INDUSTRY IN AYRSHIRE

ELECTRICAL REVIEW

FOUNDED 1872

Vol. CXXXVII. No. 3531 JULY 27, 1945 9d. WEEKLY

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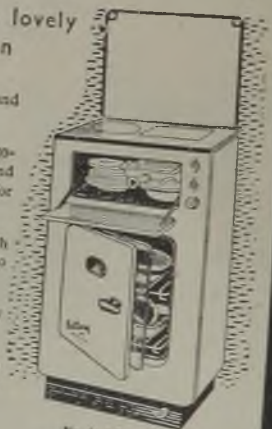

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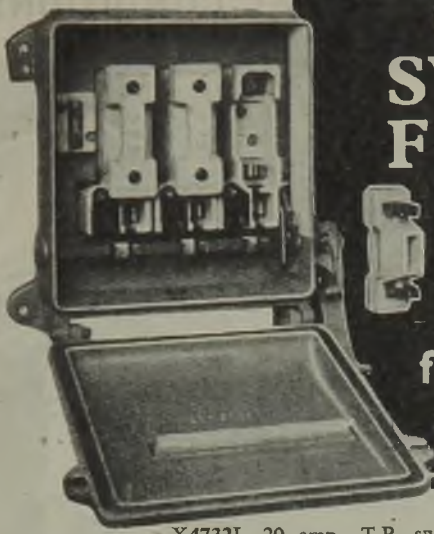

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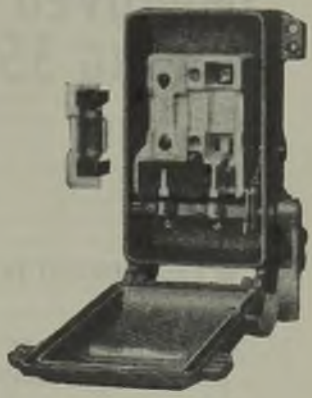
20†	X4722F	14/6 ea.	X4732F	19/6 ea.	X4732LF	£1 0 8 ea.

*** Prices exclusive of Cartridge Fuse Links.**



X4720F 15 amp. D.P. Switch Fuse with H.R.C. type Fuse carriers.

H.R.C. CARTRIDGE FUSE-LINKS FOR USE WITH ABOVE

Category of Duty B.S. 88—1939 440 A.C.4 and D.C.4

Rating Amps.	Cat. No.	Price	Rating Amps.	Cat. No.	Price	Rating Amps.	Cat. No.	Price
2	XE20Q2	8/- doz.	6	XE20Q6	8/- doz.	15	XE20Q15	9/- doz.
4	XE20Q4	8/- doz.	10	XE20Q10	8/- doz.	20	XE20Q20	11/6doz.

† For the purpose of dealing with momentarily high switching currents, these fuse carriers can be adjusted to take XQ30C series, 25 or 30 amp., H.R.C. Cartridge Fuse-Links (*See page 8 G.E.C. Catalogue X & Y Section. 7th edition*).

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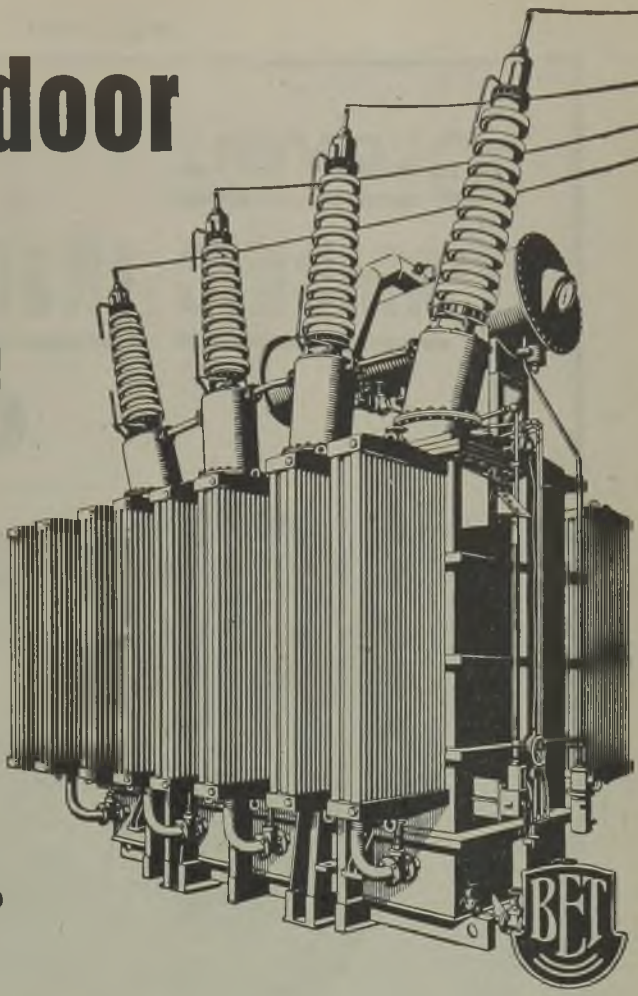

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PIONEERS

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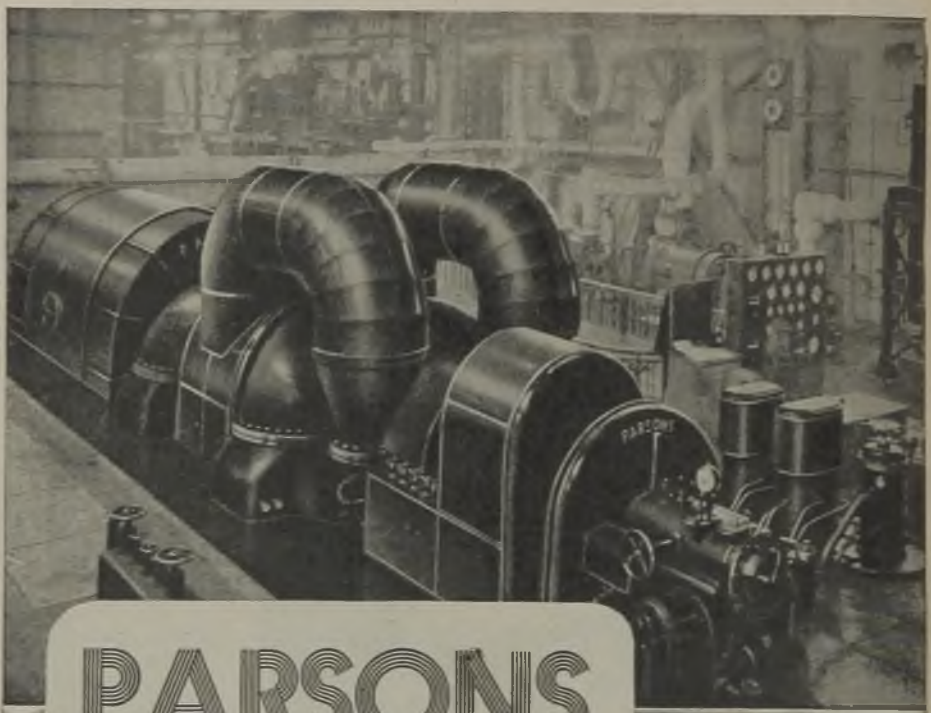
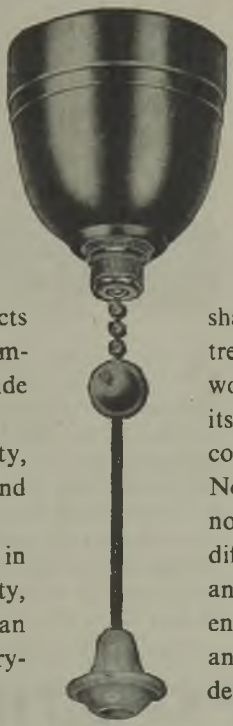


TWO similar products may have only one thing in common. Novelty. One will be merely an attractive and interesting gadget ; the other an equally novel product, but one that is carefully designed and soundly constructed. In all other respects —in efficiency, quality of component parts, and finish—a wide gulf will separate them.

The gadget, because of its novelty, will be used for a little while, and then discarded.

The other will climb steadily in public favour, first as a novelty, and then—more rapidly—as an article of real and proved everyday usefulness.



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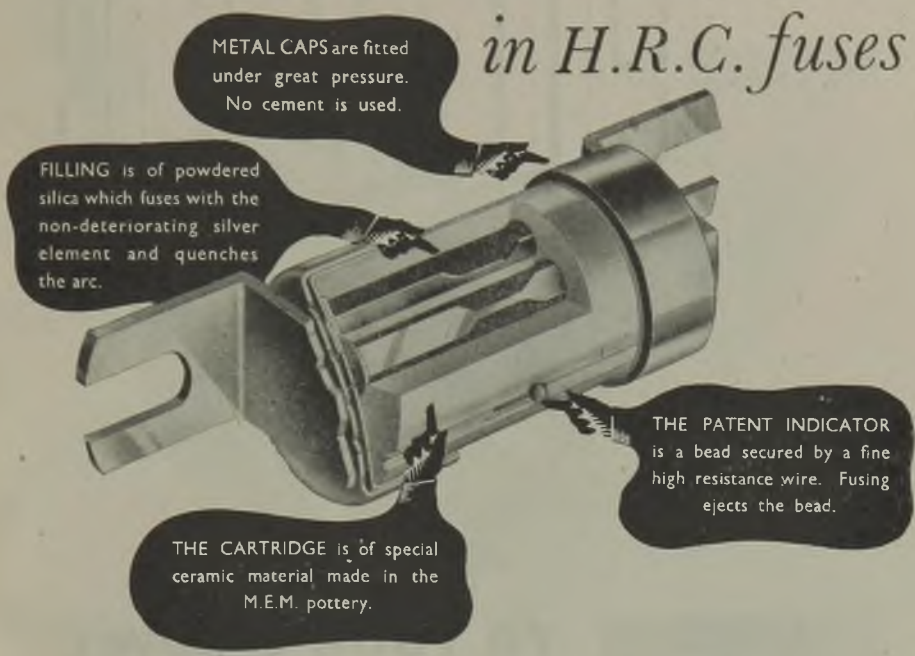

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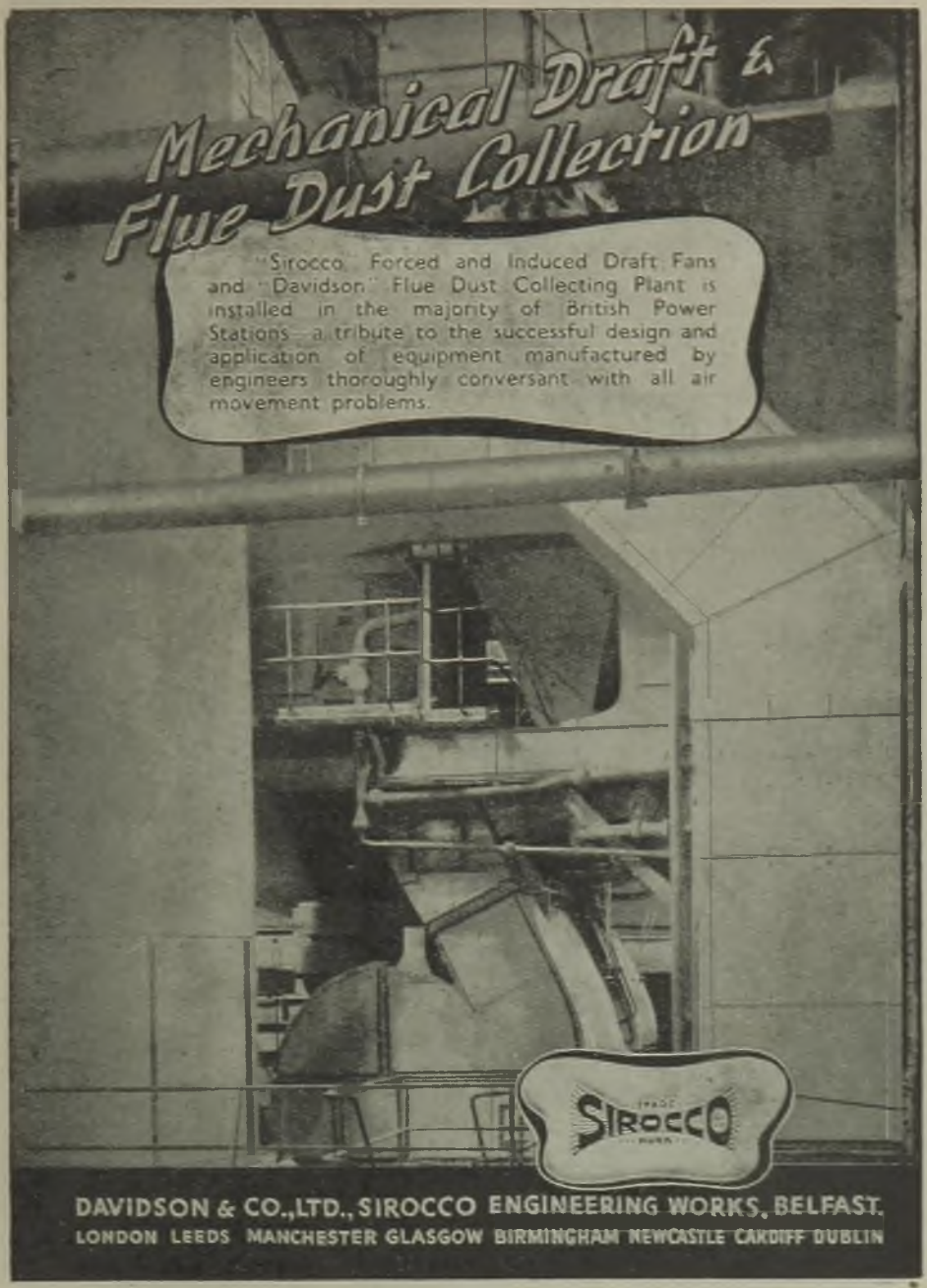
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ELECTRICAL REVIEW

July 27, 1945

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXVII. No. 3531. JULY 27, 1945 9d. WEEKLY

Load Building

Resumption After Wartime Suspension

WITH some notable exceptions the electricity supply industry up to the beginning of the first world war was, on the whole, run by engineers whose electrical training had been exclusively technical. During the first thirty years or so of its life the progress of the industry was along two avenues—lighting and industrial power. The technical and manufacturing development of the electric lamp and motor were such as to place these two services in an extremely favourable position to overtake other forms of lighting and power, and load came to the supply undertakings almost automatically. This was superficially a highly satisfactory state of affairs compatible with the outlook of the supply engineers at that time.

Serious Competition

Later on, however, when points of saturation were approached, and when advancement came to be regarded from a broader and national point of view, expansion was called for in other fields—space heating, cooking and water heating, industrial heating, welding, rural electrification, and so on—in the face of commercially highly organised competition.

The narrower, mainly technical, management was not ready for this, and the first reaction was a call for salesmanship—pure and simple. A few years of this outlook made it evident that something was amiss. We began to hear of such queer things as the Sunday cooking problem, and results were falling short of what was anticipated. During this period of "uncontrolled salesmanship," however, it was evident that things were moving more smoothly in some quarters where, it seems to us, a latent commercial flair had been awakened in the technical mind and where something of greater stability than "uncontrolled salesmanship" was gaining ground.

A few more years, during which the need for a closer knitting of the commercial and technical ideas of load development was gradually becoming appreciated, and when the newer outlook came to be expressed as load building, brought us to 1939—and war.

The Paramount Need

During this later time the *Electrical Review* saw the paramount need of the supply industry for many years ahead, and set about the task of stressing the need for load building by the publication of articles in which carefully selected widely varying load conditions were recorded and methods suitable for dealing with them were indicated. We enjoyed the wholehearted co-operation of many supply engineers in this work for which the practical experience of members of our staff in the supply world stood us in good stead.

We had to lay this work aside during the war years, and still the time is not ripe for a full resumption of the load-building programme. But with the cessation of hostilities in Europe we can look forward more closely to normal development again, and we intend to resume progressively our pre-war efforts in the cause of load building.

In this issue we publish the first results of our renewed investigation in this connection—"Industry in Ayrshire." Here is a

case where, because of small beginnings and exceptionally diverse potential load conditions, none of the more subtle load-building schemes such as are operated by industrial specialists has been possible, and direct appeal has had to be the method of winning over the consumer all along. But this week's article and that describing the Ayrshire distribution scheme in the *Electrical Review* of July 6th provide a very good example of the true load-building outlook.

Future Loads

IN view of present uncertainty regarding the adequacy of generating plant to meet demands in the near future, the importance of an appreciation of the principles of load forecasting is generally recognised. Greater accuracy than can be secured by extrapolation from present trends is requisite. An article by Mr. G. O. McLean in this issue shows that the laws of probability can be applied to such studies (as indeed they are by Post Office engineers to the similar problem of telephone traffic density and peak loads) without very laborious mathematics, and that research regarding load conditions would produce results of considerable benefit.

The Henry

A CORRESPONDENT has raised the question of whether the plural of henry—the practical unit of self- or mutual-inductance — should be spelt "henrys" or "henries." Our own preference is to use the former. There was only one Joseph Henry after whom the unit was named. Reference to more than one member of his family would be indicated by adding "s" to the surname, not by altering the termination. Moreover, a unit called after an individual becomes a noun in its own right, and its plural may be formed with "s." Both spellings are and will no doubt continue to be used in technical literature until the next edition of the British Standard Glossary gives a ruling.

Two-Way Research

MUCH closer co-operation between research workers in universities and in industry was urged in the I.E.E. Report on the Organisation of Post-War Electrical Research. The former are chiefly responsible for new ideas and new technique in research and the latter have to realise the problems which these are intended to solve, as Mr. T. M. Herbert, stated in regard to the interchange arrangements which the L.M.S. have in hand, as reported on another page. Occasional contacts between the two or post-graduate courses at universities are not enough to allow the men engaged to assimilate the atmosphere peculiar to each type of research—the ultimately practical aim and disinterested seeking of new knowledge. It is to be hoped that two-way traffic of this kind will be extensively adopted in the electrical industry.

Street Lighting

RESTORATION of full street lighting is recognised as having a social value that is out of all proportion to the cost entailed. For one thing it provides one of the few obvious indications so far of victory in the European war. There is also road safety to consider. Mr. William Lawther, president of the Miners' Union, has expressed concern over the extra coal consumption involved in view of the coal shortage expected next winter. Actually to bring street lighting up to 1938-39 standards would call for an extra consumption of hardly more than ¼ million tons compared with 192 million tons mined last year, 24 million of which was taken by electricity supply undertakings and transport authorities. Moreover, the street-lighting load being off-peak should not worsen the generating plant position.

Purchase Tax

AUTOMOBILE manufacturers are campaigning for the early removal of purchase tax from cars and no doubt they can put up a good case. Nevertheless, there are many other goods which may claim prior consideration in this matter, among them being domestic electrical appliances. Some of these may conceivably be classed as "luxuries," although we would find it hard to agree, but such things as electric cookers, water heaters and washboilers can certainly not be regarded in this light. Those which are not absolute necessities are, to put it mildly, very desirable when domestic assistance is virtually unobtainable by the harassed housewife. There is no case for retaining the purchase tax on these appliances which are difficult enough to acquire anyway.

Industry in Ayrshire—I

Load Building Results and Prospects

BUT for public electricity supply Ayrshire would not be on the map. We heard something like this more than once during a recent visit to the county to obtain some impressions of the activities of the Ayrshire Electricity Board. In a congested area dominated by one industry the best method of setting about an investigation is to try to discover the influence of the industry on electricity supply but in dealing with a mixed area like Ayrshire, "the county of a thousand trades," it is more profitable to ask "What is the influence of electricity supply on industry?"

Unfortunately it is not easy to obtain an answer to the question, for seldom will, or can, a works manager quote a figure indicating increased production as the result of using electricity. More often than not he prefers for business reasons to conceal this information even if it can be given in figures. But we were frequently told by Ayrshire consumers of improvement in the quality of their products, of greater cleanliness, more efficient driving, and of labour saving, all due to electricity; and sometimes a reference to increased output was thrown in by a particularly enthusiastic works manager.

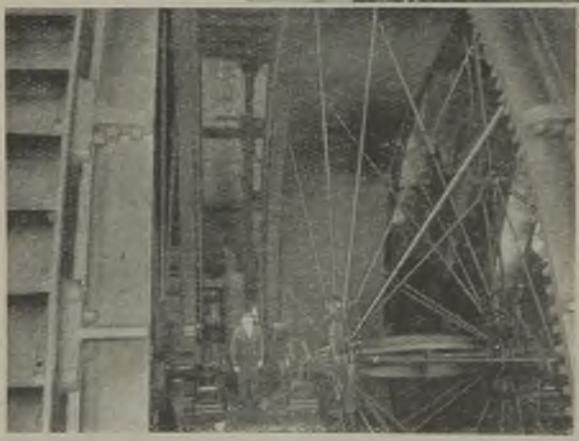
Such expressions of satisfaction by consumers perhaps have a fuller meaning than statistics to the electrical man, and that is why most of this article is devoted to impressions gained during a number of brief visits to consumers and installations throughout the county. A few statistics first, however, will help to create the right perspective. Taking the county as a whole the predomination of the industrial load is borne out by the following figures. Out of a total of 200,178,460 kWh sold in 1944, 147,272,613 kWh was sold for power, 13,824,467 kWh for commercial lighting and heating, and 38,453,129 kWh was sold to domestic consumers for heating, lighting and cooking. Of a total of 59,060 consumers, 39,878 are in the burghs, and 19,182 are in the outlying and rural districts. Considering the sparseness of the total population of the county of 300,000 inhabitants, and the start from scratch hardly more than a few years ago, the ratio of consumers to population is fairly good, but the predominant mood seems to be one of satisfaction that there is still a large field for load building. The total connected load is 198,340 kW and the energy sold per kW connected is 1,000 kWh.

Tariffs are always an indication of policy,

At the colliery of New Cumnock Collieries, Ltd., seen at the top of the page, from an incoming 11-kV supply, the colliery engineers take over and control the 3·3-kV distribution

Up-to-date methods of washing cows at the Perryston farm; note recessed floor lights and milking machine on left

especially in an undertaking so scattered as the A.E.B. The following notes merely indicate the trend; they by no means cover the comprehensive range of charges. In the industrial field the small consumer using up to 1,250 kWh per quarter pays 2d. per kWh, while the larger power consumers, using over a million kWh per year with certain consumption guarantees, secure supply at as low as 0·57d. per kWh. For the commercial consumers there are lighting flat rates of 3d. and 2d. per kWh for the winter and summer quarters, respectively, while electricity for heating and cooking can be purchased at 0·75d. per kWh.



At Catrine there is evidence of progress, but the water wheel (left) still serves about 300 looms and 8,000 spindles, all of which are to be converted to electric drive

A rather unusual two-rate tariff exists for domestic consumers. It consists of a primary rate of 3·5d. per kWh, and a secondary rate of 0·625d. per kWh. With a view to developing the cooking and water-heating loads, where apparatus is installed for these purposes the secondary rate is reduced to 0·375d. per kWh. The proportioning of these two rates is variable according to loading conditions and rateable values, and on the lower rental values, up to £20 per annum, 100 kWh may be charged at the primary rate and the remainder at the secondary rate. The charges for electricity are the same throughout the whole of the county, there being no increase to consumers in the sparsely populated areas.

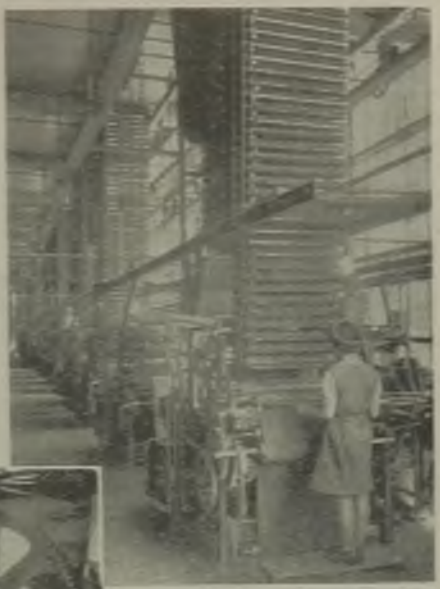
These tariffs are evidently framed for a great diversity of industry and this is reflected in the load of the undertaking and the outlook of the load builders. As to the availability of supply, our article on the distribution system in Ayrshire in the *Electrical Review* of July 6th, showed how practically the whole of the county is covered from Ballantrae in the south to Largs in the north and from anywhere on the coastline to Darvel and New Cumnock in the east.

Further, those two small areas isolated from the main system and served by the Board by means of supplementary supplies purchased from owners of private generating plants in the areas, serve to underline the Board's policy of making electricity available everywhere if it is commercially possible in the long run. On the question of the use of electricity we have a longer and perhaps a more interesting story to tell.

As to the story of electricity supply in the county it is desirable to present some outstanding facts and figures. They are taken from an excellent brochure prepared for industrial inquirers by the County Council. The county embraces over 1,000 sq. miles of the South-West of Scotland and its population is fairly evenly spread. About 150 industries

are mentioned in an appendix, many of which we shall refer to in detail later on. The location of many of the industries mentioned is determined by the availability of raw materials. In addition to these the county supports a very large agricultural and pastoral community. The standard of its milk production is probably unexcelled in Great Britain, and more than half of the 1,600 dairy farmers are licensed for the production of certified milk. From the chain of hills at the north, east and south of the county run several rivers to the sea in the west, including the Garnock, Irvine, Ayr and Girvan.

To cater for about 50,000 pupils there are about 160 schools and a staff of about 1,800 teachers, and the wide range of modes of living and working is reflected in the wide variety of types of education available. The brochure also makes reference to the electricity undertaking, including the facts that all of the 16 burghs have public electricity supplies, that only a few villages in the southern part of the county are without supplies, and that 99 per cent. of the factories in the county take a supply of electricity from the undertaking.



