
1	Belt conveyor coal-handling plant	Present capacity 110 tons coal per hour, but capable of being speeded up to 440 tons per hour	International General Electric Company Inc., U.S.A.
	Transformers—		
..	Main step-up, 6,600/22,000-volt	18,750 k.v.a.	Metropolitan Vickers Electrical Co. Ltd.
..	Unit, 6,600/415-volt	500 k.v.a.	
..	Station, 22,000/415-volt	1,500 k.v.a.	
	Switchgear, 22,000-volt—		
2	Generator equipments		English Electric Company Ltd.
4	Feeder equipments		
2	Sub-station transformer equipment		
1	Busbar sectioning and coupling equipment		
	Switchgear, 415-volt—		
1	Frequency changer equipments		
2	Station transformer equipments		
2	Unit transformer equipments		
2	Unit board feeder equipments		
1	Busbar sectioning equipments		
2	Motor generator equipments		
5	Circuit switch equipments		

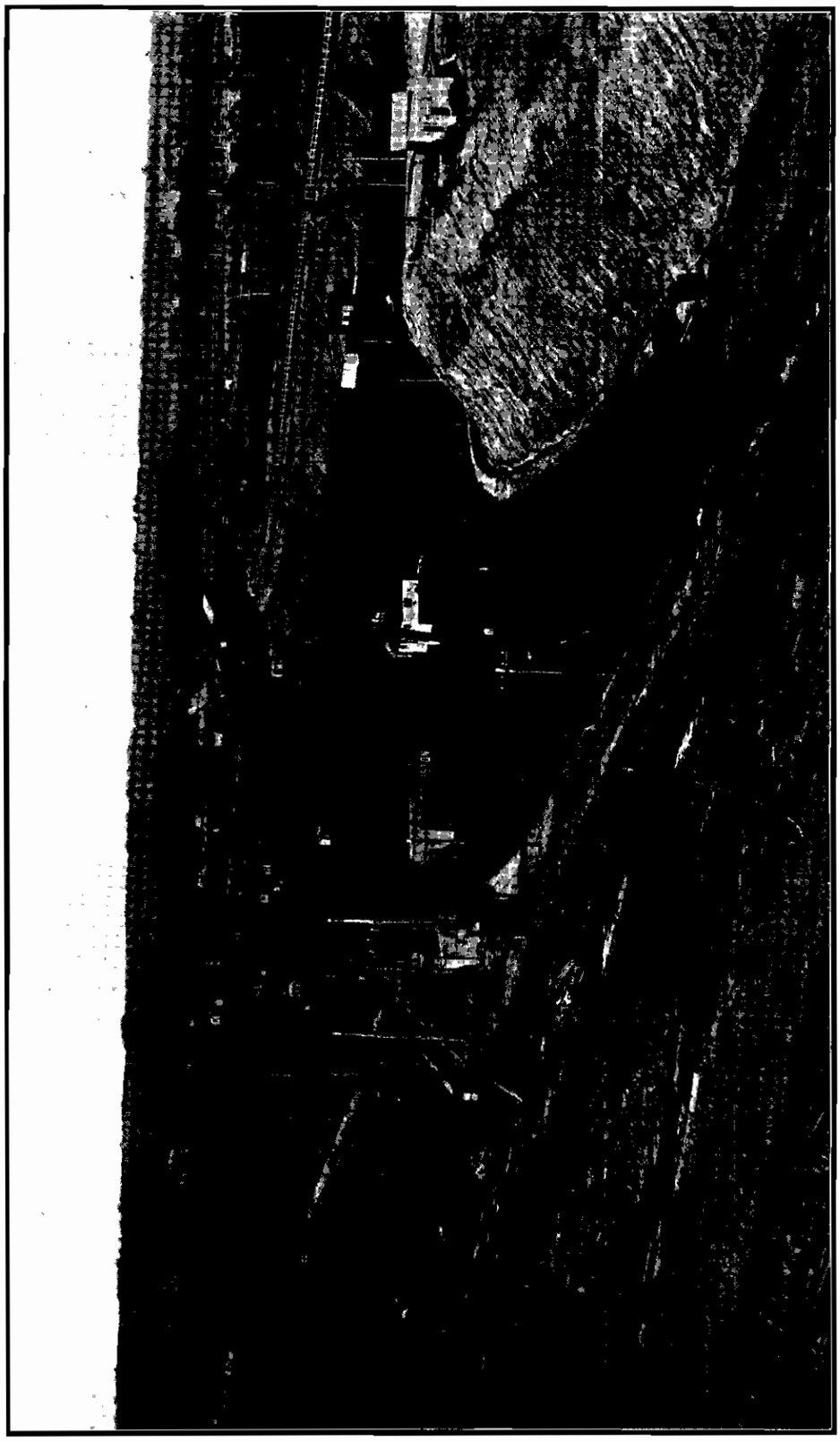
APPENDIX No. 6.