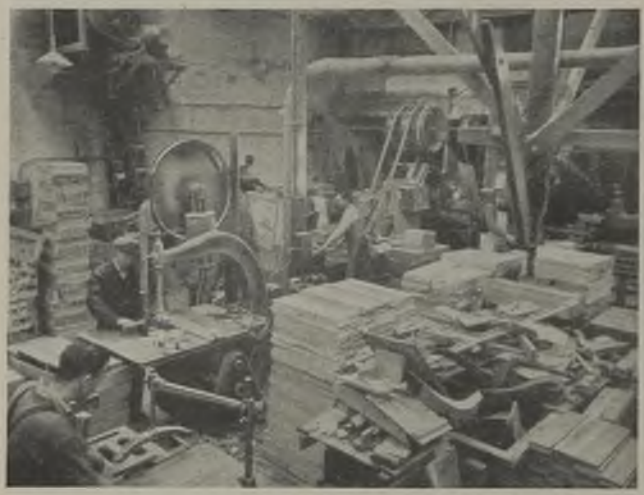
Some of the 280 weaving machines engaged in the manufacture of Royal Axminster carpets at Blackwood Morton carpet works

A ship of about 2,000 tons displacement on the slip-way of the Ayrshire Dockyard Irvine, for overhaul. The large rope-haulage equipment by which such vessels are drawn up the slip-way is shown above

Foremost among the industries of Ayrshire is coal mining. The coalfields are practically all in the straths of the larger rivers and all qualities and sizes of coal can be supplied to meet all household, commercial and industrial requirements. At the colliery of New Cumnock Collieries, Ltd., we saw how, from an incoming supply at 11 kV, the colliery engineers take over and control a supply at the distribution voltage of 3·3 kV. The main load is pumping, but electricity

is also used extensively for coal cutting, conveying, haulage, washing and screening. This colliery produces about 500,000 tons of coal per year and the electricity consumption is about 8·5 million kWh per year.

Agriculture is generally spoken of as something apart from industry, for industry and engineering are tied in the alert electrical mind, but what is modern farming but really first-class engineering? Dairy farming is the most important and widespread branch of Ayrshire's agriculture, and the famous Ayrshire cow has a reputation for her greater yield of milk and lower cost of keep. A 2,000-gallon-per-year cow is not exceptional.



Woodworking machinery at the works of Macneill Bros., Ltd., includes a modern tenoning machine and a spindle moulding machine (in the background)

In getting about we have been shown a good many up-to-date farms by proud supply engineers, but we were surprised to learn at Mr. A. P. Newall's farm at Perryston that about 66,000 kWh per annum is used in milking, cooling, bottling, sterilising and fodder milling and crushing. The highlight of this visit was to be seen at one end of a very fine and large shed cows being washed in the most hygienic manner imaginable in readiness for milking in the stalls at the rear (see illustration). Hot water at 170 deg. F. from two 40-gal. 3-kW G.E.C. immersion-heater tanks flows by gravity to a point near the washing stalls where the dairy maids can mix the hot and cold water by suitable valves in the pipe line so as to get the right temperature at the massage brush which is fixed at the end of the washing water system.

The output of the carpet factories in Ayr and Kilmarnock is decidedly on the increase, and the older types of hard carpets such as Brussels, Scotch and tapestry are giving way to the softer and more luxurious types such as Wilton and Axminster. At the carpet factory at Kilmarnock of Blackwood, Morton & Sons, Ltd., we saw some of the looms which were engaged in the manufacture of Axminster carpets. The factory normally produces 5,000 carpets, 12,000 rugs and 20,000 yards of piece goods per week in a wide variety of qualities and sizes; the consumption of electricity is about 1,250,000 kWh per year, and the total HP installed is 348.

A further example of the textile industries in the county is the works at Catrine of J. Finlay & Co., Ltd., which produces fine cotton articles in great variety. Since 1830 the whole factory has been the subject of a group drive from an extraordinary water wheel operating at a 27-ft. fall in the River Ayr at Catrine. The wheel is in two sections, each 12 ft. wide and 50 ft. in diameter. It passes 200 tons of water per minute, runs at 3 RPM and develops about 500 HP. It is about 50 yards from the factory proper, and transmission is by an 18-in. cast-iron shaft which runs in a tunnel under a public highway. The wheel serves about 300 looms and 8,000 spindles. Since 1932 the A.E.B. has supplied electricity for driving part of the cotton mills and bleach works at this factory, and under the reconstruction scheme the water wheel is soon to be dismantled and scrapped and the whole of the plant is to be electrically driven on public supply. The estimated load is 2,000 kW.

Shipbuilding firms at the coastal towns of Ardrossan, Irvine, Troon and Ayr have always had a great reputation for good work which has been enhanced by the more modern methods made possible by electricity supply—electric welding, for instance. Steam and motor passenger and cargo ships up

to 350 ft. long are built, as well as tugs, coasters, hopper barges, lighters, etc. When we called at the Ayrshire Dockyard Co., Ltd., at Irvine, there was a ship of about 2,000 tons displacement on the slip-way for overhaul, but we were particularly interested in the large rope-haulage equipment by which such vessels are drawn up the slip-way. The two lines of primary and secondary drums are gear engaged, and the whole is driven by two 90-HP, 400/700-RPM, DC variable-speed E.C.C. motors, one at each end.

The factory of the Saxone Shoe Co., Ltd., Kilmarnock, normally produces 8,000 pairs of shoes a week; making and heeling department—heel-attaching and nailing machine in foreground, sole-fixing and rounding machines in background

The centre of furniture manufacture in Ayrshire is the town of Beith. This name is of Celtic origin signifying "birch," and chair making of birch wood was a staple industry in earlier days. Huge stocks of fine timber characterise the factories, for long periods of seasoning are necessary, but after seeing the installation for artificial weathering at the works of Macneill Bros., Ltd., we feel that this costly burden on the industry may soon be considerably lessened generally. Motor-driven fan heaters draw the damp air from the drying room and send it through external tubular-heater dryers from which it is passed back to the drying room. We saw a fine complement of modern woodworking machinery here, and in our picture of a section of the machine room is shown a modern tenoning machine with a spindle moulding machine in the background and a band and squaring saw in the foreground, all electrically driven, of course. This factory consumes about 65,000 kWh per year.

Composite remilling, bagging and screening machine in the fertiliser factory at Ayr; overhead travelling cranes are used extensively for transporting the material

Another important Ayrshire industry is that of boot and shoe manufacture, and factories, particularly in Kilmarnock, Ayr and Maybole, are well equipped with electrically driven modern plant and machinery for the economic production of a high-grade article. At the factory of the Saxone Shoe Co., Ltd., in Kilmarnock, we were able to see something of the electrical aspects for a production in normal times of 8,000

pairs of shoes per week, representing roughly a consumption of 144,000 kWh.

Electricity is largely used in the manufacture of fertilisers at the works of Daniel Wyllie & Co., Ltd. Phosphate rock is first milled to flour and then dissolved to produce superphosphate which is the basis from which most fertilisers are produced by adding and mixing such materials as sulphate of ammonia, potash and other foods, according to the plant life which the material is to nourish. The mass is milled, screened and matured, remilled and bagged ready for the farmer. A composite remilling, bagging and screening machine has a 10-HP motor drive for the machine propulsion, while the remilling and screening and bagging operations are each served by 25-HP motors. Overhead travelling cranes are used extensively for transporting the material to and from the operations and the maturing store. About 20,000 tons of fertiliser is produced per year and a typical electricity consumption figure is 300,000 kWh.

The Meaford Station

Minister Lays Foundation Stone

THE Minister of Fuel and Power, Major Gwilym Lloyd George, last week laid the foundation stone of the new £5,000,000 generating station which the North-West Midlands Joint Electricity Authority is constructing at Meaford, near Stone, as part of the Central Electricity Board's development programme for Central England. Standing on a 120-acre site, the new station will have four 30,000-kW turbo-alternators, two being in commission by the end of next year and the remainder by the end of 1947.

Major Lloyd George laying the foundation stone of the new Meaford generating station. With him are Mr. F. Favell and Mrs. H. Leason

The turbo-alternators which will generate at 11,800 V, are being supplied by the General Electric Co., Ltd., which will also be responsible for the static transformers and all the motors for the ancillary equipment. The six Babcock & Wilcox pulverised fuel-fired water-tube boilers will have a maximum continuous evaporative capacity of 240,000 lb. per hour, the final steam conditions being 650 lb. per sq. in. and 850 deg. F. Each boiler will be fitted with three coal pulverising mills, economisers and air heaters and with Lodge-Cottrell electrostatic precipitators. The two cooling towers, provided by the Davenport Engineering Co. will each have a capacity of 3,000,000 gal. an hr. while the five horizontal spindle circulating water pumps (W. H. Allen, Sons & Co.) will have a capacity of 23,000 gal. per min. against a total head of 58 ft.

At a lunch which preceded the stone-laying ceremony Alderman H. Leason, chairman of the Authority, presided and said that the scheme would be a godsend to the whole community and the district. Proposing the toast of "The Authority," Lieut-Col. W. J. Kent, president of the North Staffordshire Chamber of Commerce, hoped that the pottery industry would use electricity more and asserted that electricity should be generated where the coalfields were. He hoped for full development of electricity in rural districts. Mr. F. Favell, chief engineer and manager of the Authority, said that the C.E.B. was faced with a big problem and a great responsibility in meeting the needs of consumers in the next ten years.

I.E.E. Devon and Cornwall Sub-centre

Membership of the Sub-centre now totals 248. Well-attended meetings have been held during the past year at Exeter, Newton Abbot, Taunton and Plymouth, the topics under discussion including West Devon hydro-electric developments, reinforced concrete transmission line supports, farm mechanisation and television.

Arc-Welding Costs

Comparison of Transformer and Motor-generator Plant

By E. C. Bailey, Graduate I.E.E.

THE relative merits of AC and DC for arc welding are not taken into account in the following comparison, which is based entirely upon economic considerations, of the operating costs of static and rotary plant employed for a variety of plate production purposes in a steel works.

The electrodes utilised range from No. 10 to No. 4 SWG and the machines concerned, both of the single-operator type, are (*a*) motor generator with a DC output of from 60 to 250 A, driven by a squirrel-cage motor connected to three-phase mains at 400 V and (*b*) transformer with an AC output of from 15 to 250 A, connected to two lines of three-phase mains at 400 V. A condenser of 8 kVAr is provided for power factor correction, its cost being included in that of the transformer.

The average annual consumption of energy has been arrived at in the following ways. Over a period of one year the input to twenty-four similar transformer sets totalled 60,360 kWh; thus the requirement per transformer is 2,515 kWh. For the same amount of welding during an equal period of time, more energy is utilised by the rotary plant because it is less efficient than the static sets; so the aggregate input to the former has been calculated from that to the latter, with due allowance for the difference between their relative efficiencies.

The indirect costs will be self-evident from the data set out in Table 1, while

TABLE 1.—REQUIRED DATA

	Transformer plant	Motor-Generator plant
Capital cost of plant, £	83	136
Life, in years	20	10
Scrap value after above life (percentage of cost)	10	10
Interest on capital (per cent. per annum)	4	4
Overall efficiency (ratio of power appearing at arc to input power from mains), per cent.	90	70
Average annual consumption, kWh	2,515	3,233

Table 2 shows the operating costs. Regarding the direct portion of the latter (repairs) the £3 average annual maintenance cost per transformer is taken over a period of five years for sixteen similar plants. The £6 average per motor generator is taken over a period of four years for nine similar plants. It may be noted that these figures do not include repairs to welding and earth cables and electrode holders, which are not booked to the plant number.

So far as the cost of energy is concerned the tariff for transformer welders is at the flat rate of 1½d. per kWh plus 5 per cent. whereas the motor generator type may be connected to the power main at a tariff of 0·65d. per kWh, plus 5 per cent., plus 0·068d. per kWh (coal clause).

Study of Table 2 will show that although

TABLE 2.—OPERATING COSTS

	Transformer plant	Motor-generator plant
	£ s. d.	£ s. d.
Indirect costs		
1. Interest on capital, 4 per cent.	3 6 5	5 8 10
2. Depreciation of plant	3 14 8	12 4 6
Direct costs		
1. Repairs and maintenance	3 0 0	6 0 0
2. Energy: (Transformer plant 2,515 kWh at 1½d. kWh plus 5 per cent.)	16 10 2	
(M.G. plant 3,233 kWh at 0·65d. plus 5 per cent. [plus 0·068d.])		10 2 3
Total	26 11 3	33 15 7

the cost per kWh for transformer plant is over twice as much as for motor generators, in the case considered, the total annual cost of the former is less than that of the latter. This fact is due to the greater interest and depreciation charges and maintenance costs on the motor-generator type of plant.

Power Shortage in Victoria

ELECTRICITY may have to be rationed in Victoria owing to the limited quantities of N.S.W. black coal and briquettes available for use at State electricity generating stations other than Yallourn. A chain of unfortunate circumstances has been linked with the coal troubles—a breakdown of one of the largest generating sets at Yallourn, a fire at the Yallourn briquette factory, and depletion of the electricity supply from hydro stations owing to prolonged dry weather. The position in Western Australia is also likely to be serious owing to the cessation of work on the Collie coalfields.

Views on the News

Reflections on Current Topics

IT came as a surprise to me to read that during the 1941-42 session the aggregate hours of instruction at London's polytechnics and technical institutes was greater than before the war. Many people, I imagine, will have pictured the work of the L.C.C.'s educational institutes as having been brought to a virtual standstill during the period of heavy raids. Actually, the number of civilian students at one time dropped to less than a quarter of the pre-war total of 99,050, but a considerable volume of wartime training was undertaken which the general public know little about. Some interesting facts given to the L.C.C. recently showed that the total number of Forces personnel, etc., receiving instruction in 1941-42 was 24,850. The training of troops in radio-location was a striking example of the work undertaken, and at one time as many as 6,000 were attending the courses.

* * *

I see that some transport authorities in this country are proposing to go ahead with their pre-war plans for scrapping their trams in favour of motor-buses. It would be a pity, I think, if this country, which pioneered the trolley-bus, were to lose the initiative in the development of this type of vehicle. A series of articles which has recently appeared in the Canadian *Electrical News and Engineering* calls attention to the headway which the trolley-coach is making in the United States. The case of Shreveport, La., is cited as an example. There, when trolley-coaches were introduced on one route in 1931 the number of passengers immediately increased and continued to mount throughout the depression period although other operators were experiencing a marked decline in business. A public opinion poll was taken at Portland, Ore., in 1940, 80 per cent. of the people voting for more trolley-coaches while only 2 per cent. wanted more motor vehicles. In Cleveland trolley and motor coaches could not be run together on a route because passengers waited for the former. Operators at Akron, Dallas and Youngstown are withdrawing motor-buses in favour of trolley-vehicles on some routes.

* * *

I have just been having another look at some of the prototypes of emergency houses to be provided by the Ministry of Works. The placing of plug sockets close to the floor has for a long time created a good deal of criticism so I was interested to notice that in the American house, of which 30,000 are to be imported, the outlets have been raised to waist level despite the fact that the wiring is run behind the skirting board. The use of "Perspex" in the lighting fitting over the cooker and sink points the way to the adoption of new materials, while the wall mounting of lighting fittings in this bungalow contrasts with the ceiling units with pull switches favoured in an aluminium house close by. The latter, a real piece of engineering construction, surely deserves a better fate than a life of only ten years. The makers say it would last over a hundred. When in full production these houses will be produced at the rate of one every twelve minutes. They are delivered in four sections and can be erected and made habitable in four hours.

* * *

A strange lack of leadership was manifested at a recent meeting of the Burnley Town Council. The chairman of the Electricity Committee was asked whether the Committee would consider the restoration of the hire-purchase arrangements; he replied that "the Committee would not dream of doing it unless the Gas Committee did the same thing." Surely the electricity supply industry followed the gas people for too many years; I should think that we should now show them the way.

* * *

Major G. Lloyd George, in laying the foundation stone of the new Meaford power station last week, said:—

> "In English life love of the antique is stronger than anywhere else in the world, but this does not mean that all that is ancient is necessarily beautiful or that what is modern is necessarily ugly."

On the same day the *Daily Telegraph*, referring to Mr. Churchill in Potsdam, said:—

> "From the rococo conference room he will have seen already the windmill which so offended the æsthetic sense of Frederick the Great and Voltaire. The miller, unlike subsequent generations of Germans, was passionately independent and refused stubbornly to sell or dismantle his windmill."

I can foresee the day when, as atomic energy replaces electricity, a future Council for the Preservation of Rural England will insist upon the retention of the graceful "pylons," a typical feature of the English landscape, and the cooling towers, possessing an architectural beauty which has never since been attained.

* * *

An advertisement in *The Times* of July 14th sought "an electric chair in good condition." I doubt whether such appliances come within the Lease-Lend arrangement or whether an import licence would be granted.

—**REFLECTOR.**

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Equipment of Birmingham Bungalows

THE Public Works Committee of the Birmingham Corporation has decided that of the 4,500 temporary bungalows to be erected in Birmingham, 50 per cent. are to be provided with electric cookers and 50 per cent. with gas cookers.

You may also be interested to know that the contract, which has just been placed by the Birmingham Corporation for the first 200 permanent houses, the building of which will shortly commence, includes the following electrical equipment in each house: Lighting, ten socket outlets, one fixed fire (1-kW) in bedroom and wiring provision for cooker, washboiler and circulator.

As gas piping is also being provided for the last three purposes, the individual tenants will be able to make their own choice as to whether electricity or gas is to be used for these particular items.

The wiring for the ten socket outlets (which are 15-A, 3-pin, to B.S. 546) and the 1-kW. fixed fire consists of three separate circuits, each wired with 3/·036 cable and protected at the distribution board by a 15-A fuse. The number and grouping of points which are fed by each circuit have been arranged on the basis that the maximum load which can be reasonably anticipated on each circuit will not exceed 3 kW, having in mind the particular locations of the outlets and the simultaneous use to which they might be put.

F. W. LAWTON,
Birmingham. Chief Engineer and Manager.

Releases from the R.A.F.

IN common with the other electrical engineers in the R.A.F., I am very grateful to you, in these days of severely limited space, for publishing my letter in your issue of June 29th and for your editorial comment in your current issue on the apparent improvement in the speed of release from the Technical Branch of the R.A.F. Unhappily, although the release of Groups 3 to 15 by the end of September is a big improvement on the previous situation, unless a similar tempo is maintained in subsequent months, the cold facts of the case will differ greatly from your kind hope that I and my colleagues may resume our civil duties within a very short time.

In the Bomber Command Group in which I am employed, for example, there are twenty-seven electrical engineer officers. Not one of them will be affected by the release of age and service Groups 3 to 15. To us, therefore, this apparently large concession is "full of sound and fury, signifying nothing"! The older men among us, in particular, have vitally important civil careers urgently demanding our return to the electrical engineering industry. Maybe, if you and we plug away at this fact a little harder it will convince those "chair-borne" administrators to whom we were foolish enough to entrust our destinies when we volunteered for service, that it is now high time to release a reasonable percentage of electrical engineer officers.

R.A.F.V.R. OFFICER (M.I.E.E.)

Charging the Domestic Consumer

IN the *Electrical Review* of June 29th, Captain J. M. Donaldson reviewed the several methods adopted for charging for electricity for domestic purposes. He also pointed out the pros and cons of the various methods and it would appear that he considers the two-part tariff desirable both from the consumers' and the supply authority's points of view. Every supply undertaker in this country has to purchase electricity in bulk on a two-part tariff basis from the C.E.B. and I doubt whether there is anyone who will deny that the same method should be employed for re-selling the current to individual consumers. It is on the method of application that disagreement arises. The two-part tariff in itself is "promotional" and bears relation, or should do so, to the cost of production and distribution. It should also be easily adjustable and should not (as the present methods of application do) cause annoyance and difficulty to the consumer.

Even the two methods which Captain Donaldson favours, have definite disadvantages. The floor area method is most inequitable and is merely a convenient form of collecting money; the block tariff is somewhat simpler, but in both cases the tariffs bear little or no relation to the costs of production. If each individual supply undertaker knows what his cost of electricity is going to be, I cannot see that there should be any great

difficulty in arriving at an estimate of his distribution costs and apportioning these between the domestic, commercial and industrial consumers.

With regard to commercial and industrial consumers over, say, 50 kW maximum demand, the method at present generally adopted of using demand indicators and an appropriate two-part tariff, appears to be generally satisfactory. However, there remains the suitable application of a two-part tariff for the domestic, small commercial, and small industrial consumers. The method should be suitable for adoption on a national basis which does not necessarily mean that every consumer in the country would be charged the same for his electricity, but the method would be the same and the cost of supplying electricity to the consumer would be the basis.

It appears to me that a tariff worked out on this basis can be applied by every undertaking after a careful study of its costs of production (or purchase of electricity), distribution costs and also the loading conditions. All the consumer need be told (or wishes to know) is the cost of a given number of units, and a schedule which in effect is the consumer's account, is all that is necessary. This might show the actual cost of electricity from 1 to 100 kW in 1-kWh steps, and from 100 to 1,000 in 10-kWh steps and would give the consumer at a glance the cost of any amount of electricity that he is likely to use per month, per quarter or per annum, whilst records and billing are considerably simplified.

This schedule would be based on the load factor of the domestic consumers as a whole and also on the cost of electricity and its distribution to them. Similar schedules would be made for small commercial and small industrial consumers. The method is simple and a suitable formula can be constructed for any desired curve (cost per unit plotted against units), the shape of the latter being controlled by capital charges, running costs and load factor.

The formula is easily adjustable, say annually, for a change in load factor, cost of production, capital cost or any other contingency. It offers no great difficulty where prepayment meters are concerned, as the consumer's average cost of current can be as easily estimated by this method as it can be with the present methods in vogue in many electricity supply undertakings.

This method would appear to have all the desirable attributes required by Captain Donaldson, is extremely simple to apply and seems to be a practical solution to the problem.

A.B.C.

Return of Cable Drums

THE difficulties which cable makers have experienced in obtaining adequate supplies of cable drums still continue. Timber shortage is still acute and is likely to remain so for a long time, with a very restrictive effect upon the manufacture of new drums.

It is feared that a serious bottleneck is likely to develop as soon as cable production for reconstruction gets once more into full swing, unless cable users make drastic efforts to "keep the drums rolling" by emptying and returning them to their suppliers at the earliest possible moment. This would help to speed up cable deliveries considerably.

*London, W.C.*1. T. F. PURVES,
Director, Cable Makers' Association.

Interchange of Scientific Staffs

IN an address delivered to the Manchester Joint Research Council Mr. T. M. Herbert described the scheme devised by the L.M.S. Railway for interchanging its research workers with those of universities. Some of its research staff will be seconded each year to do fundamental research in their particular field in university laboratories—the duty to include teaching. In exchange the universities will send members of their staff for six months a year to the railway research laboratory at Derby to work on applied problems in which they are interested on the fundamental side. The immediate aim is to enlarge the outlook of the railway staff and to benefit by the experience of new techniques which the university men will bring. A long-term view is that those employed after graduation will have a better idea of industrial research as a career. The L.M.S. will undertake responsibility for finance not only in regard to salaries but also in meeting additional domestic expenses incurred by the men concerned (who are expected to be of 25 to 35 years of age), and for providing temporary housing accommodation for them.

Keeping Industrial Premises Clean

ORGANISING the job of keeping factory and office premises clean and healthy as an exact science is the aim of "The Industrial Housekeeping Manual," by R. F. Vincent, published by the National Foremen's Institute, Inc., at $2.50, and obtainable in this country (price 12s. 6d.) from F. J. Burns Morton, Hillsborough, Clarendon Road, Hinckley, Leicestershire. The book, which is addressed to building managers, supervisors and "cleaning crew foremen," includes in its 115 pages chapters on works methods; safety; the best methods of cleaning with different types of floor surfaces, sanitary fittings and lockers; soaps, etc.

Engineering Export

WITH the end of hostilities in Europe, manufacturers will have increasing opportunities of renewing and extending their contacts with overseas markets. In this they will be aided not only by the pre-war international reputation of British engineers, but also by the general recognition that has been accorded to the productive skill on a large scale entailed in the successful prosecution of the war. The aim of the *British Engineering Export Journal*, which appears this month (July–August) in a new format, is to aid these efforts by presenting buyers abroad with a running record of engineering developments here in the design and production of machinery of all kinds. A special allocation of paper has been made to enable the journal to be issued every other month in its enlarged form, and it is hoped to resume monthly publication in the near future. The journal, as an Iliffe publication, has behind it the resources and experience of twenty-seven trade and technical journals.

Primarily intended to describe and illustrate plant and equipment suitable for service abroad, due regard will be paid to climatic extremes of temperature and humidity conditions and the class of labour available locally to ensure reliable operation.

Examples of electrical and associated features included in the first number are articles on electric traction (in a Spanish supplement), Diesel-electric locomotives, airport lighting, fluorescent lamps in continuous troughing, crack detection by fluorescence, Little Barford power station, welded fabrication of water-tube boilers, " Operation Pluto " and plastics moulding. A section of the journal is devoted to new equipment.

Export Trade Research

THE recently formed British Export Trade Research Organisation (" B.E.T.R.O.") was put into operation last week at a meeting of representatives of fifty founder members, including some of the largest British industrial concerns. The chairman, Mr. Ivor Cooper (Lever Bros. & Unilever, Ltd.) said that they believed that our foreign trade must be based on accurate and continual market surveys. The Council had to recruit skilled staff to carry out the new science of market research; set up the operational side of the organisation; and settle its relationship with trade associations, export groups, and others, many of whom had asked to be affiliated. A membership campaign must be undertaken as soon as B.E.T.R.O. had a concrete service to offer.

In discussion of immediate projects members urged that it was necessary for industrialists to demonstrate that they could handle the country's export trade properly. Mr. M. A. T. Johnson (Richard Johnson & Nephew, Ltd.) considered it of the greatest importance that every firm of any standing in the export trade should join the organisation, and was supported in this by Mr. Arnold Jackson (Osborne-Peacock Co., Ltd.) who was of the opinion that industry should provide from £300,000 to £500,000 a year to carry out this important work.

Among those elected to the Council were: Mr. Leslie Gamage (General Electric Co., Ltd.), deputy-chairman; Mr. F. C. Burstall (Automatic Telephone & Electric Co., Ltd.); Mr. C. P. Lister (R. A. Lister & Co., Ltd.); Major A. Pam, O.B.E. (Pressed Steel Co.); Mr. C. K. F. Hague (Babcock & Wilcox); Sir Edward Wilshaw (Cable & Wireless); and Mr. N. G. Pehrson (Turner & Newall).

Mr. Philip Scott, who has been acting as organiser for the Formation Committee expressed his wish to devote himself to the overseas development. Mr. Arthur Ethell, who has been released by the Air Ministry from work as organising adviser, was appointed director of administration.

B.E.A.M.A. Activities

THE Council of the British Electrical and Allied Manufacturers' Association has approved a recommendation by the Director (Mr. V. Watlington) that an Export Section shall be formed to co-ordinate the export activities of all Sections of the Association. The formation of a new Industrial Capacitor Section has also been approved. A plan for the disposal of surplus Government electrical stores has been submitted to the Ministry of Supply with the hope of its being put into operation at the earliest possible moment. The Council is to keep constantly under review the position concerning manufacture in the Dominions and Colonies.

During the war the work of the B.E.A.M.A. Technical Committee has been restricted to problems directly connected with the war effort and normal work, as far as practicable, has been in abeyance. Consequently there is a considerable accumulation of standardisation work and the Council has asked the Standardisation Committee to resume its work and to report upon the question of additional membership and other points requiring the Council's attention. B.E.A.M.A. has been asked to double the number of its representatives on the B.S.I. Electrical Industry Committee.

The Council has received from the Ministry of Economic Warfare an appreciation of the Association's assistance during the European war.

Unification of Engineering Standards

A THIRD Conference on the Unification of Engineering Standards opens on September 24th in Ottawa, and will be attended by delegations appointed by Canada, Great Britain and the United States. Included on the agenda for the meetings are screw threads (including pipe threads); limits and fits; drawing practice; and metrology in mechanical engineering. Considerable progress has already been made in the effort to obtain overall unification of screw threads, and research on the most satisfactory thread form for general application is under way in each of the three countries. A common standard for Acme screw threads is in sight; and proposals have also been exchanged between the three countries for pipe threads based on an international inch standard.

PERSONAL and SOCIAL

News of Men and Women of the Industry

IN our last issue we quoted from a Belfast correspondent a statement that **Sir Leonard Pearce,** engineer-in-chief of the London Power Co. had been proposed as arbitrator on the question whether additional plant should be installed at the Harbour station, Belfast, or at the new Ballylumford station. Sir Leonard now tells us that he has been unable to see his way to acting in this capacity.

The following promotions have recently been made in the technical staff of the Bradford Corporation Electricity Department: Mr. A. Carter, A.M.I.E.E., to assistant mains superintendent; Mr. A. T. Charlton, A.M.I.E.E., to first mains assistant engineer; Mr. E. A. Gillett, A.M.I.E.E., from installation inspector to third mains assistant engineer; Mr. J. F. Mather, A.M.I.E.E., from draughtsman to clerk of works; Mr. D. Hughes, from draughtsman to senior draughtsman; Mr. H. P. Bramwell, M.I.E.E., from electrical testing superintendent to meter and test superintendent; Mr. C. W. Chandler, A.M.I.E.E., from senior consumers' assistant to consumers' engineer; Mr. A. J. Francis, A.M.I.E.E., from power representative to assistant consumers' engineer; and Mr. A. J. Hutchison, from assistant consumers' superintendent to sales and lighting engineer.

Mr. A. P. MacAlister, for whom a successor as borough electrical engineer of Islington is being sought, informs us that he is continuing in office until December 31st next.

Mr. Eric L. Cottrell, who has been for many years the secretary of Oliver J. Nilsen & Co., Pty., Ltd., Melbourne, has joined the board of the company as financial director and **Mr. Joseph McGaw,** manager of the engineering workshops, has been appointed technical

Mr. E. L. Cottrell

Mr. J. McGaw

director. Mr. Cottrell is financial director of Nilsen Cromie Pty., Ltd., switchgear manufacturers and of Nilcrom Porcelains (Aust.) Pty., Ltd. He will also become financial director of Oliver J. Nilsen & Co., Ltd., Adelaide, while Mr. McGaw will become technical director of these two companies. Oliver J. Nilsen & Co., Pty., Ltd., and its subsidiaries are among the largest electrical contractors and manufacturers in Australia. The company also owns and operates a broadcasting station.

Mr. James Andrews, who for forty-seven years has been with Johnson & Phillips, Ltd., has retired on pension from the position of foreman of the Maintenance Department and on July 10th was presented with a gold wristlet watch by Mr. G. Whitehead, production engineer, on behalf of the departmental managers, staff and workpeople. Mr. Andrews was to retire two years ago but stayed on to assist in the production of the "Pluto" pipe-line and the cable-laying machinery associated with it.

Mr. J. Andrews

Mr. H. M. Fricke, B.Sc., A.M.I.E.E., has taken over the duties of branch manager in Birmingham for Johnson & Phillips, Ltd., owing to the protracted illness of Mr. D. C. McLennan. Mr. Fricke was educated at Dulwich College and University College, London. He joined Johnson & Phillips as a student-apprentice in 1924 and was transferred to Birmingham in 1927.

Mr. E. B. Tuppen retired from the service of the British Thomson-Houston Co. on July 14th. Mr. Tuppen joined the B.T.H. Co. in 1903, and from the drawing office at Rugby, transferred to the control gear engineers. He specialised in control gear design, particularly for traction service and was closely associated with the design and development of coach equipments for many of the railways in this country and abroad, including the Central Argentine, Victorian State Railways, Liverpool-Southport, Bombay Baroda, and the London Underground Railways. For a few years before the war he was engaged in developing street lighting fittings for housing "Mercra" lamps. During the war he has been engaged on various designs for war purposes.

Mr. G. H. Hirons, A.I.E.E., is resigning his position as chief electrical assistant to Hoare, Lea & Partners, consulting engineers, to become a director of K. L. Paton Engineering Co., Ltd., Birmingham, specialists in engineering service installations.

We regret that the note regarding the appointment of **Mr. S. J. L. Hardie** as chairman of

Electrical Switchgear & Associated Manufacturers, Ltd., in our last issue was inadvertently placed under the "Obituary" heading. The error was corrected in the later part of the edition.

Mr. Harold Holson, chairman of the Central Electricity Board, has accepted an invitation to serve on the Industrial Advisory Panel of the Finance Corporation for Industry, Ltd. Another member is **Mr. C. P. Lister**, chairman of R. A. Lister & Co., Ltd.

Blackburn Electricity Committee has placed on record appreciation of the work of **Mr. J. B. Ashworth**, consumers' engineer, who has been appointed to a similar post with Preston Corporation; and **Mr. O. W. Hives**, chief clerk and commercial assistant, who has retired on superannuation for health reasons.

Mr. Ashworth, who has been at Blackburn for ten years, previously held appointments with the Farnworth and Bolton Electricity Departments and with the Lancashire Electric Power Co. For many years he has been a member of the Senior Sales Committee of the N.W. England and North Wales Area of the British Electrical Development Association, acting as chairman in 1940-41. He has also served as chairman of the Lighting and Appliances Section of the British Electrical Development Association.

The Blackburn Corporation is advertising in this issue for a successor to Mr. Ashworth (salary £605). The Corporation is also seeking a deputy electrical engineer (salary £852) to succeed **Mr. F. Barrell**, who has been appointed deputy at Leeds, and an assistant station engineer (salary £564).

Dr. John L. Savage has retired from the position of chief designing engineer to the United States Bureau of Reclamation but will continue to act in a consulting capacity. Dr. Savage was responsible for the design of the Grand Coulee, Shaster and Boulder Dams, three of the largest works of their kind in the world. He has also reported on water-power development in China, India and Australia.

The Brush Electrical Engineering Co., Ltd., recently held its 1945 sales conference at Loughborough and we reproduce a photograph taken upon the occasion. This shows a corner of the conference room with the conference in progress under the chairmanship of **Mr. D. B. Hoseason**.

Mr. H. W. J. Inshaw has relinquished his post on the technical staff of United Ebonite & Lorival, Ltd., and has taken up an appointment as Assistant Controller, Rubber and Plastic Products, on the Control Commission for Germany.

Mr. L. A. D. Pedler is shortly retiring from the position of acting general manager and chief engineer of the Bristol electricity undertaking to which he was appointed upon the retirement of Mr. A. J. Newman at the end of last year. At its last week's meeting the City Council adopted a recommendation of the Electricity Committee that in view of the anticipated great development there should be a general manager, with a salary of from £1,600 to £2,000 a year and an electrical engineer (£1,500 to £1,800). Mr. W. A. Wilkins said that it was certain that eventually the generation of electricity would be solely vested in the Central Electricity Board and the responsibilities of authorities like Bristol would be largely the distribution of electricity and the sale of electrical appliances.

Mr. Charles H. Powel, president of the American Institute of Electrical Engineers, is to be chief of the electrical and radio branch of the U.S. Group Control Council for Germany.

Mr. J. K. Wilson, general sales manager of the Shawinigan Water & Power Co., has been elected president of the Canadian Electrical Association.

Mr. W. P. Wren, switchboard attendant, has retired after thirty-six years' service with the Hammersmith Electricity Department.

Dr. E. W. Smith has been elected president of the Institute of Fuel for 1945-46. This will be his third year of office.

Mr. H. S. Poole has taken up duties with Aerialite, Ltd., as Midlands sales manager. He has resigned from his position as director and sales manager of Gothic Electrical Supplies, Ltd., which company he joined in 1929. In 1940 he went to the Ministry of Supply, obtaining his release this month.

Mr. Burt J. Nun, northern manager of the Sturtevant Engineering Co., Manchester, has been elected president of the Manchester Rotary Club.

We recently reported the approaching retirement of **Mr. J. W. Spark**, city electrical engineer

The Brush Company's 1945 sales conference

of Bath. In this issue the Bath Corporation is advertising for a successor to Mr. Spark at a commencing salary of £1,300 plus war bonus (now £60).

Mr. L. H. Pearson has been elected chairman of the Electrical Section of the National Federation of Ironmongers.

Mr. H. B. V. Teague has joined the board of Crossley Bros., Ltd.

Mr. W. Vincent Waite, O.B.E., M.I.Mech.E., A.M.I.E.E., has concluded his services as Assistant Director, Fighting Vehicles Production and his present address is "Ivy Nook," Hamilton Drive, The Park, Nottingham (telephone: 43914).

Obituary

Mr. Joseph Edward Betts, whose sudden death on July 14th was briefly recorded in our last issue, had completed forty-five years service with the British Thomson-Houston Co., Ltd., holding the position of supervisor of purchases for the B.T.H. Co., and chairman of the A.E.I. Group Purchasing Committee. He was born in 1875 at Clifton, Bristol, and was educated at the Bristol Grammar School and the Merchant Venturers' Technical College, Bristol. He served an engineering apprenticeship with King, Mendham & Co., general electrical engineers. After holding engineering appointments in South Africa, Mr. Betts joined the outside construction staff of the B.T.H. Co., in 1900, being first employed on the Bristol tramways electrification scheme, then on work in connection with the Glasgow Corporation tramways power station, Pinkston, the Ayr Corporation tramways, the Hamilton, Motherwell and Wishaw tramways, the Sheffield Corporation tramway power station and elsewhere. In 1902 he was transferred to the construction staff at the Rugby Works, and later was appointed manager of factory production, stores, and order departments. He was appointed supervisor of purchases in 1918, and became chairman of the A.E.I. Group Purchasing Committee in 1931.

The late Mr. J. E. Betts

Mr. J. A. Braidwood.—Mr. John Alexander Braidwood, B.Sc., A.M.I.E.E., chief electrical engineer to Dorman Long & Co., Ltd., Cleveland Iron and Steelworks, died at his home, Marton, Middlesbrough, on July 15th, after a long illness. He was thirty-nine. Mr. Braidwood joined the company in 1932 as assistant electrical engineer at Cleveland, becoming chief electrical engineer a few months later. A native of Buckhaven, Fife, he began his engineering career in the collieries of that district, followed by some years with Metropolitan-Vickers Electrical Co., Ltd., before joining the Dorman Long organisation. Mr. Braidwood had been elected chairman of the Tees-side Sub-Centre of the I.E.E. for the ensuing session.

Mr. J. Hassall.—We regret to announce the death of Mr. J. Hassall, governing director of Electrical Power Maintenance Service, Ltd., Birmingham, who met with a fatal accident on July 10th whilst acting as glider instructor at Sutton Bank, Thirsk, Yorkshire.

Mr. A. F. Gillis.—The funeral took place at Blackburn on July 23rd of Mr. Arthur F. Gillis, aged 64, installations inspector to the Blackburn electricity undertaking in whose service he had been for over forty-two years.

Mr. F. G. B. Hill.—We regret to announce the death at his home in Leamington, on July 22nd, of Mr. Frederick George Baker Hill, manager, B.T.H. Industrial Control Sales Department. Mr. Hill, who was born in London in 1887, was educated at Aske's Haberdashers Guild School, and received his technical training at the Polytechnic. After practical experience in London, he joined the Lahmeyer Electrical Co. in 1907, as a draughtsman, but was soon transferred to tendering work, principally in relation to power stations and collieries. When the Lahmeyer Co. was absorbed by the A.E.G. Electric Co., Mr. Hill was appointed principal assistant to the manager at Manchester, in 1910, being engaged, principally, on the electrification of cotton mills. In 1913 he went to the electrical works of the A.E.G. at Bangkok, Siam, as assistant engineer.

Returning to England in 1914, he joined the Royal Engineers. In 1919 Mr. Hill joined the British Thomson-Houston Co., Ltd. After three months, he was put in charge of the Motor and Control Gear Section of the Export Department, and was later appointed manager of the Industrial Control Sales Department.

Mr. B. Shire.—We learn with regret of the death, on July 4th, of Mr. Bernard Shire, who had been with the General Electric Co., Ltd., for forty-two years. He received his technical training at Karlsruhe University, and after works experience went for a time to South Africa. Returning in 1903, he joined the staff at Witton Engineering Works, where he became one of the principal engineers, devoting his attention mostly to the preparation of tenders for important contracts. Mr. Shire, who was in his sixty-ninth year, was very popular both with his colleagues and a wide circle of friends in the electrical industry.

The late Mr. B. Shire

Load Forecasting

Scientific Synthesis of Various Factors

By G. O. McLean, M.Eng.

GRAPHICAL methods of recording load statistics will, with extrapolation and such aids as semi-logarithmic paper or Goodritch's probability paper, give short-term forecasts of reasonable accuracy, but only in the mass or on the assumption that the trends obey some mathematically expressible law, such as the hypothesis that they are autocatalytic, *i.e.*, the growth happens

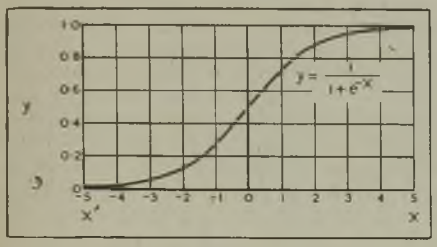


Fig. 1.—Autocatalytic growth
Horizontal scale—Time ; Vertical scale—Growth as a decimal

because of inherent characteristics, whereas it is affected by many extraneous factors. Possibly the growth of the electrical industry will follow a logistic curve as shown in Fig. 1, which is merely the curve of the equation $Y = \frac{1}{1 + e^{-x}}$, where time is the abscissa and growth the ordinate.

The "units sold" figures of the Electricity Commissioners for the twenty years from 1922 to 1942 when plotted give a rate of growth corresponding very closely to the section of the logistic curve between $x = -3{\cdot}5$ and $x = -1$, from which it follows, *if* the equation holds in this case, that the "units sold" in 1962 will be 85,000 million. The co-ordinates of the curve appear in Table I.

Not only must the mass trends be known but also the probable loads in individual areas from C.E.B. areas down to the area fed by an individual substation or even by one feeder from such a substation. These loads must also be known in advance from day to day. This can be done scientifically by applying the laws of probability.

In E.R.A. Report K/T. 108, P. Schiller has demonstrated that the load of an undertaking can be minutely dissected so as to reveal the characteristics of each type of load or class of consumer. Hamilton (A.I.E.E. *Transactions*, June, 1942) has also shown that load forecasting is really synthesising known individual loads, weighted to allow for various factors. The principal factors involved, in general terms, are the rated load of individual appliances connected, the economics of supply (that is the type and price level of tariff, together with elasticity), social habits, including industrial working hours and local eccentricities and, finally, the weather.

All these factors lend themselves to scientific treatment and mathematical manipulation, though the latter cannot, in all cases, be rigorous. The economics of supply has been dealt with by D. J. Bolton ("Electrical Engineering Economics," 1936) and is the subject of continuing research by the E.R.A. and social habits are too localised for general treatment, so only installed loading and weather factors are dealt with here. It is suggested that these are the two principal features—the former having the predominant weight of, say, 80 per cent. and the weather 10 to 15 per cent.

Connection of smaller domestic appliances is not always notified to the undertaking concerned, but this difficulty can be overcome by periodic sampling surveys (the subject of a coming E.R.A. report). Large industrial loads are generally known in some detail, such as the maximum and minimum loads and the total weekly and monthly and yearly factors, the only doubtful point being the time when the maximum demands occur.

Assuming, for example, that we know 900 cookers to have been added in a supply area in a given time (such as the eight months between two sets of winter months), what

TABLE I.—CO-ORDINATES OF FIG. 1 (CONTRACTED TO TWO DECIMAL PLACES)*

x	0	0·5	1·0	1·5	2·0	2·5	3·0	3·5	4·0	4·5	5·0
y (x positive)	0·50	0·62	0·73	0·82	0·88	0·92	0·95	0·97	0·98	0·99	0·99
y (x negative)	0·50	0·38	0·27	0·18	0·12	0·08	0·05	0·03	0·02	0·01	0·01

* With acknowledgments to Yule, *R.S.S. Journal*, Vol. 88.

effect will this addition have on the undertaking's system peak? Experience indicates that each cooker adds 0·7 kW or more to the system peak (the figure being known as "after diversity demand") and 900 cookers would mean an addition of 900 times the cooker a.d.d. This method, however, takes no account of the change in load factor with saturation or from other causes and an alternative method which does so is here suggested.

We can assume that individual cookers have similar characteristics, causing a small peak of, say, 4 kW each, but that there is lack of coincidence between the timing of these peaks. If now the peaks are evenly distributed in a certain peak period we can summate the demands at any given time in that period. Fig. 2 (*a*) shows what happens if three similar loads of a peaky nature are evenly distributed in a certain time. If the period is divided into ten equal parts, then the load of consumer A at any particular time, x_4 say, can be written by the ordinate, y_4. The maximum of three similar loads will be the sum of these loads at time x_5 and can be written M_1 = value of curve A at time x_5 + value of curve B at time x_5 + value of curve C at time x_5, but the values of curves B and C can be expressed in terms of values of curve A, and the value of curve B at time x_5 is the same as the value of curve A at time x_{10}. The value of curve C at time x_5 is equal to the value of curve A at time x_0 and is the same as the value at time x_{10} (curve A symmetrical). Therefore a simple form of the expression is $M_1 = Y_5 + Y_{10} + Y_0$.

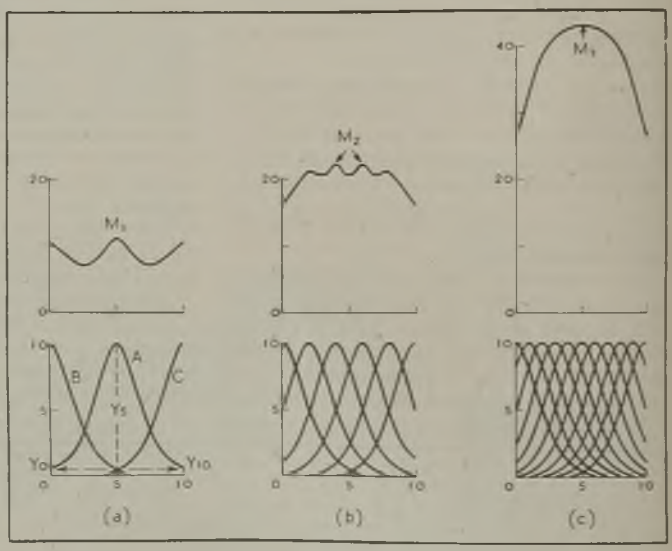


Fig. 2.—Evenly distributed equal loads
Horizontal scale—Time; Vertical scale—Load

In Fig. 2 (*b*) the number of loads is shown doubled to six with the resultant summated load, M_2. Again the summated load can be written in terms of the ordinates of load A, since the other five loads are similar but displaced in time. The maxima occur at times x_4 and x_6 and can be written $M_2 = y_5 + y_7 + y_3 + y_9 + y_1 + y_0$. Fig. 2 (*c*) takes us a stage further showing eleven peak loads and their resultant summation, M_3. Using the same notation as in the two earlier cases, $M_3 = y_5 + y_6 + y_4 + y_7 + y_3 + y_8 + y_2 + y_9 + y_1 + y_{10} + y_0$. In other words the maximum load is the sum of eleven individual loads, which have values corresponding to ordinates of the single load A at eleven different periods of time. This can be written $M = \sum_{x=0}^{x=10} y$.

If the number of loads (N) in the given period is increased to infinity, then the resulting summation will give a peak at the mid-point of the period equal in value to the integral of the curve depicting the single load. It then follows that the maximum load for N similar loads uniformly distributed in a given time is equal to N times the average of one load when N tends to infinity. If the distribution of the loads in a given time is not uniform (it could be random) then the above peak value is increased by an amount equal to $(1 - \bar{y})\,N^{\frac{1}{2}}$, where $\bar{y}$ is the average load as a decimal fraction of the maximum load.

If the single cooker demand is known (assumed in this case to be 4 kW), then the consumer's load factor tells us the energy consumed in the day. If he consumes more energy it means that he is using the appliance

for longer periods during that day, and therefore there is more likelihood of the time of his demand deviating from the normal. This can be expressed statistically by saying that there is definite co-relation between load factor and the time during which peaks are most likely to occur. Hamilton has shown that this fact can be expressed mathematically (and those familiar with the "normal probability curve" will appreciate the valuable implications) by

$$T_p = A + B \cdot e^{-h^2 f(l)^2},$$

where T_p is the peak concentration period, A, B and h are constants and f(l) a function of the load factor. The values of the constants can be found by research, enabling the peak-concentration period to be calculated, but until research in this country has established suitable values for our constants, we can make a direct approach to the peak-concentration question in the following way. We could assume that cooking demand was created in the three hours between 10 a.m. and 1 p.m. on Sunday giving a peak "concentration factor" of $\frac{3}{24} = 0{\cdot}125$. If the average cooker consumption was known (or assumed) to be 3 kWh a day, giving a cooker load factor daily of $\frac{3}{24 \times 4}$ or 3·12 per cent., then the maximum load factor during the peak-concentration period of three hours on Sunday will be $\frac{0{\cdot}0312}{0{\cdot}125}$ or 25 per cent. The actual value will be slightly different because of the consumption during the non-peak period.

Finally, there is the factor which takes account of N (the number of loads in the given concentration period) and can be defined as the ratio of the resultant peak to N times the peak of one cooker. This and the non-uniform distribution in time will cause the average load (calculated on the assumption of an infinite number of loads in the given period) to be increased by an amount proportional to the square root of the actual number (N). This final factor gives the theoretical after-diversity demand, and using the figures that have been assumed up to the present, the a.d.d. per cooker is 1·49 kW; *i.e.*, an additional 1,341-kW load on Sunday would have to be allowed for.

These hypothetical figures show how numbers affect a.d.d., because if 1,600 cookers had been concentrated in the same peak period, the demand would have been 1·46 kW, whereas if the number had been 400, the a.d.d. would have been 1·53 kW. Since the system peak load may be at 8.30 a.m. on weekdays and not on Sunday, we require to know the extra load imposed on the 8.30 a.m. peak by these 900 cookers. The same sort of calculation can be made, except that we can assume that the individual cooker demand between 6.30 and 9.30 a.m. does not exceed 2 kW and that the consumption per day is 1 kWh in this period. On this hypothesis the summated demand of

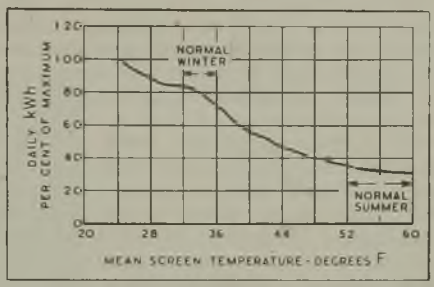


Fig. 3.—Energy sales (domestic) in relation to temperature
Horizontal scale—Mean screen temperature °F; Vertical scale—Daily kWh percentage of maximum

the 900 cookers on the system's morning peak would be 279 kW or 0·31 kW per cooker.

If the assumptions regarding individual cooker demands and peak-concentration times seem too empirical, then the habits of a particular locality can be obtained by installing recording ammeters in a few dozen cooker circuits (not necessarily at one time) selected at random and finding the modal values for the figures required. Frequency distribution curves can be constructed to show the magnitude of the cooking loads for weekday breakfast and Sunday dinner times and of T_p, the times of load concentration.

The same technique is applicable to the consideration of a larger number of industrial loads of which only the maximum demand, energy consumed (and hence the load factor) together with hours of working are known. When their number is small, recording ammeters can be installed to furnish a full knowledge of each load (the C.E.B.'s printometers do this automatically), and the results summated arithmetically to ascertain their effect on the system. An unknown industrial load, whether already in operation or projected, can be treated separately and its load factor (assumed or measured) will indicate its peakiness. This in turn affects its coincidence factor or the probability of its

coinciding with other loads in the same peak period. The factors for each unknown load can be summated and the combined demand easily calculated.

Weather Factor

The demand of the loads calculated by the methods outlined above give the basic system load. The principal other factor involved is the weather. The present writer correlated temperature with load in an article in the *Electrical Review* of August 16th, 1940, from which Fig. 3 is reproduced. Mr. Schiller, in the report quoted, drew attention to abnormalities of system load curves due to weather conditions when making his detailed analysis.

Of the many ingredients which make up weather, those principally affecting the electrical load are temperature, wind velocity and direction, and cloud, in that order of importance. Weather can affect load by as much as 10 to 15 per cent., and the most practicable way of adjusting the basic system load for weather variations is by addition or subtraction of percentages. The determination of these percentages or weights calls for a good deal of research, but as a rough guide the figures in Table II (Dryar, American I.E.E. Paper 44/106) give a valuable lead, especially as the weights have been successfully used in Philadelphia for more than five years.