PHOTOGRAPHS OF COMMISSION'S MAJOR ACTIVITIES.

1. Turbine House, Yallourn Power Station



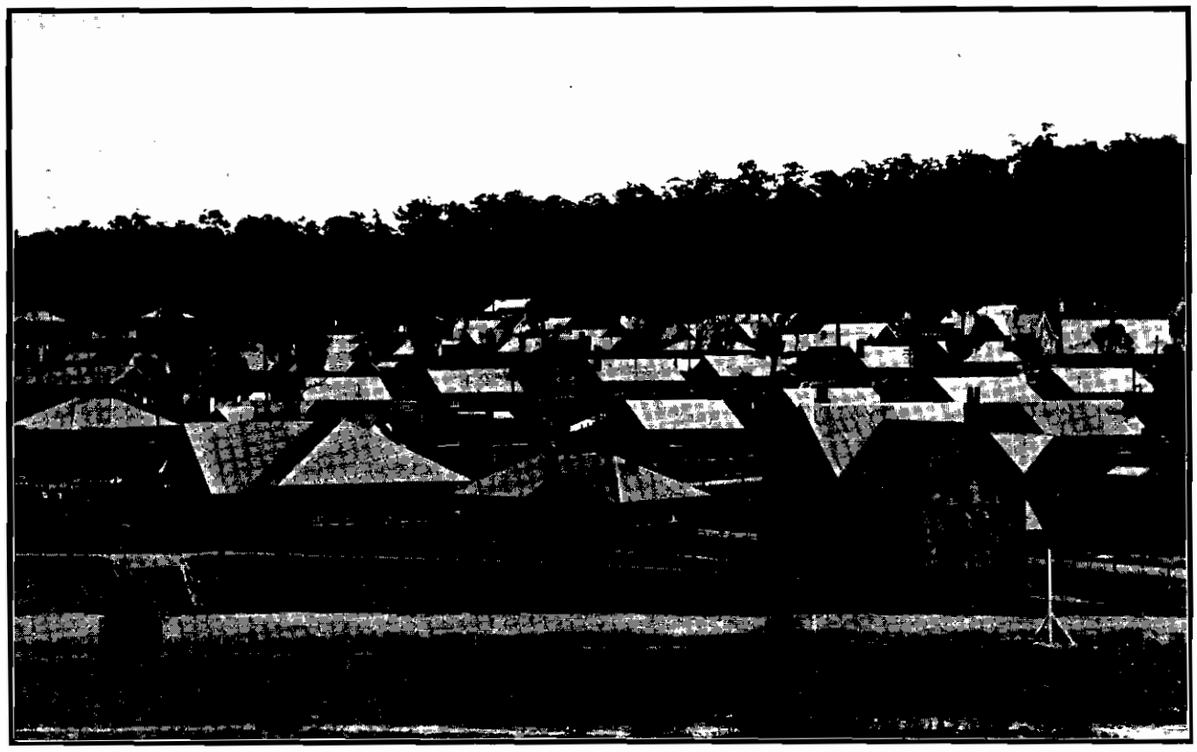
2. Control Room, Yallourn Power Station.