TABLE II.—WEATHER WEIGHTS

Temperature deg. F.	Wind Velocity miles per hr.	Cloud	Weight Percentage
25	25	Very low and very heavy	10
30	20	Low and heavy	8
35	15	Low and thick	6
40	10	High and thick	4
45	5	High and thin	2
50	0	Clear blue sky	0
55		Clouds—reflecting sun	−2
60		Clouds and snow reflecting sun	−4
65			−6

While the temperature weights vary from −6 to +10 per cent., in practice the weighting is varied to suit the normal mean temperature for the month in question. Where temperature conditions are extreme, *e.g.* owing to continued snow and ice, weights as high as 15 and 16 per cent. may be used at particular times of the day, such as early morning and last thing at night. On the other hand, local conditions must also be taken into consideration in fixing the temperature weight for any particular day. Severe weather may cause dislocation of transport with the temporary shutting down of various industrial loads. Weights for wind velocity might have to be scaled down for use in this island and a difference allowed, depending on whether the winds are east and north or west and south. The cloud weights also appear to be high, but this factor takes account of fogs and rain. The weighting is also varied in this case for local conditions and the time of day. For instance, rain out of season and in the evening may cause more people to stay at home and so increase the load in the early part of the evening. If it persists, it may cause a drop in load later because people go to bed earlier.

Electrostatic Painting

UTILISATION of the well-known Cottrell principle of electrostatic precipitation in industrial painting operations is claimed to have been beneficial in the United States. It saves the time involved in the removal of unsightly " tears " of excess paint that form at the dripping points on articles that are dip painted, while a more uniform coating is applied when paint spraying and less fine spray is lost up the exhaust vent because it is " directed " on to the object being painted. The electrostatic method has been patented by the Harper J. Ransburg Co., Indianapolis, Ind., for use with both metallic and non-metallic materials.

Objects to be dipped are arranged on a thoroughly earthed conveyor which passes over a grid maintained at 85,000 V (negative) with respect to the conveyor. The distance between them is a few inches (twice the normal spark-over distance) so that excess paint is attracted towards the grid, spurting from the object in minute streamers. The paint deposited on the high-voltage grid needs to be removed. In much the same way paint spray can be charged negatively by directing it into an electrostatic field produced by a series of 100,000-V electrodes; the spray guns themselves are outside the field and efficiently earthed, their nozzles being mounted at an angle of 10 degrees to the horizontal path of the " work " travel. In this case the high-voltage electrodes, either rods or wires, are suspended on each side and across the bottom of the conveyor path, their specific positions depending on the shape of the objects being painted.

One war plant utilising electrostatic spray painting reports saving 40 per cent. in paint and 55 per cent. in labour. There appear to be no undue shock or fire hazards when the process is correctly carried out. The single-phase inputs, through a step-up transformer and half-wave tube rectifier, are 1·5 A for dip and 3·5 A for spray painting, the short-circuit loads being 5 and 10 mA respectively.

I.E.E. Officers

Dr. P. Dunsheath's Distinguished Career

NEXT session's President of the Institution of Electrical Engineers, Dr. Percy Dunsheath, has been prominent in many aspects of the electrical profession and industry for several years past and was an obvious choice for the premier position in the electrical world. He was born in Sheffield in 1886 and later entered that city's University where he distinguished himself and gained the London B.Sc. degree with first-class honours. Subsequently he took a first in the Mechanical Science Tripos at Cambridge. He gained the London M.Sc. degree in 1932 and in the following year the University conferred on him the D.Sc. degree in engineering.

Dr. P. Dunsheath, President, I.E.E.

Upon leaving college he entered the General Post Office as an assistant engineer and during the 1914–18 war served in the Royal Engineers in France where he commanded a Telegraph Construction Company and was responsible for extensive communication systems. For his services he was twice mentioned in despatches and awarded the O.B.E. (Mil.).

For many years he has been identified with W. T. Henley's Telegraph Works Co., Ltd. He joined the company in 1919 for the purpose of reorganising the Research Department and has since been responsible for many improvements in cable design and manufacture, particularly extra-high-voltage types. In 1924 the Royal Society of Arts awarded him its medal for a paper on "Science in the Cable Industry." Dr. Dunsheath became research and technical manager in 1929 and in 1934 chief engineer of Henley's. Three years later he was appointed to the boards of the company and its subsidiaries—Henley's Tyre & Rubber Co. and the Holborn Construction Co.

His connection with the Institution began in 1912 when he was elected an associate member; he became a member in 1921. He was chairman of the Transmission Section in 1936–37 and a vice-president from 1940 to 1943 and again in 1945. For papers read before the Institution he has received several awards, including the Kelvin and John Hopkinson Premiums.

Education and training of engineers has been a special interest of the new President for many years. He initiated a comprehensive education scheme for junior employees of his company and he is vice-chairman of the governors of Woolwich Polytechnic, a member of the Council of the British Association for Commercial and Industrial Education and of the Standing Committee of Convocation of London University. Dr. Dunsheath is associated with many other bodies; he is a member of the Institution of Civil Engineers, a Fellow of the Physical Society, a founder Fellow of the Institute of Physics, vice-president of the Royal Institution and a member of the F.B.I. Research Committee. He has written many articles and papers on electrical engineering, physics, the organisation of research and education in industry.

Left to right: Mr. V. Z. de Ferranti, Mr. A. J. Gill and Mr. P. Good, vice-presidents of the Institution of Electrical Engineers for the ensuing session, and Mr. E. S. Byng, who has been re-elected honorary treasurer

He was one of the contributors to the *Electrical Review's* series of articles on "Engineers of the Future" ("Part-time Education", March 24th, 1944).

In his spare moments, which must be very few, Dr. Dunsheath goes in for mountaineering and music.

Other Elections

The Vice-Presidents for next session are Mr. V. Z. de Ferranti, M.C., chairman and managing director of Ferranti, Ltd., Mr. A. J. Gill, B.Sc. (Eng.), Assistant Engineer-in-Chief, General Post Office, and Mr. P. Good, C.B.E., Director of the British Standards Institution. Mr. E. S. Byng, vice-chairman of Standard Telephones & Cables, Ltd., has been re-elected honorary treasurer of the Institution.

The vacancies on the Council have been filled by the election of the following:—Mr. L. H. A. Carr (Metropolitan-Vickers), Mr. J. G. Craven (Green & Smith, Ltd.), Mr. J. Eccles (city electrical engineer, Liverpool), Mr. H. Faulkner (G.P.O.) and Professor Willis Jackson (Manchester University); Associate Member: Dr. J. M. Meek (Metropolitan-Vickers); Associate: Mr. A. F. Plummer (Shoolbred Electrical Co., Ltd.).

The following have been elected as officers of the various Sections:—

Installations.—Chairman, Mr. Forbes Jackson; vice-chairman, Mr. J. F. Shipley; members of Committee, Messrs. D. G. W. Acworth, R. Grierson, J. Hall, E. S. Hoare, and J. F. Stanley.

Measurements.—Chairman, Mr. S. H. Richards; vice-chairman, Mr. L. J. Matthews; members of Committee, Messrs. D. C. Gall, J. Greig, F. J. Lane, H. S. Petch, Dr. G. A. V. Sowter and Dr. S. Whitehead.

Radio.—Chairman, Mr. A. H. Mumford; vice-chairman, Mr. F. Smith; members of Committee, Mr. G. E. Condliffe, Dr. D. C. Espley and Mr. C. E. Strong.

Transmission.—Chairman, Mr. E. T. Norris; vice-chairman, Mr. J. A. Lee; members of Committee, Mr. S. E. Goodall, Dr. J. McCombe, Mr. H. Payne and Mr. P. J. Ryle.

Maintenance Planning

By J. Scott

MANY electrical plants throughout the country are in a poor way for lack of a policy of maintenance control. The following notes based on many years' experience have been compiled with a view to aiding engineers in charge of such installations. First, make up a card index recording all requisite details of the motors, viz.:—maker, size of shaft, size of bearings, speed, current when running free and on load (with notes as to possible overload), and their location.

On the reverse side of this card should be a history sheet giving full particulars of attention that the motor has had so as to enable the engineer to ascertain if a motor is liable to recurrent faults; if so, he can analyse the conditions under which the machine works with a view to their improvement. Starting gear can best be arranged in a bank for remote control, preferably housed in a glass-fronted cupboard in a central place so as to facilitate daily inspection.

Every motor should have an "address." Calling the shops 1, 2 and 3 and lettering each truss or pier as A, B or C, a motor address might be 1/A/Bay 2. Floor plans are made with the various piers lettered and from these a clearer vision of the plant is gained. For maintenance purposes each motor should be numbered M.1., etc., and beneath this number should be the code, e.g., DB1 F2, indicating distribution board No. 1 fuses number 2, reading from left to right; this prevents errors in locating circuits and ensures that the right fuses are drawn for repair work.

The maintenance programme will be determined by the number of motors. It may be possible to check up on three motors a day and a time-table should be drawn up for this to be done, say, every six weeks. The sequence should be:—Check air gaps; check bearings for wear; see that greasers are full; look for excess grease (if this runs due to heating, a change is desirable); consider whether a motor is suitable for its location, whether grit can enter the bearings or air gap and whether moisture can damage windings; see that all bolts are tight, that there is no vibration and that the belt is not too tight. It will be a great help to make up a card with these points on it in the form of questions.

Regarding the wiring and distribution system, make sure that all box lids are screwed on, insulation tests are satisfactory, no bushes are missing from tube exits, all switches are clean inside and out and all screws are tight. Attention of this kind given to the plant will make it easy to maintain and prolong its life.

Consulting Engineers

A new list of members has been issued by the Association of Consulting Engineers, 36, Victoria Street, S.W.1. The price (post free) is 9d. to members and 1s. to non-members. Names of members appear alphabetically and a geographical list of firms is appended.

COMMERCE and INDUSTRY

Steel and Coal Plans. Cohen Committee's Report.

Mines Plan Accepted

IT was announced last week that the Mining Association of Great Britain had carefully considered the Government's policy for the mining industry and had decided to support this policy and do everything possible to make it effective. A Technical Survey Committee has been set up under the chairmanship of Mr. R. Foot, chairman of the Mining Association, and it includes members of the Reid Committee.

The Government's proposals envisage the continuation of the industry under private management and the grouping and amalgamation of collieries where necessary, by voluntary methods if possible but otherwise by compulsion. A Central Authority appointed by the Minister of Fuel and Power and subject to his general direction would be charged with the duty of satisfying itself that the scope and effect of plans drawn up by the industry conformed to national requirements.

It will be the main object of the Technical Survey Committee to ensure that all technical impediments to achieving maximum efficiency are removed.

Re-equipment of Steel Industry

Sir John Duncanson, who recently became commercial and technical director of the British Iron and Steel Federation after serving as Iron and Steel Controller, has given broad particulars of the proposals for the re-equipment and development of the iron and steel industry which are estimated to involve an expenditure of £120 million. The largest item in the programme, and the one of most interest to the electrical industry, is the replacement and reconstruction of rolling mills and new continuous hot strip mills in South Wales at a cost of £33 million. The complete mechanisation of twenty-eight iron foundries for producing domestic ironware is already in hand.

Licensing of Building Work

The Ministry of Health notified local authorities last week that they were to be given additional powers in the requisitioning of houses for the accommodation of homeless people. At the same time the Ministry announced a decision to empower local authorities to license building work calculated to relieve the housing shortage above the existing £100 per annum limit. The term "building work" includes the interior equipment of houses and thus embraces electrical installations.

Institute of Physics

The address of the Institute of Physics and its *Journal of Scientific Instruments* is now 19, Albemarle Street, London, W.1 (telephone: Regent 3541).

Contract Price Adjustment Formulæ

The latest figures for the B.E.A.M.A. contract price adjustment formulæ are as follows:—(*a*) Rate of pay for adult male labour at July 14th, 95s. (unchanged). (*b*) Costs of material: the index figure for intermediate products last published by the Board of Trade on July 14th is 181·9 and is the figure for the month of June (which compares with 181·1 for May).

Electricity Helps Gas

A fractured gas main in a Northern town recently gave electricity an opportunity to "assist" its rival. The van shown in the accompanying illustration was used to make a tour of the town to warn gas consumers to turn off all taps as the supply would not be available for two or three days. Local people must have thought that there was some significance in the inscription on the van.

Electricity van warns gas consumers

Iraq's £300,000 British Purchase

Iraq has reached an agreement through the Crown Agents in London to buy from British firms machines and tools to the value of £300,000 for her post and telegraph services. One consignment is already on its way to Baghdad. Negotiations are continuing for further purchases amounting to £1,000,000.—*Reuter* (Baghdad).

Portable Tool Demonstration

Members of the Borough Council and staff, architects and building contractors were among the audience at a recent demonstration of portable electric tools arranged at Cheltenham by the borough electrical engineer (Mr. R. W. Steel) in conjunction with Black & Decker, Ltd. In opening the display, Councillor E. W. Moore, chairman of the Electricity Committee, said that the purpose of the demonstration was to show examples of the various tools which had been developed to speed up building work. Mr. Steel emphasised the value of electric tools and said that his Department would endeavour to see that wherever possible a supply of electricity was available on all local building

sites. The tools demonstrated included saws, shears, drills, screwdrivers, sanders and hammers.

Manchester Plan

The Minister of Town and Country Planning opened the Manchester and District Planning Exhibition last week. A major part of this comprises models, photographs, diagrams, etc., prepared under the direction of Mr. R. Nichols, the city surveyor and engineer, who is also honorary surveyor to the Manchester & District Regional Planning Committee. One proposal put forward is the construction of a new railway station on the Manchester-Salford boundary from which electrified suburban lines would radiate, and an underground system is contemplated.

Hot-water Jacket Patent Extended

In the Chancery Division of the High Court last week Mr. Justice Uthwatt had before him an application by T. J. McCullock & Co., for an extension of Patent No. 328,472 relating to coverings for domestic hot water pipes and cisterns, known as hot water jackets. Mr. J. Mould for the applicants said the ground of the application was loss due to the war. The patent was dated May, 1929, and expired in May last. The product was in demand by electricity undertakings and local authorities having housing estates. Prior to the war the sales were steadily rising, but during the war they had dropped. The average sale before the war was 10,042 a year. His lordship made a re-grant of the patent of three years and eight months.

American Power Plant Extensions

The United States Office of War Utilities recently sanctioned 430,000 kW of steam turbo-generator plant for installation during the next three years; approval of a further 250,000 kW was expected to be given last month. The largest of the projected extensions are 80,000-kW sets for the Venice plant of the Union Electric Co. of Missouri, and for the Port Washington station of the Wisconsin Electric Power Co., and a 50,000-kW set for the Maradosia plant of the Central Illinois Public Service Corporation.

Widow's Claim

Last week we reported the failure of a claim by the widow of an employee of the Derbyshire and Nottinghamshire Electric Power Co., Thomas Paling, for damages for the loss of her husband, who was killed while working on an overhead line. The Judge was subsequently asked to approve the amount to be awarded to Mrs. Paling under the Workmen's Compensation Act, £683. Mr. Justice McNaghten made the necessary order and suggested that the company should not deduct its costs from the amount. Counsel for the company said that he hoped costs would not have to be deducted.

Distribution Gear Window Display

A. Reyrolle & Co., Ltd., have two display windows at their works, where from time to time they exhibit items of interest to their employees. The illustration shows one of them, containing "HH" unit-type distribution gear, which was selected for display because of the expansion of production to meet the increasing demand. The display shows not only how the components are assembled, but also how the world-wide use of the gear takes it into many greatly varying climates.

Window display of unit-type distribution gear at the Reyrolle works

Company Law Reform

The Committee appointed under the chairmanship of Mr. Justice Cohen to consider what amendments in existing company law are desirable issued a 115-page report last week. Among the principal recommendations are that subsidiary companies' accounts should be presented with those of the parent companies; that accounts should give fuller indications of companies' financial position, including hidden reserves; that the names of nominee share holders should be disclosed (but not necessarily the names of those for whom they hold shares); that private companies should be required to file accounts; that prospectuses of issues should contain all facts whose omission would give a misleading idea of the companies' affairs; and that heavier penalties should be imposed for the publication of misleading prospectuses.

Fluorescent Train Lighting

Tubular fluorescent lamps have been tried experimentally on the Underground railway (District line) in London. They have also been used in the United States, the necessary AC being obtained from a generator driven by a Diesel engine installed in a special box van and presumably furnishing energy for illuminating a whole train of coaches.

The first example in France is described with

diagrams of connections in the *Bulletin de la Soc. Fr. des Electricians* by M. Marcel Durand. One coach only, a restaurant car, was fitted out in November, 1944, utilising the ordinary axle-belt driven 24-V dynamo (Dick system) for driving a DC shunt motor which in turn drives a small generator furnishing AC at 220 V for the lamps. In one compartment of the car six fluorescent tubes of 22·5 W each providing a total of 6,900 lumens replaced eighteen metal filament 24-V lamps of the same wattage, but consuming three times the energy needed by the fluorescent tubes. Eight similar tubes were installed in a larger compartment while in the kitchen section two tubes of 22·5 W replaced four 25-W lamps each.

Argentine Fuel Shortage

From time to time we have referred to the very serious shortage of fuel in Argentina and there seems to have been no improvement during the past year. In its report for 1944 the Cia. Italo-Argentina de Electricidad says that 36 per cent. of the power produced was generated by the use of liquid fuel (including linseed oil) while the remaining 64 per cent. was produced by the combustion of vegetable substitutes—Cereals, "oleaginous substances" and their derivatives. The company's total output was 448 million kWh and the total connected load 517,271 kW.

Fined for Selling Without Licence

A fine of £5 was imposed last Friday at Glasgow on F. S. Coats (43), 999, Shettleston Road, Glasgow, when he pleaded guilty to a charge of selling electrical goods and appliances without having the necessary licence from the Board of Trade.

Hams Hall "B" Station

In the article on this station in last week's issue there occurred a slight topographical inexactitude. It was stated that make-up water was pumped from the River Thames. Actually the river in question is the Tame.

Annual Holidays

The works of the United Insulator Co., Ltd., are being closed from July 28th to August 6th.

Trade Announcements

The Harland Engineering Co., Ltd., is returning from Gerrards Cross to London on Monday. Its new offices are at Harland House, 20, Park Street, London, W.1 (telephone: Grosvenor 1221–2–3; telegraphic address: Rheometric, Phone, London).

Compound Electro Metals, Ltd., have appointed A. Johnson & Co. (London), Ltd., Royal Exchange Buildings, Glasgow, C.1 (Central 2251), as agents for Scotland and Northern Ireland, and C. J. Reeves, 58, Walsall Road, Four Oaks, Sutton Coldfield, Birmingham (Four Oaks 227), as agent for the Midlands.

C. H. Wood & Co., Ltd., are moving at the end of this month to 11, Curzon Street, Oldham, where increased accommodation will enable them to present a greater range of radio and electrical apparatus. Manufacturers, distributors and importers are asked to send catalogues in duplicate.

Industrial Finance Corporation

The Industrial and Commercial Finance Corporation, Ltd., the primary object of which will be to supply medium and long-term capital for small and medium-sized companies in amounts, say, from £5,000 to £200,000, has now been registered. Its £45,000,000 share and loan capital will be subscribed by the banks. The registered offices are at 5, London Wall Buildings, London, E.C.2.

Changes of Address

Alexander Thomson & Co. (London), Ltd., have returned to London. Their address is 45a, Kensington High Street, W.8. (Telephone: Western 0952; telegrams: Aductline, Kens, London.)

H. H. Hywood, electrical engineer and contractor, has moved to 18, Coram Street, Woburn Place, W.C.1.

Negative Rake Milling

The Machine Tool Control, 35, Old Queen Street, S.W.1, has published a well-illustrated booklet explaining the nature and purposes of negative rake milling and giving many examples of its application.

TRADE MARKS

THE following applications have been made for British trade marks. Objections may be entered within one month from July 18th.

ARCA. No. 633,799, Class 7. Installations for feeding boilers (being machines or parts of machines), fittings of steam boilers (machinery), blowing machinery for the compression of vapours, condensing installations, apparatus for the degassing of feed water for machines, engine speed governors (not for land vehicles), feed-water regulators, hydraulic machinery, mixing regulators (parts of mixing machines), pressure reducers, pressure regulating valves and pressure regulators, all parts of machines; rotary pumps (not for scientific purposes), steam valves, steam turbines, steam winches. No. 633,801, Class 11. Installations for feeding boilers (not being machines or parts of machines), draught regulators (heating), oil filters (not for laboratory use and not being parts of engines, of motors, or of machinery); gas regulators, regulating and safety accessories for gas apparatus, for gas pipes and for water apparatus.—British Arca Regulators, Ltd., 18, West End Avenue, Pinner, Middlesex.

METWAY PRODUCTS (designs). Nos. 629,553 and 629,555, Class 9. Electrical instruments and apparatus and parts thereof, none being included in other classes. Nos. 629,554 and 629,556, Class 11. Electric domestic and electric household apparatus and appliances for heating, cooking, refrigerating and drying and parts thereof not included in other classes.—Metway Electrical Industries, Ltd., 52, King Street, Brighton, 1.

AISH (design). No. 634,510, Class 9. No. 635,411, Class 11. Installations and apparatus for lighting, cooking, heating, refrigerating, drying and ventilating, all being electrical goods; and parts thereof not included in other classes.—Aish & Co., Ltd., Yelverton Road, Bournemouth.

Municipal Reports

Further Complaints Regarding Coal Costs

Hull

IN his report for 1944-45 Mr. D. Bellamy, general manager of the Hull undertaking gives comparative figures for 1938-39 and 1943-44. It is seen that while the kWh generated fell from 366·8 million in 1938-39 to 343·3 million last year (owing to a sharp fall in the amount generated for the Central Electricity Board) the sales to the undertaking's consumers rose from 232·1 million kWh to 264·5 million. The number of consumers was reduced from 99,076 to 96,018. Explaining the rise in coal cost per kWh generated, Mr. Bellamy says that in addition to an 82·4 per cent. increase in the price of coal since 1939 the worsened calorific value and suitability resulted in an increase of 8·35 per cent. in consumption per kWh.

The Department's policy has been to maintain prices at the lowest possible level and the general increase has been only 5 per cent. (There is still a 5 per cent. discount for prompt payment.) About half of the increased coal cost is met by large industrial and bulk supply consumers through the operation of the coal clause.

The income from all sources was £1,072,373, against £990,480 in the preceding year and £948,205 in 1938-29 and there was a net profit of £27,997. The general reserve fund now stands at £303,535—an increase of £118,110 since 1938-39; in addition a reserve of £20,000 has been provided for change-over of system and the apparatus sales and hire-purchase reserve has been increased from £20,932 in 1938-39 to £34,715. The capital cost of assisted wiring systems destroyed by enemy action exceeds £10,000 but this, it is said, will be recovered from the Government.

Reference is made in the report to the 30,000-kW and boiler plant extensions now in progress; change-overs from private to public supply (a 4,500-kW example is quoted); the resumption of full public lighting; and the review of tariffs since the close of the year. Appended to the report is a review of the Department's operations during the war period which includes an account of the damage sustained.

Lincoln

The 1944-45 report of Mr. F. Newey, city electrical engineer of Lincoln, records a reduction in total sales from 57·9 million to 54·4 million kWh. This was the net result of a 14 per cent. drop in power supplies (from 38·4 million to 33·0 million kWh) and a rise of 12 per cent. in domestic consumption (from 13·9 million to 15·6 million kWh), other sales showing little change. The former reflects the restriction on the use of electricity imposed by the Minister of Fuel and Power, while the latter has been largely the result of consumers finding difficulty in obtaining solid fuel and also taking advantage of the low electricity charges—the same as in 1938. The latest increase in the price of coal, however, may necessitate a re-examination of the present tariff structure.

A total of 14·2 million kWh was generated at Lincoln. The engineer points out the substantial benefit from the undertaking's being a selected station owner. This has a bearing, of course, on the proposed power station extensions.

Income amounted to £225,403 (against £222,328) and working expenses were £179,412 (£168,410), there being a net profit of £3,938 (£17,823). The average price obtained per kWh sold was 0·963d. (0·891d.).

The report states that it will be necessary to complete the replacement of the distribution switchgear at St. Swithin's at an early date.

Scarborough

At a meeting of the Scarborough Town Council on July 9th, Councillor R. A. Wood, chairman of the Electricity Committee, submitted a financial statement on the past year's operations of the Electricity Department, of which Mr. W. K. Fleming is engineer and manager. The statement shows that sales rose from 20·5 million to the record total of 23·1 million kWh. Income amounted to £196,873 (against £178,913) and working expenses were £125,951 (£111,635). The net profit was £4,901 (£4,571), but as the income included £2,867 recovered in respect of income tax for previous years the actual trading profit was £2,034. The average price per kWh sold shows a reduction from 1·86d. to 1·79d.

After the last increase in the price of coal on May 1st, it seemed likely that a small addition to electricity charges (unaltered since 1940) would have to be made. The Committee, however, having considered an estimate of revenue and expenditure for 1945-46, during which a further appreciable rise in output is expected, proposes that no change shall be made at present. Had it not been for the large increases in the price of coal electricity charges could have been reduced.

Blackburn

This undertaking's accounts for 1944-45 show a net profit of £29,980 against £11,261 for 1943-44. With £65,482 brought forward the total surplus now carried forward is £94,164. Loans outstanding on March 31st, 1945, amounted to £2,026,446. Sales during the year totalled 97·4 million kWh, an increase of 1·5 million. Work on the second stage of the Whitebirk power station extension has proceeded as rapidly as the labour and material position have permitted.

Manufacturers' War Work—IX

Standard and Special Products of Many Kinds

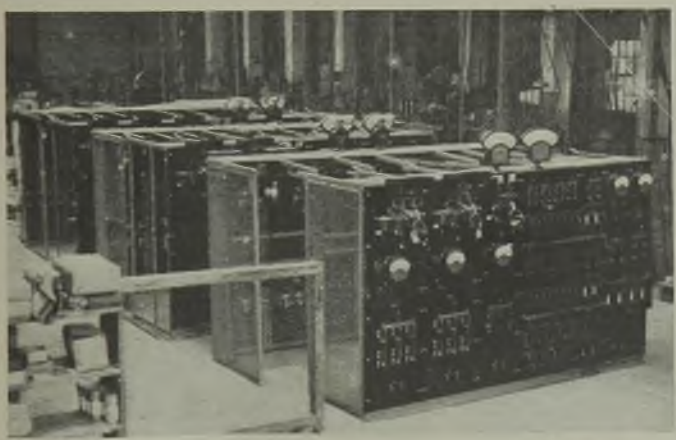
G. P. Dennis, Ltd.