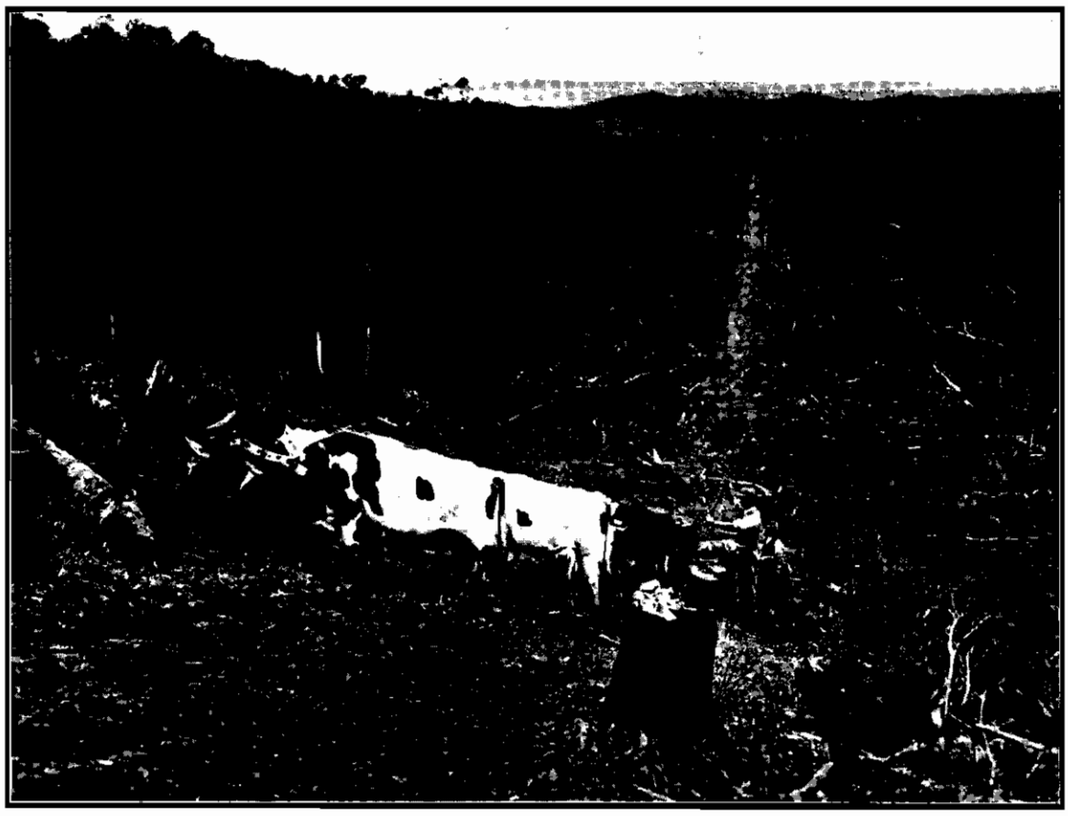
3. Yallourn Open Cut.