THE manufacture of war equipment by this company commenced at the time of the Munich crisis. They were then engaged on the manufacture of the main switchboards controlling the electrical equipment for the heavy coastal fortifications of Great Britain. As the war situation became more tense, the demand of the War Office for this equipment increased both in quantity and urgency. The urgency was successfully overcome, and up to the present time these main control switchboards have been installed in the coastal fortifications throughout the British Isles, the Dominions, Colonies and the strategic outlying posts of the British Empire.

Throughout the war, the demand for the company's fuse and switchgear has been very great and fuses, fuseboards, switch-fuses, control panels, switchboards, etc., have been supplied in ever increasing quantities for ordnance depots, army workshops, camps, hospitals, aerodromes, dockyards, Admiralty and Merchant Navy vessels, Government factories, cold storage plants, etc.

In addition to the company's standard productions, thousands of sets of equipment for the control by radiolocation of heavy, medium and light A.A. guns have been supplied. Charging sets and ancillary equipment for wireless telegraph communications, control panels for mobile workshops and other vehicles, etc., and units for the gyroscopic A.A. gunsight, have been manufactured in considerable quantities. The Navy has been supplied with vast quantities of fuses for war vessels and the company has been for a long time considerably occupied, in co-operation with the Admiralty, on the design and manufacture of "Radar" equipment for surface ships and of sight controls for anti-aircraft guns. The Ministry of Aircraft Production, since war began, has been supplied with considerable numbers of charging switchboards of various types for both static and mobile purposes and large quantities of the company's "Lokd" fuses for use in planes and ground equipment.

The company is at present heavily engaged on equipment for the war against Japan, but priority of production is also being given now to fuse- and switch-gear for the Government's housing schemes and other similar requirements.



440/220-V DC three-wire switchboards for the War Department

Hopkinsons, Ltd.

The efficiency and continuous operation of power stations and vital industrial plant depend to a considerable extent on the reliability of boiler mountings or valves. In consequence, the products of Hopkinsons, Ltd., were accorded high priority upon the outbreak of war, for some time before which the company was dealing with considerable orders for equipment for Government factories and power station extensions. Before the heavy demands from these sources had appreciably diminished, the invasion of the U.S.S.R. brought exceptionally large contracts for boiler mountings and valves, not only for the new emergency industries under construction in Russia, but also for the mobile power plants which have played

such a remarkable part in the revival of industry and civil organisation in the liberated areas of the Soviet Union. At the same time the submarine menace entailed heavy orders for mountings and valves for the new corvettes, frigates and other special craft.

Among the many incidental wartime uses to which Hopkinsons' valves have been applied may be mentioned the supply of stop valves, check valves and relief valves for "Crocodile" flame throwers. The construction of large numbers of naval vessels of all types has necessitated the provision of machines for the purification of turbine, lubricating and fuel oils. Production of anti-submarine devices, already manufactured before the war, increased both in types and quantities as the war progressed. Large numbers of torpedo components and high-pressure valves were also produced, as well as aircraft engine components, bomb castings, tank sub-assemblies and components, and predictors.

The Engineering Department of Glenfield & Kennedy, Ltd., showing sluice and disc valves for hydro-electric schemes in course of manufacture

Glenfield & Kennedy, Ltd.

The contribution by Glenfield & Kennedy, Ltd., to the war effort has covered a very wide field. Commencing in 1938, the company supplied the majority of valves and fire fighting equipment for Royal Ordnance Factories. As a protection against the risk of flooding caused by bombing, the company was also entrusted with the complete work of designing, manufacturing and installing the mechanically operated gates on the London Underground Railway system.

In two years no less than 131,000 individual finished components of the 6-pdr. anti-tank gun were produced. For the 17-pdr. gun made later a great number of components were manufactured in "Meehanite" a special form of cast-iron used exclusively for all the company's standard products. This material was also used for tens of thousands of components for A.A. gun predictor instruments, replacing aluminium and non-ferrous die castings. Large numbers of horizontal hydraulic cordite extrusion presses for explosives factories, and hydraulic presses, high pressure pumps and storage accumulators for the production of 3·7 in. and 4·5 in. shells and mechanically operated presses for the production of the "Jerrican" petrol container, were produced, as well as 2,500-HP triple expansion main propulsion engines for ships.

The majority of the breakwater caissons of the Mulberry Ports were equipped with Glenfield flooding valves and a special design of operating gear, and no fewer than 800 sets of steering gears for landing craft were constructed. To help in restoring transport facilities on the Continent eighty-nine sets of lock gates of the double leaf and direct lift types as well as locomotive water filling cranes were supplied.

Lifts for aircraft carriers are among the items made for the Navy, which has also required very large numbers of the Pitometer log used to measure the speed of the vessel and closely connected with the control of the main armament. The latest work has been the complete machining and fitting of 12,000 lb. bomb castings, and in the production of connecting rod and bearing cap components for the Rolls Royce "Merlin" engine. Material sent to Russia has included control valves for hydro-electric and steam power stations and for oil refineries and chemical plants. In six weeks 250 ejector units were constructed for use with N.F.S. fire pumps for combating flooding in Holland.

ELECTRICITY SUPPLY

Dumfries Rural Progress. Manchester Extensions.

Dumfries. — ELECTRICAL DEVELOPMENT OF FARMS.—Reviewing the position of the electricity undertaking the convener of Electricity Committee stated at the last meeting of the County Council that during the war years they had added to their consumers 63 farms, thus raising the total from 648 to 711. Consumption on farms had risen so that the average was now 1,832 kWh a year. Over 347 farms now used electricity for milking and there were 135 electric steam sterilisers in use. If they found it necessary later on to raise the tariff he hoped it would be kept in mind that the Council had borne the extra price for coal from £1 to 42s. 9d. a ton. The total revenue of £193,000 was practically the same as the previous year.

Dunblane.—PROPOSED TRANSFER TO GRAMPIAN CO.—Intimation was made at last meeting of Dunblane Town Council of the intention of the Dunblane and District Electricity Supply Co. to transfer its undertaking to the Grampian Co. The town clerk said the Council had an option to acquire the undertaking, and it was agreed to consider the matter further.

Fulham.—SUPPLY TO COMPANY.—The Electricity Committee is to provide an additional supply to Weldangrind, Ltd., Peterborough Road, at a cost of £4,685, the company agreeing to contribute £900 and guarantee an account of £250 per annum for three years.

NEW COLLIERS.—The Electricity Committee has obtained sanction to borrow £200,000 for the purchase of two colliers for the power station.

Liverpool.—EMPLOYMENT OF GERMAN PRISONERS.—The Electric Power and Lighting Committee is asking the City Council to sanction arrangements for employing German prisoners to lay cables for a supply to temporary houses.

London.—PLANT FOR WATER WORKS.—The Metropolitan Water Board is to install a Diesel driven alternator at a cost of £3,500 at Ferry Lane pumping station and electrical plant for the remodelled Dartford pumping station at a cost of £7,850.

Leicester. — ELECTRICITY UNDERTAKING'S LARGE SURPLUS.—A gross revenue of £997,795 with a net surplus of £112,144 was reported by the Lord Mayor, Alderman J. Minto, chairman of the Electricity Committee, in presenting the annual statement of accounts of the electricity undertaking. He said that but for the war something like £80,000 of the surplus would have been spent on short-lived assets such as cookers and meters. Although coal costs had increased three-fold, electricity charges had not been increased. In reply to criticism by Councillor Hill of the use of the surplus to redeem borrowings, Alderman Minto said that if £20,000 were given to the relief of rates, ratepayers would benefit by only a few coppers a week but by redeeming debt they were saving pounds a year. If the Gas Committee, which in its time had given £900,000 to the relief of rates, had adopted the same policy as the Electricity Committee, it would not have been drained of all its reserves as it was now.

Manchester.—STUART STREET GENERATING STATION.—The state of devastation seen in the accompanying picture sent to us by Mr. R. A. S. Thwaites, chief engineer and manager of the City Electricity Department, is not, as might at first sight be supposed, the result of enemy action but depicts certain buildings in process of demolition at the Stuart Street generating station as a prelude to the erection of new buildings to house a 60,000-kW generating set, together with two 400,000 lb./hr. boilers. Lack of unskilled and semi-skilled labour to complete the work is causing some anxiety, and Sir William Walker, chairman of the Corporation Electricity Committee, says that constant appeals had been made to Government departments but except for certain skilled workers they appeared to have no priority at all. Having taken out 45,000 kW of plant the undertaking is left with 115,000 kW to work on and it is

Stuart Street, Manchester, power station being prepared for the reception of new plant

imperative to get on with the work in order to be able to carry the winter's load. As soon as Parliament re-assembles the city M.P.'s will be asked to take up the matter. Stuart Street supplies power for industrial as well as for domestic consumption, and the replacement of the old modern plant will save a considerable amount of coal.

Northants.—HOUSING POLICY.—In view of the possibility of electricity being available throughout the county within a short time the Joint Rural Housing Committee of the County Council recommends that all new houses should be wired for electric light and power points, even if there is not an electricity supply in the particular district when the houses are erected.

Northern Ireland.—TWO COMPANIES WITHDRAW OPPOSITION.—During the course of the inquiry into the Northern Ireland Electricity Board's No. 8 Development Scheme it was announced that the Limavady Electric Supply Co. and the Antrim Light & Power Co. (not to be confused with the Antrim Electricity Supply Co. and the Antrim Electricity Distribution Co., subsidiaries of the British Electric Traction Co.) would withdraw their opposition. As regards the Glenarm & District Electricity Supply Co., it was stated that no evidence would be offered, the company relying on the representations made in its letter.

Scarborough.—LOAN SANCTIONED.—The Corporation Electricity Committee has obtained sanction to borrow £4,600 for mains and services and substations.

Scotland. — ROTHESAY-BUTE LINK. — The North of Scotland Hydro-Electric Board is negotiating with local authorities in Bute and Cowal in connection with the construction of a 22-kV transmission line to link up Rothesay and Dunoon. The Board recently completed negotiations for the purchase of Rothesay Corporation electrical plant and distribution system, the transfer to take effect next May. Meanwhile the Board is financing the purchase of additional plant at Rothesay. The reasons for providing this line before the Board's Loch Striven scheme is in operation is the need for additional electricity in Dunoon.

Stirling.—PURCHASE OF PLANT.—The Town Council at a special meeting approved an Electricity Committee recommendation to negotiate for the purchase of the electricity substation and plant at Goosecroft laid down by the Air Ministry, the price not to exceed £700. The substation would enable AC to be supplied to new premises being erected in the district and to other consumers in the centre of the town. It was also agreed to make application to the Electricity Commissioners for permission to change over the supply in Stirling from DC to AC.

Stratford. — SUPPLY FOR TEMPORARY BUNGALOWS.—Submitting a report at a recent meeting of the Town Council, the chairman of the Housing Committee (Alderman Knight) stated that the S.W. & S. Electric Power Co. had written saying that as the cost of providing cables to the Council's temporary bungalows would be high the Committee was requested to provide half the bungalows with electric cookers, washboilers and refrigerators. Alternatively the company would have to ask for a contribution of about £1,000 towards the cost of the cables. Alderman Knight said that the Ministry of Health had ruled that all temporary houses on any one site must be provided either with gas or with electrical appliances. The Town Clerk was in communication with the Ministry on the matter.

Swanscombe.—DAMAGE TO LAMPS.—The Kent Electric Power Co. has written to the Council pointing out that it is becoming increasingly difficult to maintain street lamps owing to the amount of wilful damage, the lamps being rendered useless. The Council has informed the company of the steps which it is taking to deal with the trouble.

West Midlands.—VILLAGERS' PETITION.—A petition for a supply of electricity has been sent to the West Midlands Joint Electricity Authority by villagers of Astley, sixty of whom have agreed to take a supply.

Workington.—LOANS FOR EXTENSIONS.—The Electricity Committee is seeking sanction to borrow £3,890 for cables, substation and equipment at Fleet Street and £4,837 for extensions in the Poole Road area.

Wigan.—SUPPLY TO DALTON.—In connection with the proposed supply of electricity to Dalton the Lancashire Electric Power Co. has informed the Rural Council that it is the company's intention to proceed with the necessary development in that district as soon as circumstances permit. The Lancashire War Agricultural Committee has informed the L.E.P. Co. that it regards the supply of electricity to farms at Dalton as most desirable from the point of view of food production.

Worksop.—DEBT REPAID.—In four years Worksop electricity undertaking has repaid its debt to the general rate fund of £11,577, and has now a profit in hand of £2,725.

Overseas

Burma.—THE SUPPLY CO.'S POSITION.—The Burma Chamber of Commerce is appointing committees to proceed to reoccupied Burma under the military authorities and it is hoped that some reliable information as to the Burma Electric Supply Co.'s properties may be received from that visiting Mandalay. As yet no agreement has been reached with the Government on the company's claim for compensation.

Portugal.—HYDRO-ELECTRIC SCHEME.—Dr. Luiz Supico Pinto, Portuguese Minister of National Economy, has announced that two companies have been formed to start work on the Zezere, Cavada and Rabagao rivers, as the first step towards an ambitious scheme of hydro-electrification. The first part of the plan involves the expenditure of £9,000,000 in eight years; the second stage involves £4,000,000.—*Reuter* (Lisbon).

TRANSPORT

South Shields.—TRAM ROUTE CONVERSION.—The Town Council is to spend £13,000 converting the last tram route to trolley-buses and extending the present route from Mile End to The Lawe. Tenders are to be considered for the necessary equipment.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Morgan Crucible Co., Ltd.—Some details of the company's war work were given at the recent annual meeting by the chairman, Mr. P. Lindsay. He mentioned among a number of other developments the manufacture by the radio department of a special resistor which considerably increased the life of sparking plugs and special high altitude brushes and a carbon pile for voltage regulators were outstanding contributions to the success of the war in the air. With the Battersea staff's assistance their associated company in New York had also made valuable contributions including the production of novel electrical parts. Mr. Lindsay referred to the labour shortage and emphasised the importance of re-instituting world trade.

Mr. Lindsay also said it was proposed to form a subsidiary company in India as another step to strengthen their hold on world markets. He recalled that last year he had referred to the expansion of their organisation in Australia, Canada and South Africa.

The Electric Construction Co., Ltd., held its annual meeting last week, Mr. W. M. Furniss (managing director) presiding, owing to the illness of the chairman, Mr. G. W. Spencer Hawes, O.B.E. The chairman's report which Mr. Furniss read referred to the slight decrease in the profit from the previous year's record sum. This was not through a decrease in the output, which had actually established a new record, but was largely due to Government costing, the percentage of profit having been cut down on those contracts which had occupied the major part of the company's production. As regards the future, he thought the prospects were good, but Government orders had already begun to decrease and it was not possible to make an immediate return to normal peacetime production.

Lightfoot Refrigeration Co., Ltd.—Mr. F. Ryder, chairman, presiding at the annual meeting, referred to the fact that it was the company's diamond jubilee. With regard to the accounts, he said that the company's factories at Calcutta had been disposed of and £31,000 in excess of the book value of these assets had been obtained. This had enabled the company to liquidate the balance of debentures outstanding. Speaking of future prospects, he expressed the opinion that the huge task of reconstruction would involve a very large demand for refrigerating plant.

Hick, Hargreaves & Co., Ltd., show a net profit of £38,571 (£40,169). A final dividend of 8 per cent. is paid, making 10 per cent. (same) for the year. £10,000 again goes to contingency reserve and £2,000 (£5,000) to the employees' benevolent fund, £4,298 (£4,077) being carried forward.

Christy Bros. & Co., Ltd., report a gross trading profit to March 31st of £69,488 (against £71,288). After meeting expenses and depreciation there is £42,590 (£45,317) to which is added dividends and interest £22,384 (£19,848). Tax and N.D.C. take £22,145 (£21,497), £2,000 goes to superannuation and £5,000 to general reserve. The ordinary dividend is maintained at 17½ per cent. and £22,877 (£21,473) is carried forward.

Cinema Television, Ltd.—At meetings last week the proposals for the merger with Bush Radio, Ltd., and the increase of the capital to £1,198,250 by the creation of 550,000 5 per cent. cumulative preference shares of £1 and 12,000,000 " A " ordinary shares of 6d., with a view to the acquisition of not less than 90 per cent. of the issued capital of the company, were approved.

The English Electric Co. of Canada reports an operating profit for 1944 of $359,843 with $5,859 from investments, and a net profit of $74,462. The dividend on Class " A " shares is $1 and the earned surplus is increased from $162,156 to $194,222.

McMichael Radio, Ltd., has declared a dividend of 10 per cent. on the participating preferred ordinary shares, representing 6 per cent. for the nine months ended December 31st, 1941, and 4 per cent. for the six months to June 30th, 1942.

The Globe Telegraph & Trust Co., Ltd., announces a final ordinary dividend of 2 per cent., again making 5 per cent. for the year. The net profit to June 30th was £183,444 (£182,442).

Greenwood & Batley, Ltd., record a trading profit for the year to March 31st of £145,583 (£155,105). The final ordinary dividend is 10 per cent., making 15 per cent. (same).

The Nico Light Co., Ltd., is maintaining the dividend for the year ended March 31st last at 7½ per cent. The net profit was £3,085 (against £2,401).

Crossley Bros., Ltd., are doubling the deferred ordinary dividend (10 per cent. against 5 per cent.). The net profit for the year to April 30th was £35,872 (against £35,090).

Crossley-Premier Engines, Ltd., is paying a first and final ordinary dividend of 10 per cent. (same). The net profit to April 30th was £18,619 (£14,304).

Redfern's Rubber Works, Ltd., are again paying an interim dividend of 3¾ per cent.

New Companies

Pye Industrial Electronics, Ltd.—Private company. Registered July 12th. Capital, £100. Objects: To carry on the business of manufactures of, dealers in and agents for devices incorporating electronic tubes, apparatus associated therewith, scientific instruments, industrial electric, telephonic, radio, photographic and kinematographic apparatus, etc. Directors: C. O. Stanley, Fairstead, Long Road, Cambridge; and C. A. W. Harmes, Barrow House, Barrow Road, Cambridge, both directors of Pye, Ltd., etc. Registered office: Radio Works, Cambridge.

Britmac Electrical Co., Ltd.—Private company. Registered July 14th. Capital, £100. Objects: To carry on the business of agents for the purchase and sale of electrical articles, appliances and accessories, radio and television goods, etc., especially such goods as are manufactured wholly or partly by C. H. Parsons, Ltd., some of which bear the names of "Britmac," "Silomac," "Silomatic" or "Little Briton," etc. Directors: G. B. Handley, White Walls, Warwick Road, Solihull, G. Lancaster, Syndall, Hampton Lane, Solihull and J. B. Handley, 86, Heaton Road, Solihull (all directors of C. H. Parsons, Ltd.). Registered office: Britannia Works, Wharfdale Road, Tyseley, Birmingham.

Aire Electrics, Ltd.—Private company. Registered July 12th. Capital, £3,000. Objects: To carry on the business of electrical, mechanical, motor, radio and general engineers, etc. Directors: J. L. Rushworth and Mrs. Ida C. Rushworth, both of 151, Horton Grange Road, Bradford and J. Laycock, 3, Laburnum Grove, Cross Road, Keighley. Registered office: Ryan Street Works, Bowling, Bradford.

Lloyd Allen Engineering, Ltd.—Private company. Registered July 13th. Capital, £1,000. Objects: To carry on the business of electrical engineers and contractors, etc. First directors: H. J. Mann and Jean A. Mann, both of 60, Springfield Road, Sale, and R. A. H. Johnson, 37, West Drive, Swinton. Registered office: 36, Kennedy Street, Manchester.

Light & Power Accessories Co. Ltd.—Private company. Registered July 10th. Capital, £2,000. Objects: To carry on the business of heat, light, power and general engineers, etc. Directors: E. J. Lott, 1, Wroxham Gardens, N.11, and F. J. Lott, 41, Langham Gardens, N.21. Registered office: 12a, Tudor Chambers, Station Road, N.22.

Companies' Returns

Statements of Capital

A. Reyrolle & Co., Ltd.—Capital, £1,250,000 in £1 shares (115,000 preference, 1,017,647 ordinary and 117,353 undenominated). Return dated May 3rd. 102,500 preference and 1,017,647 ordinary shares taken up. £1,064,830 paid. £55,317 considered as paid. Mortgages and charges: Nil.

Boothroyd Electrical Co., Ltd.—Capital, £2,000 in £1 shares. Return dated January 13th. 1,773 shares taken up. £1,773 paid. Mortgages and charges: £1,000.

E.M.I. Service, Ltd.—Capital, £100 in £1 shares. Return dated January 13th. All shares taken up. £100 paid. Mortgages and charges: Nil.

Burgess Hill Electricity, Ltd.—Capital, £65,000 in £1 shares (all ordinary). Return dated May 8th. 52,250 shares taken up. £50,400 paid. £1,850 considered as paid. Mortgages and charges: Nil.

Seaford and Newhaven Electricity, Ltd.—Capital, £120,000 in £1 shares. Return dated May 8th. All shares taken up. £106,000 paid (being £1 per share on 92,000 and 10s. per share on 28,000). Mortgages and charges: Nil.

International Hydro-Electric Development Syndicate, Ltd.—Capital, £10,000 in £1 shares. Return dated December 26th. 2,894 shares taken up. £2,894 paid. Mortgages and charges: Nil.

Concordia Electric Safety Lamp Co., Ltd.—Capital, £100,000 in £1 shares. Return dated April 23rd. All shares taken up. £100,000 paid. Mortgages and charges: Nil.

D.P. Battery Co., Ltd.—Capital, £100,000 in £1 shares. Return dated April 27th. All shares taken up. £28,000 paid. £72,000 considered as paid. Mortgages and charges: Nil.

Trent Valley & High Peak Electricity Co., Ltd.—Capital, £200,000 in £1 shares (all ordinary). Return dated April 2nd. All shares taken up. £200,000 paid, plus £10,666 13s. 4d. in respect of premiums. Mortgages and charges: Nil.

Ringwood Electric Supply Co., Ltd.—Capital, £50,000 in £1 shares (all ordinary). Return dated April 2nd. All shares taken up. £50,000 paid. Mortgages and charges: Nil.

Evered & Co., Ltd.—Capital, £300,000 in 150,000 preference and 150,000 ordinary shares of £1. Return dated March 26th. 125,000 preference and 125,000 ordinary shares taken up. £106,393 paid on 100,000 preference and 6,393 ordinary shares. £143,607 considered as paid on 25,000 preference and 118,607 ordinary shares. Mortgages and charges: Nil.

British Short-Circuit Testing Station, Ltd.—Capital, £10,000 in £1 shares (all ordinary). Return dated May 3rd. 302 shares taken up. £302 paid. Mortgages and charges: Nil.

Croydon Cable Works, Ltd.—Capital, £170,000 in £1 shares. Return dated February 16th. 700 shares taken up. £700 paid. Mortgages and charges: Nil.

British Brown-Boveri, Ltd.—Capital, £50,000 in £5 shares. Return dated January 12th. All shares taken up. £21,250 paid (£2 10s. on 8,500 shares). £7,500 considered as paid (£5 on 1,500 shares). Mortgages and charges: Nil.

Increases of Capital

London Electrical Co. (Blackfriars), Ltd. (formerly London Electrical Co. (Sherborne Lane), Ltd.).—The nominal capital has been increased by the addition of £5,000 in £1 ordinary shares beyond the registered capital of £32,500.

Hales & Co. (East Anglia), Ltd.—The nominal capital has been increased by the addition of £2,000 in 750 preference and 1,250 ordinary shares of £1 each, beyond the registered capital of £500.

Bankruptcies

W. Sumner and **E. Sumner**, trading in copartnership as "W. & E. Sumner," electrical and mechanical engineers, at 65, Victoria Street, Liverpool, and elsewhere. (Separate estate of W. Sumner).—Last day for receiving proofs for dividend August 3rd. Trustee, Mr. A. Barrett, Hunter Street (Friends' Meeting House), Liverpool, 3, Official Receiver.

A. J. Harding, 50-51, Broad Street, and West Street, Hereford, electrical engineer.—Supplemental dividend of 2s. 3d. payable at the Official Receiver's office, 133, St. Owen Street, Hereford.

STOCKS AND SHARES

TUESDAY EVENING.

BEFORE these lines appear in print, the results of the General Election will have been declared, thus clearing away the doubt which has existed since July 5th. Pending the declarations, Stock Exchange markets remain very firm, having practically recovered from the weakness that overtook them at the time of Mr. Churchill's statement in May that the Labour Party had declined to defer an appeal to the country until after the war with Japan. There continues to be a fair amount of activity in the shares of the radio group. Elsewhere, the ordinary shares of the manufacturing and equipment companies again absorb attention and capital.

July Price Movements

During the past month, a rise of 50 points in British Electric Traction deferred has lifted the price to 1215. Southern Railway 5 per cent. preference at 120½ is up by 5, the preferred showing a gain of 3½ at 75½. Cable & Wireless ordinary moved in switchback fashion ; from 86 the price rose to 98, reacting to 93, the last-named being ex the dividend of 2 per cent. net. The 5½ per cent. preference is unchanged on balance at 115. Tokyo Electric six per cents. at 23½ are 3½ points down. A similar fall took International " Tel. & Tel." to 31½, the New York stock market having been disturbed by a heavy bout of selling. This also affected Brazilian Tractions, which at 28¼ are down $1¼.

The Brazilian Traction company has announced its intention of co-operating with whatever Government the Brazilians may choose in the elections which take place early in December. The company points out that wages have increased under a Federal Decree. It maintains that this increase should be met by permission to make a corresponding advance in the charges to public utility customers. The company's meeting took place a week or two ago, when the chairman declined to make any long-term prophecy of dividend prospects. However, as Brazil is in a satisfactory position for taking advantage of peace in Europe, the Brazilian Traction Company should be able to share fully in the favourable outlook which opens for Brazilian prosperity while the world is struggling to its feet.

Manufacturing and Equipment

British Insulated and Callender's Cable as separate entities have disappeared, their places being taken by the new amalgamated company. Starting off at 41s. 6d. the price of this newcomer's shares advanced to 47s. Johnson & Phillips at 79s. 6d. are 4s. 6d. and Siemens at 38s. are 3s. 6d. higher on the month. Westinghouse Brakes at 79s. have gained 2s. 3d. International Combustions responded to the dividend increase with a further rise, of 12s. 6d., to 8½. De la Rue are 7s. 6d. up at 11. English Electrics at 53s. 6d. show an improvement of 3s. 6d. Ransome & Marles at 87s. 6d. and Reyrolles at 75s. are up by 3s. 9d. and 1s. 9d. respectively. Crompton Parkinsons at 34s., Metal Industries " B " at 51s. and Thorn Electrics at 30s. are all a florin to the good. Reference to the price lists will show a number of other rises. Home electricity supply ordinary shares are a steady market. Newcastle are 6d. lower at 31s. 4d.; apart from this, what few changes occurred during the month were in favour of holders.

General Electrics

The General Electric Company's meeting on Thursday in this week was expected to prove an even more interesting function than usual, owing to the fact that the security ban has been raised to a great extent and the chairman is, therefore, able to throw some light upon the remarkable contribution made to the war effort by the company. Some of the developments designed to defeat the enemy can be turned in peacetime to the service of the community and the profit-earning capacity of the company. As already announced, the net profit for the year to March 31st, 1945, was £1,303,119, an increase of £68,000 over last year's comparable figure. Thanks to the recent issue of the " C " preference shares, the loan of £2,030,000, which had been appearing in the accounts, is now no longer there. The current assets at a little over £16,000,000 are £400,000 higher on the year, current liabilities at £10,500,000 being about £150,000 up. The price of the ordinary shares at 98s. 6d. xd. is half-a-crown higher on the month.

Metropolitan Assented

A rise to 58¾ in assented " A " stock of the Metropolitan Railway, drew attention to a security comparatively little known, but which holds interest for the investor. It carries guaranteed interest of 3¼ per cent. for fifteen years, up to July 1st, 1948, and thereafter at 3 per cent. for ten years, to 1958, the guarantors being the four main-line railway companies. The stock was issued in 1933 in exchange for Metropolitan Railway consolidated, and the guarantee is subject to certain conditions, which may not be fulfilled. What will happen definitely, however, is that in 1958, if nothing has occurred before then, £100 of this stock will automatically be converted into £67 10s. London Passenger Transport " C " stock, the price of which now stands at 67½. At the current 3¼ per cent. dividend, the yield on the assented " A " stock at 58¾ is £5 3s. per cent., whereas that on Transport " C " is £4 9s. per cent. In 1948, however, the interest on the former, as mentioned above, falls to 3 per cent.

Ultra Electric

Ultra Electric (Holdings) 5s. ordinary shares at 9s. to 9s 3d. are unaffected by the issue of the

(*Continued on page* 145)

ELECTRICAL INVESTMENTS

Past Month's Price Changes

Company	Dividend Previous	Dividend Last	Middle Price July 24	Month's Rise or Fall	Yield p.c. £	s.	d.
Home Electricity Ordinary							
Bournemouth and Poole	12½	12½	62/6	..	4	0	0
British Power and Light	7	7	32/–	+1/–	4	10	4
City of London ..	5½	6	31/–	..	3	17	5
Clyde Valley ..	8	8	42/–	..	3	16	1
County of London	8	8	42/6	+6d.	3	16	1
Edmundsons ..	6	6	31/–	..	3	17	5
Elec.Dis.Yorkshire	9	9	46/–	..	3	18	3
Elec. Fin. and Securities ..	12½	13½	61/6	+3d.	4	7	8
Elec. Supply Corporation ..	10	10	50/–	+6d.	4	0	0
Lancs. Light and Power ..	7½	7½	37/–	..	4	1	1
Llanelly Elec. ..	6	6	28/6	..	4	4	3
Lond.Assoc.Electric	3	4	26/9	+3d.	2	19	10
London Electric	6	6	31/6	..	3	16	3
Metropolitan E.S.	8	8	42/6	+6d.	3	16	1
Midland Counties	8	8	43/3	+1/–	3	14	0
Mid. Elec. Power	9	9	45/–	..	4	0	0
Newcastle Elec...	7	7	31/–	–6d.	4	9	0
North Eastern Elec.	7	7	35/6	..	3	18	4
Northampton ..	10	10	50/6	..	3	19	0
Northmet Power	7	7	40/–	..	3	10	0
Richmond Elec.	6	6	26/6	..	4	10	7
Scottish Power ..	8	8	40/–	..	4	0	0
Southern Areas	5	5	24/–	..	4	3	4
South London ..	7	7	30/6	+6d.	4	11	10
West Devon ..	5	5	25/–	..	4	0	0
West Glos. ..	4½	3½	27/6	..	2	11	0
Yorkshire Elec...	8	8	44/6	..	3	12	1
Public Boards							
Central Electricity							
1955–75 ..	5	5	115	..	4	7	0
1951–73 ..	4½	4½	106	..	4	5	0
1963–93 ..	3½	3½	104½	..	3	7	0
1974–94 ..	3½	3½	101	..	3	3	9
LondonElec.Trans.	2½	2½	98xd	..	2	11	0
London & Home Counties 1955–75	4½	4½	111xd	..	4	1	4
Lond.Pass.Trans.Bd.							
A	4½	4½	121½	+1	3	14	6
B	5	5	120½	..	4	3	0
C	3½	3	67½	..	4	9	0
West Midlands J.E.A. 1948–68	5	5	106½	..	4	14	0
Overseas Electricity Companies							
Atlas Elec. ..	Nil	Nil	8/–	..	—		
Calcutta Elec. ..	6*	6*	61/–	+6/6	2	4	0
Cawnpore Elec...	10	7	60/–	+8/–	2	13	10
East African Power	7	7	35/6	+1/6	3	19	0
Jerusalem Elec.	7	5	27/6	–6d.	3	12	9
Kalgoorlie (10/–)	5	5	10/–	..	5	0	0
Madras Elec. ..	Nil	4	41/6	+7/–	2	6	5
Montreal Power	1½	1½	25	–1	—		
Nigerian Elec. ..	8	10	38/6	+6d.	5	4	0
PalestineElec."A"	5*	5*	39/6	+6d.	2	10	8
Perak Hydro-elec.	6	7	16/6	..	—		
Tokyo Elec. 6%	6	6	23½	–3½	—		
VictoriaFallsPower	15	15	88/9	..	3	7	7
WhitehallInv.Pref.	—	6	26/–	..	4	12	4

Company	Dividend Previous	Dividend Last	Middle Price July 24	Month's Rise or Fall	Yield p.c. £	s.	d.
Equipment and Manufacturing							
Aron Elec. Ord.	10	15	63/9	+9d.	4	14	3
Assoc. Brit. Eng.	6	7	53/9	..	2	12	0
Assoc. Elec.:							
Ord.	10	10	58/6	+1/3	3	8	0
Pref.	8	8	40/6	–6d.	3	19	1
AutomaticTel.&El.	12½	12½	69/6	+6d.	3	12	0
Babcock & Wilcox	11	12	59/3	+2/6	4	1	4
British Aluminium	10	10	43/–	+1/–	4	13	9
British Insulated & Callender's..	..	..	47/–	..	—		
British Thermostat (5/–)	18½	18½	19/9	+3d.	4	13	8
British Vac. Cleaner (5/–)	30	30	34/6	+1/6	4	7	0
Brush Ord. (5/–)	8	9	10/–	..	4	10	0
Burco (5/–) ..	15	15	15/6	+3d.	4	16	9
ChlorideElec.Storage	15	15	88/9	–1/3	3	7	8
Christy Bros. ..	12½	17½	77/6	..	4	10	2
Cole, E. K. (5/–)	15	20	40/–	–1/16	2	10	0
Consolidated Signal	24	27½	6¾	..	4	1	4
Cossor, A. C. (5/–)	7½*	10*	41/6	+2/–	1	4	1
Crabtree (10/–) ..	17½	17½	43/6	+6d.	4	0	5
Crompton Parkinson Ord. (5/–) ..	20	22½	34/–	+2/–	3	6	3
De La Rue ..	40	40	11	+⅛	3	12	9
E.M.I. (10/–) ..	6	8	35/–	+6d.	2	5	9
Elec.Construction	10	12½	60/–	..	4	3	4
Enfield Cable Ord.	12½	12½	65/–	+1/16	3	17	0
English Electric	10	10	56/6	+3/6	3	11	5
Ericsson Tel. (5/–)	22*	20*	54/–	..	1	17	0
Ever Ready (5/–)	40	40	42/6	+1/–	4	14	1
Falk Stadelmann	7½	7½	36/6	+1/–	4	3	4
Ferranti Pref. ..	7	7	33/6	..	4	3	7
G.E.C.:							
Pref.	6½	6½	34/6	..	3	15	4
Ord.	17½	17½	96/6	+2/6	3	13	0
General Cable (5/–)	15	15	19/–	..	3	19	0
Greenwood&Batley	15	15	48/3	..	6	3	0
H.T.A. (10/–) ..	12½	12½	30/–	..	4	3	4
Henley's (5/–) ..	20	20	28/–	+9d.	3	11	5
4½% Pref. ..	4½	4½	24/6	..	3	13	6
Hopkinsons ..	17½	20	86/6	+2/9	4	13	0
India Rubber Pref.	5½	5½	24/–	..	4	11	9
Intl. Combustion	30	32½	8½	+⅝	3	16	6
Johnson & Phillips	15	15	79/6	+4/6	3	15	5
LancashireDynamo	22½	22½	105/–	..	4	5	10
Laurence,Scott(5/–)	12½	12½	13/3	+3d.	4	14	3
London Elec. Wire	7½	7½	40/–	+1/–	3	15	0
Mather & Platt	10	10	53/9	..	3	14	4
Metal Industries(B)	8	8½	51/–	+2/–	3	6	0
Met.Elec.CablePref.	5½	5½	21/3	..	5	3	6
Mid. Elec. Mfg.	25	25	7 11/16	+1/16	3	5	1
Murex	20	20	97/6	..	4	2	0
Newman Ind.(2/–)	20	20	7/9	..	5	3	1
Philco (2/–) ..	—	—	14/–	–6d.	—		
Power Securities	6	6	28/6	..	4	4	3
Pye Deferred (5/–)	25	25	33/6	..	3	14	7
Ransome & Marles	20	20	87/6	+1/16	4	11	4
Revo (10/–) ..	17½	17½	45/–	+1/–	3	17	9
Reyrolle ..	12½	12½	75/–	+1/9	3	6	8

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend Previous	Dividend Last	Middle Price July 24	Month's Rise or Fall	Yield p.c. £	s.	d.
Equipment and Manufacturing (*Continued*)							
Siemens Ord. ..	7½	7½	38/–	+3/6	3	19	0
Strand Elec. (5/–)	10	12½	10/6	..	5	19	3
Switchgear & Cowans (5/) ..	20	20	21/6	..	4	13	0
T.C.C. (10/–) ..	7½	10	25/6	..	3	18	6
T.C. & M. ..	10	10	62/6	+1/–	3	4	0
TelephoneMfg.(5/–)	9	9	12/–	–6d.	3	15	0
Thorn Elec. (5/–)	20	20	30/–	+2/–	3	6	8
Tube Investments	20	22½	5 7/16	+⅛	4	1	0
Vactric (5/–) ..	Nil	22½	23/–	+1/–	4	17	10
Veritys (5/–) ..	7½	7½	9/–	..	4	3	3
WalsallConduits(4/–)	55	55	54/6	–1/–	4	0	9
Ward & Goldstone (5/–)	20	25	30/6	..	4	2	0
WestinghouseBrake	14	14	79/–	+2/3	3	11	0
West, Allen (5/–)	7½	7½	8/6	+6d.	4	8	3
Traction and Transport							
Anglo-Arg. Trans.:							
First Pref. (£5)	Nil	Nil	2/6	..	—		
4% Inc. ..	Nil	Nil	6½	–1	—		
Brit. Elec. Traction:							
Def. Ord. ..	45	45	1215	+50	3	14	0
Pref. Ord ..	8	8	180	..	4	4	3
Bristol Trams ..	10	10	57/6	–1/6	3	9	5
Brazil Traction	1¾	2	28½	–1½	7	1	7
Calcutta Trams..	6½	7½	78/6	+6/–	1	18	3
Cape Elec. Trams .	5	6	25/–	..	4	16	0
Lancs. Transport	10	10	49/–	..	4	1	0
Southern Rly.:							
5% Prefd. ..	5	5	76½	+3½	6	10	9
5% Pref. ..	5	5	120½	+5	4	3	0
T. Tilling ..	10	10	58/–	+6d.	3	9	0
West Riding ..	10	10	47/6	+6d.	4	4	2
Telegraph and Telephone							
Anglo-Am. Tel.:							
Pref.	6	6	123½	+1	4	17	0
Def.	1½	1½	30½	..	4	18	4
Anglo-Portuguese	8	8	29/–	+1	5	10	4
Cable & Wireless:							
5½% Pref. ..	5½	5½	115	..	4	15	6
Ord.	4	4	93	+7	4	6	0
CanadianMarconi$1	Nil	4 cts.	16/6	+1/–	—		
Globe Tel. & Tel.:							
Ord.	8¼*	5*	44/–	+1/6	2	5	6
Pref.	6	6	31/6	..	3	16	2
Great Northern Tel. (£10)	Nil	Nil	32½	–½	—		
Inter. Tel. & Tel.	Nil	Nil	31½	–3½	—		
Marconi-Marine..	7½	7½	36/6	+1/–	4	2	2
Oriental Tel. Ord.	4	4	58/–	+1/–	—		
Telephone Props.	Nil	6	22/–	+1/–	5	9	1
Tele. Rentals (5/–)	10	10	12/9	+1/–	3	18	6

* Dividends are paid free of Income Tax.

Stocks and Shares (*Continued from page* 143)

Company's annual report. The profit of Ultra Electric, Ltd., for the year ended March 31st last, was £20,649, comparing with £25,910 in the previous year. The chairman's statement mentioned that the period under review covered the German fly-bomb and rocket attacks on London, and although no physical damage was suffered by the company, the volume of output was adversely affected. During the past few months, it has been possible to give attention to resumption of the company's normal business.

Indian Utilities

Amongst the features of the past few weeks, a steady rise in the prices of Indian utility shares stands out prominently. On this side, the shares have been for years past a favourite with investors prepared to take a certain amount of risk in order to obtain a good rate of interest on the money. The recent rise has reduced the yields in most cases to negligible amounts.

The buying, or much of it, is said to have come from India, where indications point to there being large amounts of money available for investment. War conditions have favoured Indian industrials. Moreover, the negotiations which led to the likelihood of the Calcutta Tramways being taken over by the municipal authority, although the amount that would be receivable by the company's ordinary shareholders is not determined, have been effective in causing notice to be taken of shares in other utility companies that might also be subject to similar treatment. One of them is Cawnpore Electric, for whose acquisition arrangements are now being negotiated. Since the beginning of this year, Calcutta Electric have risen from 46s. 6d. to 61s.; Cawnpores, then 41s. 3d., are now 60s.; Calcutta Trams advanced from 62s. 6d. to 78s. 6d.; and Madras from 31s. to 41s. 6d.

Shares on Offer

To obtain a yield of 4 per cent. from ordinary shares in Home electricity supply companies, the investor must be referred to Lancashire Electrics at 37s. 6d., Midland Electric Corporation at 45s. and Electric Supply Corporation at 50s., all of which, at these prices, will pay the level rate. Shares are on offer in the market at about the prices quoted. South London Electric ordinary have come on offer to a small extent at 31s., giving at that price 4½ per cent. In the provincial group, Altrincham 5 per cent. participating ordinary at 33s. 9d. yield £5 6s. 6d. On the last-named shares, the dividend for 1944 was 9 per cent., compared with 11 per cent. for 1943 and 12½ per cent. in each of the two previous years. Most of the ordinary shares in other Home supply companies give a return of about 3¾ per cent. or less, and are not always easy to obtain.

Intensive Training Schemes

Details are given in our advertisement pages to-day of six-month intensive courses for Higher National Certificates in mechanical, electrical and production engineering which are to be held in technical colleges in Lancashire and Cheshire.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

AKT.-GES. BROWN, BOVERI & CIE.—"Windings for AC commutator machines." 7016/42. May 30th, 1941. (570328.)

Aktiebolaget, Svenska Elektro-Industri Companiet.—"Devices for facilitating the taking of bearings by compasses." 13616/43. September 2nd, 1942. (570466.)

British Insulated Cables, Ltd., H. R. F. Carsten and C. H. M. Thorpe.—"Couplings for coaxial electric cables." 15907. September 28th, 1943. (570339.)

British Thomson-Houston Co., Ltd.—"Adaptors for electric discharge lamps." 11014/43. July 7th, 1942. (570431.) "Noise limiting circuits for signal modulated carrier waves." 16217/43. October 5th, 1942. (570466.)

British Thomson-Houston Co., Ltd., and E. C. Barwick.—"Induction regulators." 7539. May 12th, 1943. (570375.)

Brush Development Co.—"Piezo-electric crystal units." 4934/43. March 26th, 1942. (570370.)

Burco, Ltd., and D. K. Ward.—"Detachable leg for a washboiler, washing machine casing and the like." 16856. October 14th, 1943. (570381.)

Callender's Cable & Construction Co., Ltd., Callender-Suchy Developments, Ltd., L. G. Brazier, R. M. Fairfield and C. T. Suchy.—"Electric cables particularly applicable for high frequencies." 11930. July 22nd, 1943. (570379.)

Callender's Cable & Construction Co., Ltd., Callender-Suchy Developments, Ltd., P. V. Hunter, L. G. Brazier, R. M. Fairfield and C. T. Suchy.—"High-voltage electric cables." 11931. July 22nd, 1943. (570380.)

R. O. Carter.—"Circuits for the demodulation of frequency modulated signals." 21513. December 23rd, 1943. (570478.)

Communications Patents, Ltd., and R. V. Roscoe.—"Coaxial electric cable and systems comprising such cable." 17746. October 27th, 1943. (570349.)

N. R. Davis and Sunvic Controls, Ltd.—"Hygrometric apparatus." 20624. December 9th, 1943. (570416.)

J. M. Dodds, G. J. Scoles and Metropolitan-Vickers Electrical Co., Ltd.—"Step-by-step driving mechanisms." 10135. September 8th, 1941. (570360.)

Ferranti, Ltd., and H. Jackson.—"Integrating electricity meters." 21098. December 16th, 1943. (570476.)

D. J. Fewings.—"Control circuits for radio and like oscillation generators." 1500. February 4th, 1942. (570392.)

H. H. Harvey.—"Electrical current transmission apparatus of the moving contact type." 7099. April 17th, 1944. (570453.)

Hasler Akt.-Ges. Werke für Telephonic und Prazisions-Mechanik.—"Distributors for multipole magnetos for internal combustion engines." 9950/43. July 2nd, 1942. (570426.)

H. Jefferson.—"Radio reception." 1498. February 4th, 1942. (570390.) E. Llinas.—"Protecting tubes for electrical mains and wiring installations." 305. January 8th, 1942. (Convention date not granted.) (570361.)

Lumsden Machine Co., Ltd., E. G. Blake, W. Lumsden, J. H. Stanier, and A. H. Blake.—"Magnetic devices for removing ferrous particles from water." 20829. December 13th, 1943. (570355.)

Mullard Radio Valve Co., Ltd., and T. H. Jones.—"Screening cans for electron-discharge tubes." 14893. September 10th, 1943. (570458.)

J. G. Murdoch & Co., Ltd., D. L. Clay and F. L. Hogg.—"Radio signalling system calling arrangements." 20307. December 4th, 1943. (570415.)

Patentverwertungs-Patelhold & Elektro-Holding Akt.-Ges.—"High frequency coil with variable inductance." 19114/43. December 17th, 1942. (570474.)

Revo Electric Co., Ltd., F. H. Reeves and A. N. Harding.—"Electric hot plates." 15859. September 28th, 1943. (570334.)

D. Rushworth.—"Apparatus for use with portable electrically or fluid operated tools or the like." Cognate applications 8359/43 and 16669/43. May 26th, 1943. (570402.)

Sangamo Weston, Ltd., and M. S. Snell.—"Photo-electric exposure meters." 10488. June 29th, 1943. (570429.)

Standard Telephones & Cables, Ltd.—"Making selenium elements." 16500/43. November 25th, 1942. (570346.) "Method of making selenium elements." 16955/43. January 7th, 1943. (570347.) "Method of making selenium elements." 18845/43. November 18th, 1942. (570385.) "Indirectly-heated thermionic cathodes for electron discharge devices." 16958/43. December 8th, 1942. (570468.)

Standard Telephones & Cables, Ltd., and M. L. Gayford.—"Electro-acoustical transducers of the moving-coil types." 15894. September 28th, 1943. (570337.)

Standard Telephones & Cables, Ltd., and C. N. Smyth.—"Lecher wire systems." 10705. June 21st, 1940. (570359.)

Svenska Turbinfabriks Aktiebolaget Ljungström.—"Radial flow turbine having axially spaced blade groups." Cognate applications 17833/43 and 17834/43. December 19th, 1942. (570472.)

Wardle Engineering Co., Ltd., and D. H. Ogley.—"Apparatus for raising, suspending and lowering elevated beacon, warning or other lights on their supports." 13690. August 23rd, 1943. (570447.)

Westinghouse Electric International Co.—"Electric irons." 9561/43. May 22nd, 1942. (Addition to 557139.) (570409.)

A. C. Wickman and R. G. Moffat.—"Electrical junction devices for components and apparatus having many electrical connections with the main equipment." 20852. December 13th, 1943. (570417.)

A. Wright and Wright & Lloyd Ltd.—"Electric heating of liquids." 12739. August 6th, 1943. (570441.)

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Belfast.—August 3rd. Electricity Department. Fire extinguishing equipments for substations; and replating battery. (July 20th.)

Chichester.—August 17th. City Council. About 20 miles of 11 kV and control cables and accessories. (July 13th.)

Manchester.—July 30th. Electricity Department. Manufacture, testing and delivery at Stuart Street generating station of 33,000-V cable. (July 13th.)

August 11th. Transport Department. Overhead trolley-bus equipment materials. Particulars from general manager, 55 Piccadilly.

Southampton.—August 1st. Electricity Department. Cables and domestic appliances. (July 13th.)

Swansea.—August 4th. Borough Council. Electrically equipped pumping station at Morristone Park. Trevelyan Price, waterworks engineer, Guildhall, Swansea. (Deposit, £5 5s.).

Whittingham, Preston.—August 3rd. Mental Hospital. Supply and erection of generating plant and other electrical gear. (July 13th.)

Wilton.—August 25th. Borough Council. Supply and erection of a public lighting installation in the borough. Borough surveyor, Municipal Offices, Fugglestone House, Wilton.

Orders Placed

Bedford.—Electricity Committee. Accepted. Three 15,000-kVA transformers (£28,950).—Fuller Electrical & Manufacturing Co. Three panel switchboard with relay board (£14,544).—A. Reyrolle & Co. Six 25-kVA transformers (£468).—Bonar Long & Co.

Housing Committee. Recommended. 200 lamp columns, etc., for housing estate street lighting (£1,998).—G.E.C.

Fulham.—Electricity Committee. Recommended. Switchgear for Fulham Cross substation (£562).—Lucy & Co.

London. — Metropolitan Water Board. Accepted. Cable for Hampton works (£887).—Aberdare Cables. Switchboard for Hammersmith works (£217).—Parmiter, Hope & Sugden. Resistances for starters (£70).—Laurence, Scott & Electromotors. Switchgear for Streatham pumping station (£177).—County of London Electric Supply Co.

Newcastle-on-Tyne.—City Council. Accepted. Intercommunication system for city police (£238).—Dictograph Telephones, Ltd.

Middlesbrough. — Corporation. Accepted. Circuit-breakers. — English Electric Co. Ltd. Cable.—Britannic Electric Cable & Construction Co.

Sunderland.—Corporation. Accepted. Tram track for junction of Villette Road and Ryhope Road (£1,030).—Titan Track Work Co., Ltd.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Becontree.—Industrial development; Waterlow & Sons, Ltd.

Birmingham.—Houses (65), Baldwins Lane, Hall Green; H. Dare & Sons, building contractors, Ward End, Birmingham.

Cumberland.—Conversion of old hospital block, Penrith Institution, into staff quarters; county architect, 4, Alfred Street North, Carlisle.

Frizington (Cumberland).—Houses (28); North-Eastern Housing Association, Northumberland Road, Newcastle-on-Tyne.

Gateshead-on-Tyne.—Houses (85); borough engineer, Town Hall.

Hereford.—Houses (50), Hunderton; T. B. Feltham, town clerk, Town Hall.

London.—ISLINGTON.—Flats (56), Highbury Park (£44,484) and rebuilding flats, Halton Mansions (£19,987); A. Roberts & Co. Ltd.

Repair and adaptation of requisitioned houses (£200,000); borough engineer.

Jarrow-on-Tyne.—Paper process factory at the Saltgrass; Spiro, Ltd.

Temporary houses, Harbottle Crescent, for T.C.; R. Hudson & Sons, builders, St. Mark's Crescent, Sunderland.

Kiveton Park.—Houses (92), several parishes, for R.D.C.; surveyor, Council Offices, Kiveton Park, near Sheffield.

Leicestershire.—School kitchens (£2,000); county engineer.

Extensions, Mental Institution (£40,000); county architect.

Lichfield.—Houses (50), Anglesey Road site; G. Warren Baxter, Ltd., contractors, Wolverhampton.

London.—Dwellings (1,487), various estates; development of Chingford (£1,362,000); alterations and additions to Alexandra House, Maitland Park (£21,000); and hostel for the blind; L.C.C. architect, Westminster Bridge Road, S.E.1.

Luton.—Houses (125) and flats (10); F. Oliver, borough engineer.

Newcastle-on-Tyne. — Large factory, for McClean, Ltd.; Cackett, Burns, Dick & McKellar, architects, 21, Ellison Place, Newcastle.

Conversion of property, St. George's Terrace, into flats; Marshall, Tweedy & Bourn, architects, Grainger House, Blackett Street, Newcastle.

Factory and store, Walker Road, for G. Angus & Co., Ltd.; Hetherington & Wilson, architects, County Chambers, Westgate Road, Newcastle.