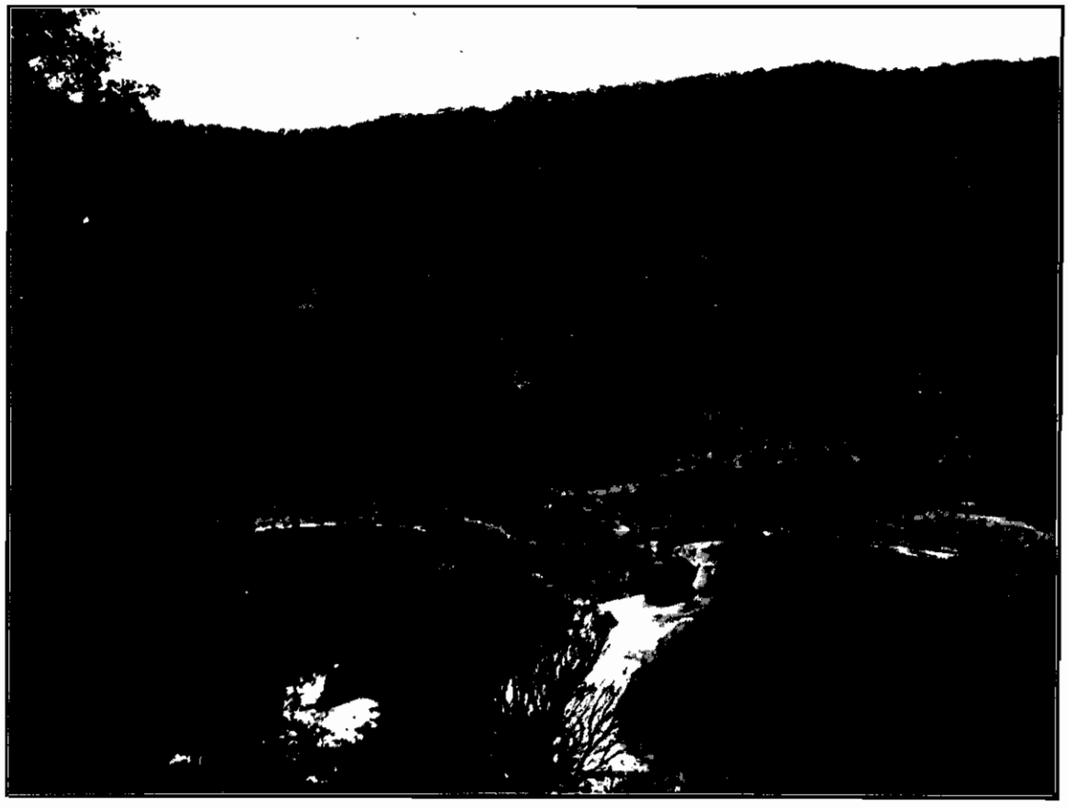
4. Briquetting Factory, Yallourn.