Factory, City Road, for Brown's Furniture Co.; J. W. Taylor, architect, Westgate Road, Newcastle.

Factory, Chillingham Road, for Ferris, Ltd.; Alnwick Construction Co., Ltd., Alnwick.

Newcastle-under-Lyme. — Alterations, etc. (£18,227), Farcroft Maternity Home; G. & J. Seddon, Ltd., building contractors, 55, Duke Street, Fenton, Stoke-on-Trent.

Norfolk. — Infants' school, Sprowston (£12,250); C. H. Thurston, county architect, 25, Thorpe Road, Norwich.

Poole.—Houses (96), Trinidad estate; J. R. Barron, borough engineer, Municipal Buildings, Park Gates East.

Rochdale.—Works additions, Spotland Mill; Dexine Rubber & Ebonite Co., Ltd., Coldwell Street.

Rugeley.—Houses (50), Brereton and Rugeley, for U.D.C.; A. Evans, clerk, Council House, Rugeley, Staffs.

St. Pancras. — Housing schemes: Oakley Square; Ian B. Hamilton, architect. Cromer Street; A. M. Chitty, architect.

Salterbeck (Cumberland).—Additions to factory for Cumberland Cloth Co., Ltd.; Thomas Armstrong, builder, Cockermouth.

Scarborough.—Food factory, Belle Vue Street; D. H. Moore.

Stockton-on-Tees.—Thirty houses, Preston, for R.D.C.; G. W. T. Brown, surveyor, Finkle Street, Stockton.

Conversion of premises, Lorne Terrace, into hospital for sick babies; borough architect.

Stourbridge.—Houses (58), and bungalows, Birmingham Street-Junction Road estate; G. N. Maynard, borough engineer, Council House.

Sunderland.—Rebuilding of furniture factory for Ditchburns, Ltd.; J. W. White, High Barns Works, Sunderland.

Westminster. — Adapting requisitioned premises (£20,000); city engineer. Extension and redevelopment of Tachbrook estate; Westminster Housing Trust, Ltd.

Whilton (Northants). — Eight-storey warehouse; L.M.S. Railway Co.

Machinery Traders

AT a general meeting of the Electrical Machinery Traders' Association on July 17th it was reported that a regular bulletin detailing the Association's activities and developments within the industry was to be issued.

The following were elected to the Council:—Mr. H. Vernon (Thos. Ward, Ltd.), Mr. J. W. Grant (James Grant & Co.) and Mr. R. A. Joseph (Midland Electrical Installation Co., Ltd.).

A Fair Trading Policy drafted by the Northern Committee was discussed. It detailed procedure and requirements in the description of plant, guarantees, deposits and disputes. It was decided to give the policy a twelve-month trial. A minimum guarantee period of six months is one of the points of the policy. A technical committee is to be set up for the purpose of dealing with technical problems and exchange of information.

On the subject of the disposal of Government-owned industrial electrical equipment, the chairman (Mr. W. E. Lawton, Industrial Electrical Co.), reported upon negotiations with the Government which, he said, were proceeding satisfactorily and expeditiously.

Reduced Palestine Imports

A STEEP decline occurred in the electrical import trade of Palestine between 1942 and 1934. The values of the principal items, according to official figures issued in Jerusalem, are given below, together with notes of decrease and increase (one only) compared with 1942. Recently the import duty on radio sets and parts was raised from 15 per cent. to 25 per cent. *ad valorem*. Shortage of stocks is reported in most lines and local industry is producing mainly for the civilian market.

Class	1943 £P	Inc. or dec. on 1942 £P
Dry batteries	80	− 1,670
Insulated cable and wire lead-covered	1,390	− 1,410
Insulated cable and wire, other, not exceeding 9 sq. mm. cross section	5,460	− 21,620
Insulated cable and wire other, exceeding 9 sq. mm. cross section	2,400	− 2,400
Electric cooking stoves		− 130
Electric glow lamps	8,900	− 1,800
Electric glow lamps, gas-filled or vacuum not exceeding 16 V	500	+ 500
Electric meters	960	− 2,240
Electric refrigerators	840	− 360
Electric refrigerator parts (2,350)	4,050	− 2,350
Radio sets	4,600	− 32,900
Radio parts	7,800	− 2,900
Electrical apparatus n.e.s.	5,360	− 4,400
Electrical goods, other	17,900	− 30,500
Electrical machinery for light and power	12,100	− 3,400

Tanganyikan Imports

THERE was an appreciable increase in the electrical import trade of Tanganyika in 1943, compared with 1942, notably in machinery, cable and radio goods. There were small decreases in lighting material. In 1942 the United States had a small share in the machinery trade and South Africa appeared in the radio and battery group, but their participation in 1943 was less noticeable.

Class	1943 £	Inc. or dec. on 1942 £
Accumulators and batteries*	5,012	− 1,013
Dynamos, motors and rotary convertors*	6,420	+ 2,250
Lighting bulbs and tubes, domestic*	650	− 50
Ditto for flashlights and hand-lamps	60	− 30
Other lighting bulbs and tubes	60	− 85
From Great Britain	4	− 133
,, United States	54	+ 46
Cable and wire*	7,500	+ 3,700
Telegraph and telephone instruments and apparatus*	1,000	+ 200
Radio receiving sets, complete	4,200	+ 1,700
From Great Britain	3,600	+ 1,400
,, United States	240	+ 100
Electric tools and appliances, portable or domestic*	780	+ 230
Other electrical machinery, goods and apparatus	2,600	+ 1,300
From Great Britain	2,130	+ 880
,, Canada	120	+ 60
,, United States	290	+ 290

* Mainly from Great Britain

Onwards after Victory

WHEN the National effort has been crowned with overwhelming success in WAR production British factories must swing back to no less intensive production for the rehabilitation of the Nation and the World.

Electrical cables, essential for war, are no less essential for the arts of PEACE, and the lessons learned in war call urgently for development and application by the best brains in the Industry.

Users of C.M.A. Cables can rest assured that they are served by unsurpassed products of Research and Engineering.

CERTIFICATION MARK

Regd. Trade Mark Nos. 566, 585-6-7

MEMBERS OF THE C.M.A.

The Anchor Cable Co. Ltd.
British Insulated Cables Ltd.
Callender's Cable & Construction Co. Ltd.
Connollys (Blackley) Ltd.
The Craigpark Electric Cable Co. Ltd.
CromptonParkinson Ltd. (Derby Cables Ltd.)
Enfield Cables Ltd.
Edison Swan Cables Ltd.
W. T. Glover & Co. Ltd.
Greengate & Irwell Rubber Co. Ltd.
W. T. Henley's Telegraph Works Co. Ltd.
Johnson & Phillips' Ltd.
The India Rubber, Gutta-Percha & Telegraph Works Co. Ltd. (The Silvertown Co.)
Liverpool Electric Cable Co. Ltd.
The London Electric Wire Co. and Smiths Ltd.
The Macintosh Cable Co. Ltd.
The Metropolitan Electric Cable & Construction Co. Ltd.
Pirelli-General Cable Works Ltd. (General Electric Co. Ltd.)
St. Helens Cable & Rubber Co. Ltd.
Siemens Brothers & Co. Ltd. (Siemens Electric Lamps and Supplies Ltd.)
Standard Telephones & Cables Ltd.
Union Cable Co. Ltd.

Be safe and use

C.M.A. CABLES

Advt. of the Cable Makers' Association, High Holborn House, 52-54 High Holborn, W.C.1. Holborn 7633

CLASSIFIED ADVERTISEMENTS

ADVERTISEMENTS for insertion in the following Friday's issue are accepted up to **First Post on Monday**, at Dorset House, Stamford Street, London, S.E.1. (*For August 10th issue see notice below.*)

THE CHARGE for advertisements in this section is 2/- per line (approx. 8 words) per insertion, minimum 2 lines 4/-, or for display advertisements 30/- per inch, with a minimum of one inch. Where the advertisement includes a Box Number there is an additional charge of 6d. for postage of replies.

SITUATIONS WANTED. — Three insertions under this heading can be obtained for the price of two if ordered and prepaid with the first insertion.

REPLIES TO advertisements published under a Box Number if not to be delivered to any particular firm or individual should be accompanied by instructions to this effect, addressed to the Manager of the ELECTRICAL REVIEW. Letters of applicants in such cases cannot be returned to them. The name of an advertiser using a Box Number will not be disclosed. All replies to Box Numbers should be addressed to the Box Number in the advertisement, c/o ELECTRICAL REVIEW, Dorset House, Stamford Street, London, S.E.1. Cheques and Postal Orders should be made payable to ELECTRICAL REVIEW LTD. and crossed.

Original testimonials should not be sent with applications for employment.

AUGUST 10th ISSUE

Classified Advertisements for the above issue should reach us by **first post on FRIDAY, AUGUST 3.**

SITUATIONS VACANT

None of the vacancies for women advertised in these columns relates to a woman between 18 and 40 unless such woman (a) has living with her a child of hers under the age of 14, or (b) is registered under the Blind Persons Acts, or (c) has a Ministry of Labour permit to allow her to obtain employment by individual effort.

METROPOLITAN BOROUGH OF ISLINGTON

Appointment of Engineer and General Manager, Electricity Undertaking

THE Council invite applications for the position of Engineer and General Manager of their Electricity Undertaking from corporate members of the Institution of Electrical Engineers experienced in the management and administration of an Electricity Undertaking. Corporate membership also of the Institution of Civil Engineers or the Institution of Mechanical Engineers would be an advantage. The salary for the position will be in accordance with the agreement made by the National Joint Committee of Local Authorities and Chief Electrical Engineers, dated 9th July, 1941, and in accordance with Clause 10 of the agreement the salary for the first year will be 85% of the full salary, and for the second year 92½% thereof, the full salary being payable in the third and subsequent years. The approximate salary for the financial year ending 31st March, 1946, is £1,683 2s. In addition a temporary cost-of-living bonus is payable in accordance with the recommendations of the Whitley Council, and at the present time the bonus amounts to £33 16s. per annum. A motor car will be provided and no car allowance will be payable.

The appointment will be determinable by three months' notice on either side and will be subject to the provisions of the Local Government Superannuation Act, 1937, and to the successful candidate passing satisfactorily an examination by the Council's Medical Adviser.

Applications on the forms provided and enclosed in an envelope endorsed "Engineer and General Manager" must reach the undersigned not later than 11th August, 1945.

Canvassing directly or indirectly will be a disqualification.

Town Hall, Upper St., Islington, N.1. 13th July, 1945.
W. ERIC ADAMS, Town Clerk.
2380

CAMBRIDGESHIRE EDUCATION COMMITTEE

Cambridgeshire Technical College and School of Art

APPLICATIONS are invited for the post of TEACHER OF ENGINEERING SUBJECTS, particularly for Electrical Science in the Day School and Electrical Engineering in the part-time day and evening classes for National Certificate, City and Guilds Courses, etc.

Further particulars and application forms, which should be returned by Tuesday, 14th August, will be forwarded on receipt of a stamped addressed foolscap envelope by the Chief Education Officer, Shire Hall, Cambridge. 2409

STEWARTRY OF KIRKCUDBRIGHT COUNTY COUNCIL

Electricity Department

District Engineer—Southern and Western Area

APPLICATIONS are invited for the above Post from persons who are Grad. Members of the I.E.E. or possess equivalent technical qualifications. Previous experience in the Consumers' Department of an Electricity undertaking is essential.

The duties will include the operation of a District Office and Showroom, Service work, installation and maintenance of Hired and other Apparatus, Wiring Installation, and all matters affecting consumers. A knowledge of the operation and maintenance of H.V. and L.V. Overhead Distribution Systems is also called for, and experience of a rural Undertaking, supplying farm consumers will be an advantage.

The salary and conditions of employment will be in accordance with the National Joint Board Agreement Grade 7, Class D, £377 per annum. The appointment is subject to the provisions of the Local Government Superannuation (Scotland) Act, and the successful applicant will be required to pass a medical examination.

Applications, together with copies of two recent testimonials, should be lodged with the undersigned not later than 11th August, 1945.

The Ministry of Labour and National Service, A.9 (D), have given permission under the Control of Engagement Order, 1945, for the advertisement of this vacancy.

County Offices, Kirkcudbright.
A. L. BUSHNELL, County Clerk.
2420

SUSSEX ELECTRICITY SUPPLY COMPANY LTD.

Superintendent, Class A, Single-Phase Testing Dept.

APPLICATIONS are invited for the above position. Salary and conditions of employment will be in accordance with the N.J.B. Schedule, Class C, Grade 6, to commence.

Applicants must have had a thorough practical and technical training in meter engineering, and should hold a position of responsibility in a polyphase station. Sound experience in testing and maintenance of general domestic equipment will be an advantage.

Applications, stating age, present appointment and salary and details of qualifications and experience, should be sent in endorsed "Meter Engineer" to the Head Office of the company at "Silverlands," 37, Alexandra Road, Epsom, Surrey.

The Ministry of Labour and National Service has given permission under the Control of Engagement Order, 1945, for the advertisement of this vacancy. 2446

ELECTRICAL ENGINEER AND MANAGER

REQUIRED for eventual service in Far East, having good experience electrical contracting, cable laying, etc., capable organising and managing large contracting business. Reply, in first instance with full particulars of experience, to—Box 2391, c/o The Electrical Review.

CITY AND COUNTY OF LICHFIELD

Electricity Department

Appointment of Assistant Mains Engineer

APPLICATIONS are invited for the position of an Assistant Mains Engineer who must be capable of superintending the installation and maintenance of high voltage and low voltage overhead and underground mains, substation plant, and distributing equipment. The applicants must have had a proper theoretical and technical training, and practical experience, and be familiar with drawings and estimating.

The salary will be in accordance with Grade 8, Class D, of the N.J.B. Salaries Schedule.

The successful candidate will be required to pass a medical examination, and contribute to the Corporation's superannuation scheme.

Applications, giving full details of age, training and experience, together with copies of three testimonials, are to be endorsed "Assistant Mains Engineer," and must reach the undersigned by Tuesday, August 14th, 1945.

The Ministry of Labour and National Service, A9(D.), have given permission under the Control of Engagement Order, 1945, for the advertisement of this vacancy.

W. F. RUSSELL, A.A.I.E.E.,
Electricity Department, City Electrical Engineer.
Market Square,
Lichfield.
21st July, 1945. 2447

ALTRINCHAM ELECTRIC SUPPLY LTD.

Mains Assistant

APPLICATIONS are invited for the above appointment from qualified engineers experienced in:—(1) The control of workmen; (2) The laying, jointing and testing of high and low tension cables; (3) The location of faults and (4) The general operation of a distribution system.

Salary and conditions of employment in accordance with the N.J.B. Schedule, Class F, Grade 6, at present commencing at £459 p.a. It is a further condition of employment that all employees shall become members of the Company's Contributory Pension and Life Assurance Scheme.

Applications, stating age, details of training and experience and accompanied by copies of three testimonials or references, must be delivered not later than 30th July, 1945, to:—R. R. H. Matthews, Engineer and Manager, Altrincham Electric Supply Ltd., 60, Stamford New Road, Altrincham, Cheshire.

The Ministry of Labour and National Service have given permission under the Control of Engagements Order, 1945, for the advertisement of this vacancy. 2435

LONDON PASSENGER TRANSPORT BOARD

Vacancy for Shift Engineer

APPLICATIONS are invited for the position of Shift Engineer at one of the Board's Generating Stations at a commencing salary of £425 plus £66 6s. war wage per annum.

Candidates must have had a thorough practical and technical training in electrical and mechanical engineering, together with recent operating experience of all plant in a modern generating station.

Corporate Membership of one of the Senior Institutions would be an advantage.

Applications, stating age and full particulars of training and experience, must be addressed to the Chief Staff and Welfare Officer, ER/E.206, London Passenger Transport Board, 55, Broadway, London, S.W.1, so as to be received not later than 28th July. 2394

FIRST GARDEN CITY LIMITED

Electricity Undertaking

CONTROL Engineer required to operate modern E.H.T. and D.C. switchboard at generating station, N.J.I.C. schedule (No. 9 area) rate, 2s. 4½d. per hour; state experience, age, married or single, as there is an acute housing shortage in the area.

The Ministry of Labour and National Service have given permission under the Control of Engagement Order, 1945, for the advertisement of this vacancy.

CHARLES GOULD, M.I.E.E.,
Works Road, Engineer and Manager.
Letchworth, Hertfordshire. 2436

COUNTY BOROUGH OF BLACKBURN

Electricity Undertaking

APPLICATIONS are invited for the following positions, and preference will be given to applications received from Chartered Electrical Engineers:

Deputy Electrical Engineer

Applicants for this post must have had a sound technical and practical training in mechanical and electrical engineering and possess considerable experience in the construction, maintenance and operation in all forms of public supply work comprising the following:—

1. Transmission and distribution.
2. Modern power station work involving the operation of high pressure plant.
3. Sales development and commercial organisation.

Salary and conditions of employment in accordance with the National Joint Board Schedule, Grade 1, Class H, present rate £852 per annum.

Consumers' Engineer

Applicants for this post must have had experience in the following branches of supply work, full details of which must be given in the application:—

1. Showroom organisation and sales.
2. Load development (industrial and domestic).
3. Preparation of specifications and estimates for wiring, etc.
4. Carrying out of installation work on consumers' premises.

Salary and conditions of employment in accordance with the National Joint Board Schedule, Grade 4, Class H, at present commencing at £608 per annum.

Assistant Station Engineer

Applicants must have had a sound technical and practical training and be conversant with the operation and maintenance of high pressure plant in a modern power station.

Salary and conditions of employment in accordance with the National Joint Board Schedule, Grade 5, Class H, present rate £564 per annum.

All the above appointments will be subject to the provisions of the Local Government Act, 1937, and persons appointed respectively will be required to pass a medical examination.

Applications, stating age and giving full particulars as above, technical training and qualifications, accompanied by copies of not more than three recent testimonials, must be forwarded to R. H. Harral, M.I.E.E., Engineer and Manager, Electricity Offices, Jubilee Street, Blackburn, appropriately endorsed and delivered not later than Saturday, August 11th, 1945.

The Ministry of Labour and National Service have given permission under the Control of Engagement Order, 1945, for the advertising of the above vacancies.

CHAS. S. ROBINSON, Town Clerk.
2444

CITY OF BATH

Appointment of City Electrical Engineer

THE Council invite applications for the appointment of City Electrical Engineer from applicants who are Members or Associate Members of the Institution of Electrical Engineers and experienced in the management and administration of an Electricity Undertaking, at a salary of £1,300 per annum rising by annual increments of £100 to £1,500 per annum, plus war bonus (at present £59 16s. per annum). The salary will be reviewed after a period of 4 years' service with the Council, and regard will be had to all the circumstances prevailing at that time.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and to determination by three months' notice in writing on either side.

The successful candidate will be required to pass a medical examination.

Applications (on a form to be obtained from me) must be delivered to me not later than 12 noon on the 22nd August, 1945, and must be accompanied by copies of two testimonials.

Canvassing either directly or indirectly will be a disqualification.

J. BASIL OGDEN,
Guildhall, Town Clerk.
Bath.
20th July, 1945. 2449

COUNTY BOROUGH OF DERBY

Electricity Department

Appointment of an Assistant Distribution Engineer

APPLICATIONS are invited for the appointment of an Assistant Distribution Engineer. Applicants should be qualified electrical engineers, and must have experience in the laying, jointing, testing and maintenance of single-phase and three-phase high tension and low tension cables, and also in the maintenance and operation of static sub-stations.

The salary will be in accordance with the National Joint Board Schedule, Class J, Grade 9, at present £382 per annum.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the selected candidate will be required to pass a medical examination.

Applications, giving full particulars of age, training and experience, and accompanied by copies of recent testimonials, should be sent to the undersigned not later than August 11th, 1945, and the envelope must be endorsed "Assistant Distribution Engineer."

The Ministry of Labour and National Service have given permission under the Control of Engagement Order, 1945, for the advertisement of this vacancy.

F. H. POOLES,
Chief Engineer and General Manager.

Electricity Offices,
36, Full Street, Derby. 2442

CITY AND ROYAL BURGH OF DUNDEE

Electricity Department

Appointment of Junior Charge Engineer

APPLICATIONS are invited for the position of Junior Charge Engineer in the Main Generating Station at Carolina Port.

Applicants must have had a proper theoretical and technical training, and practical experience either in a similar capacity, or in a manufacturer's works.

The salary will be in accordance with Grade 9 Class "H" of the N.J.B. Salary Schedule, at present £361 per annum.

The successful candidate will be required to pass a medical examination, and contribute to the Corporation's Superannuation Scheme.

Applications, giving full particulars of age, training and experience, accompanied by copies of recent testimonials, should be sent to me not later than Thursday, 9th August, 1945.

This advertisement is published by permission of the Ministry of Labour and National Service under the Control of Engagement Order, 1945.

P. PHILIP, M.I.E.E., M.I.Mech.E.,
City Electrical Engineer.

Dudhope Crescent Road,
Dundee. 2427

BOROUGH OF SCUNTHORPE

Appointment of Junior Mains Assistant

APPLICATIONS are invited for the appointment of JUNIOR MAINS ASSISTANT in the Corporation Electricity Department at a salary in accordance with Grade 9a, Class F, of the National Joint Board Agreement, namely, a total salary of £283 per annum, rising to £292 per annum in four years.

The appointment will be temporary, but the successful candidate, if satisfactory, will receive consideration along with other applicants for the permanent appointment at a later date.

Applications, endorsed "Junior Mains Assistant," stating age and giving full particulars of qualifications and experience, together with copies of two recent testimonials, should be delivered to the undersigned not later than 2nd August, 1945.

This advertisement is published by permission of the Ministry of Labour and National Service under the Control of Engagement Order, 1945.

W. P. ERRINGTON,
Town Clerk.

Municipal Offices, 34, High Street,
Scunthorpe, Lincs.
16th July, 1945. 2438

ASSOCIATED MUNICIPAL ELECTRICAL ENGINEERS
(Great Britain and Ireland)
and the
ELECTRICAL POWER ENGINEERS' ASSOCIATION

NOTICE

Bath Corporation—Appointment of City Electrical Engineer

THE Standing Joint Committee of the above Associations desire to point out that all applicants for the above advertised post should stipulate a salary in accordance with Clause 10 of the Agreement made by the National Joint Committee of Local Authorities and Chief Electrical Engineers (Electricity Supply Industry), under which clause the latest available data (subject to any adjustment which may be necessary under the interpretation of the Agreement) indicates a commencing salary of £1,512 per annum for the first year rising to £1,778 the third year and thereafter subject to adjustment above or below in accordance with the National Agreement.

ALL ENGINEERS, WHETHER ENGAGED IN THE ELECTRICITY SUPPLY INDUSTRY OR NOT, ARE URGENTLY REQUESTED TO INCLUDE THE ABOVE CONDITION IN ANY APPLICATION MADE FOR THE APPOINTMENT REFERRED TO.

W. ARTHUR JONES, A.M.I.E.E.,
Secretary,
Standing Joint Committee,
A.M.E.E.—E.P.E.A.

2450

A Practical Designer for Lighting Fittings is required by a large Electrical Engineering Company for the position of Production Manager. Good experience of all modern types of electric light fittings, including discharge lamps and fluorescent tubes is necessary. Experience of design of auxiliaries would be an added advantage. Applications giving full details of training and experience to—Box 2411, c/o The Electrical Review.

ASSISTANT Designer with previous experience required for Electric Motor Manufacturers. State age. Permanent progressive position. Applicants should be over 51 or Class A ex-service men only. Apply—Higgs Motors Limited, Witton, Birmingham, 6. 2379

APPLICATIONS for an experienced Electrical Plant Engineer (Managerial) are invited by large industrial undertaking employing over 10,000 in South Midlands. He must have extensive practical experience in the layout, installation and maintenance of A.C. and D.C. electrical equipment as installed in a large industrial factory. Able to control skilled and unskilled labour. Age preferably under 42. Applications, which must be in writing, stating date of birth, full details of qualifications and experience, salary expected, should be addressed to—Box 2402, c/o The Electrical Review.

APPLICATIONS for an experienced Mechanical Plant Engineer (Managerial) are invited by large industrial undertaking employing over 10,000 in South Midlands. He must have extensive practical experience of the installation of all types of machine tools, conveyor equipment, compressors and general plant maintenance. Sound technical education required and able to handle skilled and unskilled labour. Good prospects. Age preferably under 42. Applications, which must be in writing, stating date of birth, full details of qualifications and experience, salary expected, should be addressed to—Box 2401, c/o The Electrical Review.

BOYS or Girls required to learn Elect. Inst. making. Apply—W. C. Davey & Co., 180, Tottenham Court Road, W.1. 2318

CHIEF Draughtsman. Progressive company employing 1,500 requires experienced man having extensive background in similar capacity with well-established firm in the light mechanical electrical industries to reorganise and take charge of D.O., including jig and tool design. Write details and salary required to—Box 2406, c/o The Electrical Review.

CHIEF Inspector required by progressive light electrical mechanical engineering firm, S.W. London district. Applicants must have pronounced administrative ability, extensive previous experience, satisfactory electrical qualifications to recognised standards, and be thoroughly conversant with usual Government inspectional procedure. Write, giving full particulars and salary required, to—Box 2403, c/o The Electrical Review.

CLERICAL Assistant, Class A, Ex-Serviceman, for Stores Office. Must have thorough knowledge of all electrical material. Apply—London Electrical Company, 92, Blackfriars Road, S.E.1. 2324

DOMESTIC and Industrial Electric Heating Appliance Manufacturers in Midlands, require Assistant to Managing Director, practical Works and Executive experience essential. Position offers exceptional prospects to man with initiative, energy and good personality. Write in confidence to—Box 2433, c/o The Electrical Review.

DRAUGHTSMAN required for Electrical Machines. North Kent district. State experience and salary required. Applicants should be over 51 years of age. Class A ex-service men, or otherwise exempt from M.O.L. control.—Box 2383, c/o The Electrical Review.

ELECTRICAL Engineeer. Factory in South Midlands producing Vacuum Cleaners and Fractional H.P. Electric Motors, requires a Manager to take charge of its Small Motor and Cleaner Production. Applicants should have theoretical training and practical experience of all modern technical production problems. (No designing experience necessary.) Applications should be made in writing, with full particulars of training and previous employment, references, age, salary expected, and time when free to take up a new position to—Box 2434, c/o The Electrical Review.