5. The First Train Load of Briquettes Leaving Yallourn.

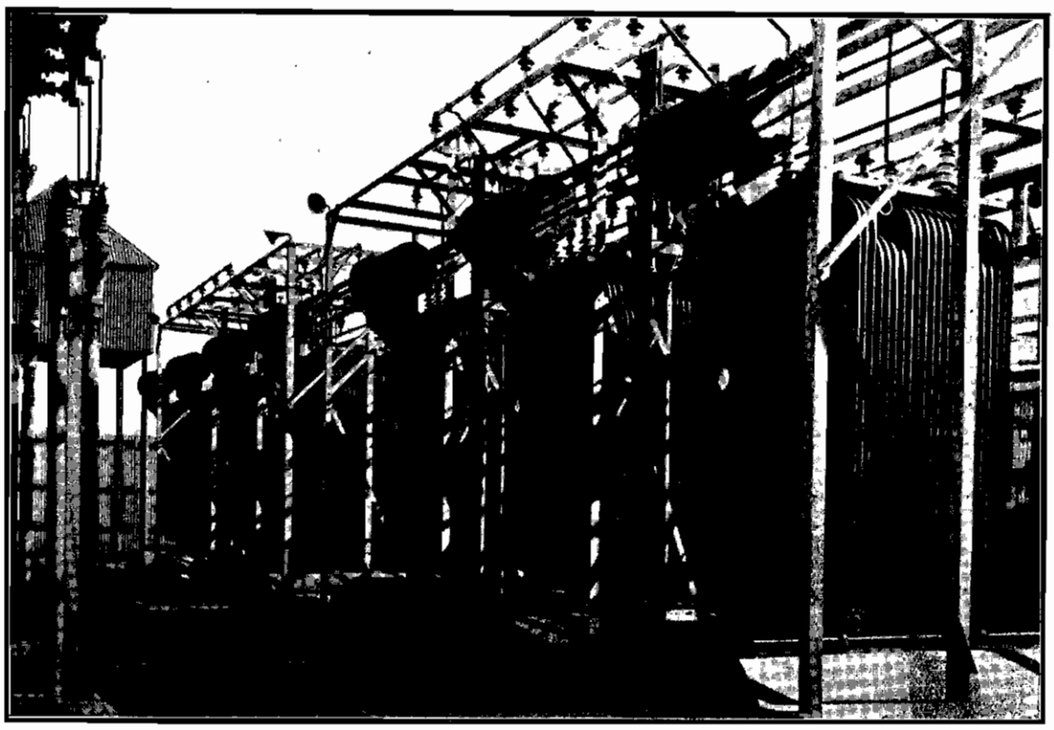


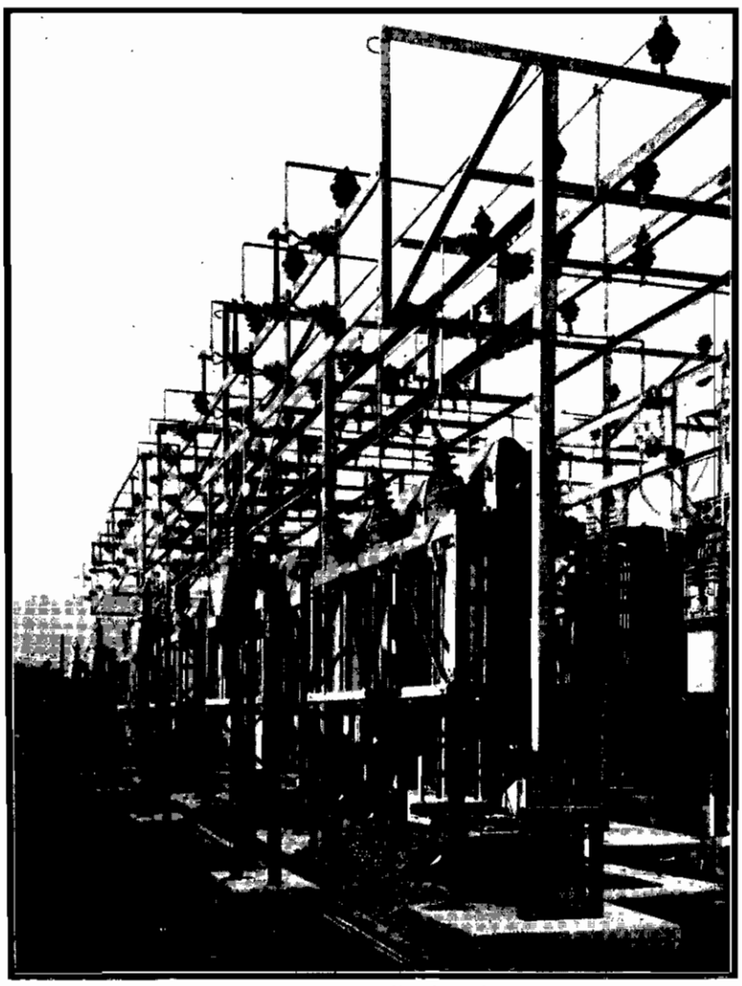
6. Views of the Town of Yallourn.





7. Views of the Main Thomastown-Benalla Transmission Line (66,000 volts), part of the Sugarloaf-Rubicon Scheme. The photographs show the works at Kinglake and Sugarloaf respectively.





8. Main Sub-Station " B," Collingwood.

By Authority: H. J. GREEN, Government Printer, Melbourne.