ELECTRICAL Testing Apparatus and Equipment Manager wanted for small high-quality design and production plant, handling quantities up to 20 of a diverse range of test gear, which includes R.F.; not in London area. Knowledge of theory and practical ability to produce are essentials. Qualified engineer preferred. Excellent prospects for advancement in important business organisation for effective, industrious youngish man of right character. Write, stating salary required, to—Box 7493, A.K. Advg., 212a, Shaftesbury Avenue, W.C.2. 2428

ELECTRICIAN required immediately by Electrical Contractors, London, permanency to suitable man. Class "A" ex-Service man or man over 51. Apply, giving full particulars to—Box 2422, c/o The Electrical Review.

ELECTRICIANS wanted by Central London Contractors, Class "A" ex-Service men only, or over 51.—Box 7383, c/o The Electrical Review.

ENGINEER/Tester required (Croydon area). Must be fully experienced (practical) in D.C. generators driven by petrol and diesel engines (high speed) and able to carry out any necessary adjustments, etc. Highest priority work and ample post-war prospects. Good rate of pay. Applications from those over 51 or from Class A ex-service men only. Full details of previous experience to—Box 7327, c/o The Electrical Review.

ENGINEER required by large firm in the Manchester area for dealing with enquiries and orders for Electric Motors, Generators, etc. Applicants over 51 or Class "A" ex-Servicemen only. State age, experience and salary required. Box 2407, c/o The Electrical Review.

FOREMAN required for Electrical Instrument department, sound knowledge and practical experience with moving coil instrument production, scaling, calibrating, training female labour. Permanent post with good prospects. Over 51 or Class A ex-service man only.—Box 2398, c/o The Electrical Review.

HEAD Foreman required by company engaged on essential work, S.W. London district, to take charge of assembly shop. Applicants must have previous and thorough experience in similar capacity with firms manufacturing light electro-mechanical equipment. Write, giving full particulars and salary required, to—Box 2404, c/o The Electrical Review.

INSTRUMENT Manager for growing section of a Works production. Post calls for young man of drive and initiative with eye to future rather than immediate position. Technical qualifications in Electrical Engineering or Physics necessary besides good all round instrument production experience, in order to co-operate with Research Department in development of instruments largely connected with high vacuum industrial and laboratory equipment.—Box 7370, c/o The Electrical Review.

MANAGER required to take charge of technical development in the design and production of small electric motors. Please send full details of experience and salary required.—Box 2424, c/o The Electrical Review.

MANAGER required, with general experience in the manufacture of lead storage batteries. State experience and salary required.—Box 76, c/o The Electrical Review.

ONE Shift Maintenance Electrician required for chemical works in Scunthorpe area, experience in maintenance and installation of industrial equipment essential. Base rate £5 6s. 3d. for 47 hours of 2/3½d. per hour plus 2d. shifts. Applications to be sent to Box No. 7354, "Electrical Review." By permission of the Ministry of Labour and National Service under the Control of Engagement Order, 1945.

OVERSEAS EMPLOYMENT: Mechanical Inspector of Works (Temporary), required by the Government of Sierra Leone, for the Electricity Branch of the Public Works Department for one tour of 12 to 24 months in the first instance. Salary £500 a year, rising to £600 a year plus separation allowance for married men between £84 and £204 according to the number of children. Outfit allowance £60. Free passages and quarters. Candidates must have served a recognised mechanical engineering apprenticeship, and have had experience in the running and maintenance of water tube boilers and steam turbines. Experience in modern power station practice, and in the running and maintenance of diesel engines would be an advantage. Applications, which must be in writing, stating date of birth, full details of qualifications and experience, including present employment; also Identity and National Service and other registration particulars, and quoting Reference No. O.S. 605 should be addressed to the Ministry of Labour and National Service, Appointments Department, Sardinia Street, Kingsway, London, W.C.2. 2416

PLANNING Engineer to take charge of planning department and jig and tool drawing office. Must be first-class jig and tool designer having good all-round experience with mass production, particularly on small mechanisms utilising press work, auto parts and bakelite mouldings. Only Class "A" ex-service man accepted until present restrictions removed. Good salary offered for right man. Write, giving age, salary expected, experience, etc., to—Box 2345, c/o The Electrical Review.

PLANT and Maintenance Engineer required, West London District. Must have comprehensive knowledge of Switch gear, Motors and Generating Plant, Wiring, etc. One with knowledge of Electric Cranes an advantage. (Class "A" ex-Service men, or over 51 only.) Apply, stating age and salary required, to—Box 2430, c/o The Electrical Review.

REPRESENTATIVE, over 51, or Class "A" ex-Service man, by actual manufacturer of decorative Electric Lighting Fittings, to call on the wholesale electric trade. All areas. Own Car and previous experience an asset. Also Agents wanted. Write, giving fullest particulars to Mr. Sydney I. Leon, Messrs. Leons, 153/5, High Street, Epsom, Surrey. 7375

ROTARY Substation Attendant required for Shift Work. Wages in accordance with District Council No. 7 East Midland Area. (Over 51 or from Class "A" ex-Service Men only.)—The Wellingborough Electric Supply Co. Ltd., 21, Silver Street, Wellingborough. 7364

SALESWOMAN required for Electrical Contractors Showroom. (Only applicants having held similar position need apply). Write giving full particulars, wages required, etc. W. T. Clarke & Co. Ltd., Sicilian Avenue, Southampton Row, W.C.1. 2421

SHIFT Charge Engineer required by large Manufacturing Company in S.E. England. M.I.E.E., M.I.M.E., or equivalent qualifications, preferred. Applicants must have held similar position in large modern Power Plant, and be thoroughly conversant with P.F. H.P. Boilers. (Experience with Turbo Alternators of not less than 30 m.W. an advantage. Present salary, £525 per annum. Pension Scheme operating. Write, quoting D.1341XA, to Ministry of Labour and National Service, Appointments Department, Branch A.9, Room 670, York House, Kingsway, London, W.C.2 for application form, which must be returned completed by 10th August, 1945. 2437

TECHNICAL Sales Correspondent required by well-known firm in the electrical manufacturing industry. Applications from men over 51, or Class "A" ex-Service men only. Please send full particulars, stating age, training, experience, and salary required to—Box 2431, c/o The Electrical Review.

WELL-known Cinematograph Circuit requires the services of a chartered Electrical Engineer. Must be capable of preparing plans and specifications of electrical installations for new theatre projects. Knowledge of modern plenum, heating and ventilating systems is desirable. Applications from Class "A" ex-Service men only. Replies, which should give age and detailed particulars of applicant's career, salary, etc., will be treated in strict confidence.—Box 2440, c/o The Electrical Review.

WELL-known Electrical Engineering Company have vacancies for suitable lads, under 18 years of age, with matriculation or general school certificate, for apprenticeship in the above industry. Good rates of pay and living accommodation provided.—Box 2245, c/o The Electrical Review.

WIREMAN wanted, London, over 51 or otherwise free to take position. Best conditions. Reply—Box 2344, c/o The Electrical Review.

WORKS Superintendent. Progressive company employing 1,500, manufacturing light electrical mechanical equipment, S.W. London district, requires man with extensive experience in similar capacity. Applicants must be competent to control labour, all grades, have thorough knowledge latest manufacturing methods and layout. Capable of supervising large quantity production on economical basis to give results. Write, giving full particulars and salary required, to—Box 2405, c/o The Electrical Review.

SITUATIONS WANTED

ADVERTISER (21). Higher Nat. Cert., City & Guilds Final, 5 yrs.' engineering apprentice, desires a post in electronics, radio or sound reproduction. Exempt military service.—Box 7337, c/o The Electrical Review.

ADVERTISER (50), experienced in all branches sales-office organisation, many years administrative position, methodical and efficient controller, seeks change.—Box 7382, c/o The Electrical Review.

B.Sc.Eng. (Hons.) (23), exempt, inventive, wide experience transformer and switchgear testing and commissioning and experimental work, seeks post with better prospects. London area.—Box 7288, c/o The Electrical Review.

BUYER. A.M.P.O.A. Age 35. Ten years with leading firm Domestic Electrical Appliance Manufacturers; still so employed. Desires change to Company engaged on similar light engineering activities. London area or South.—Box 7355, c/o The Electrical Review.

CAPABLE Engineer (32), experienced, works installations, application of electric motors, sales, works procedure, office administration, will consider responsible progressive position with medium-size concern. Own car. London or South. Alternatively partnership with small investment.—Box 7303, c/o The Electrical Review.

ELECTRICAL and Mechanical Engineer, M.Sc., expert, electrical instruments, motors, generators, also A.C. commutator machines, 16 years' experience, seeks suitable position.—Box 7335, c/o The Electrical Review.

ELECTRICAL Engineer, exempt, 20 years' exp. research-design-manufacture of el. apparatus, domestic and heating, temperature control, inventive abilities, organizer seeks position.—Box 7300, c/o The Electrical Review.

ELECTRICAL Engineer, German refugee, University training, 30 years' experience consulting power-stations, high tension and factory installations, seeks position.—Box 7302, c/o The Electrical Review.

ELECTRICAL Test Engineer (27), on release from M.N., desires progressive post with transformer manufacturers or similar concern. Six years' experience in assembling, erecting and testing all types of power and H.T. units. Write—Box 7324, c/o The Electrical Review.

ELECTRICIAN requires permanent maintenance position, all-round experience, good references.—Box 7374, c/o The Electrical Review.

ENGINEERING Sales Post, for elect. engr. (27), stnd. I.E.E., member Illum. Eng. Scy., Senior Nat. Cert. Elect. Engg., 10 years' practical experience, including D.O., 4 years supervising naval and dockyard installation and maintenance, 100 men. Overseas post acceptable.—Box 7376, c/o The Electrical Review.

EX-Merchant Navy Electrical Engineer, at present foreman electrician M.A.P. factory, seeks service agencies for North Wales and/or Merseyside areas. Wide experience on "trouble shooting" and maintenance of domestic, industrial and marine equipment, British and American. Age 40, married, car owner, will travel for interviews.—Box 7298, c/o The Electrical Review.

EX-service man (Class A), prof. el. engineer, with wide experience in high and low voltage machinery and installations of all kinds, seeks appointment or partnership with el. contractor or consulting engineer firm.—Box M.37, Scripps's, South Molton st., W.1. 7339

GRADUATE I.E.E., aged 29, captain in Royal Engineers, free in October, seeks technical or administrative post with prospects.—Box 7329, c/o The Electrical Review.

MAN (36), 16 years' design and production engineering experience, desires change to outdoor work, in connection with electrical installation or agricultural implements.—Box 7304, c/o The Electrical Review.

PRODUCTION and Planning Engineer, mechanical and electrical, fully conversant with the most up-to-date methods of planning, processing, tool design, lay-out and time and motion study; also has a full knowledge of television and suitable mass production methods. Age 34½, and out of the present restrictions. Technically qualified. Salary by arrangement.—Box 7358, c/o The Electrical Review.

PLUMBER-Jointer, married, requires situation, North West Coast preferred; 10 years' experience with supply undertaking.—Box 7379, c/o The Electrical Review.

PROFESSIONAL Electrical Engineer, at present free, seeks position. Salary £800.—Box 7371, c/o The Electrical Review.

REPRESENTATIVE, 45, desires change. Twenty years' experience. London and Southern England. Salary, Expenses, and/or Commission only. Box 7352, c/o The Electrical Review.

SWITCH and Control Gear (E.H.T., L.T. and Contactor) Instruments and Meters. Advertiser (55) has occupied positions of general, sales and works manager, requires administrative position, connection with corporations, public supply companies, large industrial users and shippers throughout U.K. Manchester 20 years, London 10 years. Efficient organiser small works.—Box 7291, c/o The Electrical Review.

YOUNG man, fully experienced Lift, General Electrical and Mechanical Engineering, at present employed by well-known lift engineering firm on South Coast as tester and supervising engineer, would welcome enquiries from lift manufacturers who desire fresh business on South Coast as to prospects of position in similar capacity or taking full control. Fully conversant with office routine, estimating, etc. Very well known in south-south-eastern area. Or alternatively would consider agency run in conjunction with proposed own business.—Box 7381, c/o The Electrical Review.

FOR SALE

Traders buying and selling hereunder must observe the Restriction of Resale Order, S. R. & O. 1942 No. 958.

COUNTY BOROUGH OF BARROW-IN-FURNESS

Electricity Department

Mercury Arc Rectifier Plants.

FOR disposal, two Mercury Arc Rectifier Equipments by the Electric Construction Company, installed 1937, each designed to give a continuous output of 528 kW under balanced load conditions to a 3-wire, 220/440 volts D.C. system, when supplied from a 6,600 volt, 3-phase, 50 cycle system. Each equipment includes rectifier, comprising four 6-phase bulb units of 400 amps. capacity, connected two bulbs across the outers and one bulb either side of the mid-wire, together with transformer, induction regulators, automatic control gear and low tension switchboard. (E.H.T. switchgear not included.)

For further details and arrangements for inspection, applications to be made to the Borough Electrical Engineer.

Offers to be made in writing, addressed to the Borough Electrical Engineer, Electricity Offices, Duke Street, Barrow-in-Furness, and enclosed in a sealed envelope, endorsed "Rectifier," not later than the 10th August, 1945.

W. LAWRENCE ALLEN,
Town Clerk.

Town Hall,
Barrow-in-Furness,
17th July, 1945. 2417

ELECTRIC MOTORS AND DYNAMOS

WE hold one of the largest stocks of New and Second-hand Motors. Secondhand machines are thoroughly overhauled. Inspection and tests can be made at our Works.

For Sale or Hire. Send your enquiries to:—

BRITANNIA MANUFACTURING CO. LTD.,
22-26, BRITANNIA WALK,
CITY ROAD, LONDON, N.1.

Telephone: 5512-3 Clerkenwell. 13

BURDETTE & CO. LTD.

Stock

Reconditioned A.C. and D.C. Motors and Starters Equal to New.

STONHOUSE STREET, CLAPHAM, S.W.4.

Day and night service. MACaulay 4555. 17

GEORGE COHEN, SONS & CO. LTD.

for

GUARANTEED ELECTRICAL

PLANT,

MOTORS, GENERATORS,

SWITCHGEAR,

etc.

WOOD LANE, LONDON, W.12.
Telephone: Shepherds Bush 2070
and
STANNINGLEY, NEAR LEEDS.
Telephone: Pudsey 2241.
Established 1834.

27

BOROUGH OF ASHTON-UNDER-LYNE

Electricity Department

TENDERS are invited for the dismantling and removal of the following redundant plant which comprises the contents of the Boiler House at the Wellington Road Generating Station

6 WATER TUBE BOILERS (Messrs. Thompson Ltd.). 30,000 lbs. per hour each, 200 lbs. per square inch.
AUXILIARY PLANT, Pipework, etc., including Pumps, Fans and Steel Smoke Stacks.

The Corporation do not bind themselves to accept the highest of any tender.

Further particulars and specification may be had from Mr. N. Jones, Chief Engineer, Electricity Works, Ashton-under-Lyne, and the plant may be inspected by appointment.

Tenders to be delivered to the undersigned in a plain sealed envelope, endorsed "Tender for Steam Plant," not later than 12 noon on Monday, August 27th, 1945.

Town Hall, Ashton-under-Lyne, July 17th, 1945.
D. W. BROMLEY, Town Clerk.
2408

REBUILT MOTORS AND GENERATORS

LONG deliveries can often be avoided by purchasing rebuilt secondhand plant. We can redesign or replace surplus plant of any size.

SEND US YOUR ENQUIRIES.

OVER 1,000 RATINGS ACTUALLY IN STOCK HERE.

DYNAMO & MOTOR REPAIRS LTD.,
Wembley Park, Middlesex.
Telephone: Wembley 3121 (4 lines).

Also at Phœnix Works, Belgrave Terrace, Soho Road, Handsworth, Birmingham.
Telephone: Northern 0898.

26

WATER TUBE BOILERS IN STOCK

Two	25,000 lbs. evaporation,	250 lbs. W.P.	
Two	25,000 lbs.	,,	175 lbs. ,,
Three	20,000 lbs.	,,	175 lbs. ,,
One	12,000 lbs.	,,	200 lbs. ,,
One	12,000 lbs.	,,	160 lbs. ,,
One	9/10,000 lbs.	,,	200 lbs. ,,

We install complete, including brickwork. Economisers, Pumps, Piping Valves, Generating Sets and Motors in stock. Please send us your enquiries; we can give immediate delivery.

BURFORD, TAYLOR & CO. LTD.,
Boiler Specialists, Middlesbrough.
Telephone: Middlesbrough 2622.

32

METROPOLITAN BOROUGH OF HACKNEY

Electricity Department

THE Borough Council invite offers for the purchase of the machines described hereunder:—

Peebles-La Coeur Motor Converters. One 1,500 kW and two 500 kW, 6,000 volts, 3-phase, 50 cycles to 500/550 volts D.C. Stator and rotor of 1,500-kW machine require repair. 500-kW machines in running order. All complete with D.C. Control Panel and starting equipment.

Also Four 1,000-kVA single-phase oil-immersed type Transformers, 50 cycles, 6,070/3,460 volts.

The above can be viewed on application to the Borough Electrical Engineer, 18/24, Lower Clapton Road, E.5. Telephone, Amherst 2361.

Your offer to be made by letter addressed to the Town Clerk, Hackney Borough Council, Town Hall, Hackney, E.8.

2371

ELECTRIC FIRE SPIRALS & HEATING ELEMENTS

1,000-watt, 240-volt spirals.
£7 per gross.

Other competitive prices on application.

MIDDLESEX ELECTRON CO. LTD.
199, High Street, Hampton Hill, Middx.
Molesey 3541.

7380

COX & DANKS LTD.
for
NEW AND SECONDHAND MOTORS.
A.C. and D.C.—Fractional to 100 h.p.

M.G. SETS. DISTRIBUTION BOXES.

MISCELLANEOUS SWITCHGEAR.

FAGGS ROAD, FELTHAM, MIDDX.
Tel. Feltham 3471/3.

72

A large stock of Searchlights (sale or hire), also Winches of our self-sustaining type. Hundreds of thousands supplied during the last 40 years to Government departments, corporations and innumerable traders. Mirrors, Lenses, A.I.D. Turnbuckles, etc., also surplus Carbon Rods, Ebonite and Fibre.—London Electric Firm, Croydon. 42

A number of portable Alternating Lighting Sets, fully guaranteed, for quick delivery, 3-5 kVA, 230/1/50.—The Electroplant Co., Wembley, Middlesex. 2415

A quantity of insulined material in strips, various widths and thicknesses, suitable for laminations for the Electrical Trade.—Box No. 2418, c/o The Electrical Review.

A.C. and D.C. House Service Meters, all sizes, quarterly and prepayment, reconditioned, guaranteed one year. Repairs and recalibrations.—The Victa Electrical Co., 47 Battersea High Street, S.W.11. Tel. Battersea 0780. 19

A.C. and D.C. Motors, all sizes, large stocks, fully guaranteed.—Milo Engineering Works, Milo Road, East Dulwich, S.E.22 (Forest Hill 4422). 6781

A.C. Motors, 1/50th h.p. to 10 h.p., from stock. Also D.C.—The Johnson Engineering Co., 86, Great Portland Street, London, W.1. Tel.: Museum 6373. 57

ACETATE Sheet. Transparent and non-inflammable. Suitable for manufacture of Lampshades.—Collingridge & Co. Ltd. Riverside Road, Watford. Phone, Watford 5963. 2426

AERIAL Cables, all sizes quoted for, good deliveries against Government contract numbers.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 7361

ALTERNATING Diesel Set, complete installation for 120 kVA output 400/3/50, in first-class condition, ready for work.—The Electroplant Co., Wembley, Middx. 2414

BELT Grinders or Sanders 4" wide belt, £5 5s.; 6" wide belt, £10 10s.—John E. R. Steel, Clyde Mills, Bingley. Phone 1066. 52

BEST English Cables, 1/.044 up to 127/.103, deliveries against M.O.S. requirements.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 7362

CARBONS, large stocks assorted sizes, solid and cored. Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 7363

EXHAUST Fans, new, 14", 1-phase, 200/250 v., 1,900 cu. ft./min., £11 15s.—Southern Ignition Co. Ltd., 190, Thornton Road, Croydon. 75

FOR sale, back numbers of Journals of the Institution of Electrical Engineers and Physical Society Journals, dating from 1911.—Box 2442, c/o The Electrical Review.

FOR sale, 12 in all, Electrical Fittings, modern, 5 slightly incomplete, centre champagne glass with 4 decorative fins. Suitable for hotel ballroom or cinema use. The lot £50. Write—Box 2448, c/o The Electrical Review.

FULHAM Borough Council Electricity Undertaking: Two Alfa Laval 12 kW Oil Purifiers, 250 g.p.h., complete with 1.5 h.p. Motor-Starter and Heatrae Heaters for disposal. Also six 2½" bore Isolating Valves, manufactured by Sydney Smith, working pressure 600 lbs. per sq. in. Full details obtainable from W. C. Parker, Esq., M.I.E.E., Borough Electrical Engineer, 587/591, Fulham Road, S.W.6. Fulham 0041. 2413

GENERATING Sets for sale, 18 kVA, 400/3/50, petrol; 2½-kW, 200-v. D.C. crude oil Set.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 2432

HEAVY duty Arc Welding Plants, 200 amps. Price £31 10s. complete. Also Spot Welders, £36 15s. John E. R. Steel, Clyde Mills, Bingley. Phone 1066. 50

INSU-Glass covered Plain or Enamelled Instrument Wires, No. 18 s.w.g., No. 40 s.w.g., stock deliveries.—Saxonia, Roan Works, Greenwich, S.E.10. 29

LEAD-covered and Armoured Cables, P.I. and V.I.R., various special lines at low prices.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 7364

LESLIE Dixon & Co. for Dynamos, Motors, Switchgear, Chargers and Telephones.—214, Queenstown Road, Battersea, S.W.8. Telephone, MACaulay 2159. Nearest Rly. Sta.: Queen's Road, Battersea (S.R.). 18

MOTOR, D.C., 2 volt, 1,000 amp. or more, shaft diameter 1½", yoke diameter 22", overall length 30", sep. exciter, homopolar type without commutator.—Box 7377, c/o The Electrical Review.

MOTOR Generator Sets and Convertors, all sizes and voltages from ½ kW up to 500 kW in stock.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, City Road, London, N.1. Telephone, Clerkenwell 5512, 5513 & 5514. 28

MOTOR Generators. Small D.C./D.C. Motor Generators, drive off 12-volt accumulator and give 230 volts, 30 m.a. D.C. output; off 6-volt, 110 v., 15 m.a. output. Originally made for Gvt. radio; two commutators, ball bearings, laminated fields, insulated brush gear, covered armature windings. In new condition, 75s. each. Aluminium Tubing, in approx. 12-foot coils, 5/16" I.D., new, surplus W.D. stock, 3s. 6d. each.—Leslie Dixon & Co., 214, Queenstown Road, Battersea, London, S.W.8. 65

MOTORISED ½" Bench Drilling Machine, 13 speeds, £12 2s. 6d.—John E. R. Steel, Clyde Mills, Bingley. Phone 1066. 51

NAMEPLATES, Engraving, Diesinking, Stencils, Steel Punches.—Stilwell & Sons Ltd., 152, Far Gosford Street, Coventry. 14

ONE new totally enclosed vertical Lancashire Dynamo 8-h.p. Fan Motor, for 200 v., 2-ph., 50 cys., with four facings, without feet, shaft 2½" dia., 10" long, keyway 6" long, with starter complete. Ex stock. For price apply—H. J. H. King & Co. Ltd., Engineers, Nailsworth, Glos. 71

PHONE 98 Staines. 130-kW, 110-v. D.C. Diesel Generating Set; 60-kW, 220-vo. D.C. ditto; 7/9-kW, 110-vo. D.C. ditto; 50-kW, 440/220-vo. D.C. Steam Set; 400-kW Belliss Surface Condenser; Weir Feed Pumps, 9½" × 7" × 21" and 8½" × 6" × 13".—Harry H. Gardam & Co. Ltd., Staines. 60

PHOTOMETER Head by Krüz (Lummer Broden type), Single Stage Rotary Oil Vacuum Pump, Gaede Mercury Pump (without mercury), 1 h.p. 230 volt Motor A.C., Counter Shaft Pump Bench (incomplete), McLeod Gauge, H.T. Coil, many H.P. Gas Burners, Small Hand Winding Machine, etc.; £45 the lot, in London.—Box No. 7360, c/o The Electrical Review.

PLATING Motor Generator Sets with 400-volt, 3-phase, 50-cycles driving motors: 4 1,000 amps., 6 volts capacity; 1 3,000 amps., 6 volts; 1 3,000 amps., 10 volts; 1 1,000 amps., 10 volts; 1 500 amps., 6 volts. With or without switchgear.—Newman Industries Limited, Yate, Bristol. 2374

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ROTARY Converters in stock, all sizes; enquiries invited.—Universal Electrical, 221, City Road, London, E.C.1. 16

SEVERAL Telescopic Tower Ladders ready for essential work. Extensions, Trestles and Steps to order.—Shaftesbury Ladders Ltd., 453, Katherine Road, E.7. Grangewood 3363. 15

SELF-Priming Electric Pumps, 300 g.p.h. £12.—John E. R. Steel, Clyde Mills, Bingley. Phone 1066. 53

SPECIAL line, Bell and Telephone Wires, also screened wires, large quantity, cheap.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 7368

STAFF Time Checking and Job Costing Time Recorders (all makes) for quick cash sale. Exceptional condition. Write—Box 528, Smiths, 100, Fleet Street, London, E.C.4. 31

STEAM Engine for sale, twin cylinder, horizontal condensing type by Robey, 120 h.h.p., installed new in 1923, cost £2,000, suitable for steam pressure 50/60 lbs. sq. in. In perfect condition, may be seen running at any time by appointment. Engine redundant through electrification. £200 or nearest offer for quick sale as space is urgently required. Also considerable quantity of all sizes leather and composition belting, new and secondhand, for sale cheap.—J. J. Williamson & Sons (Canterbury) Ltd., St. Mildred's Tannery, Canterbury, Kent. 2362

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SWITCHBOARDS suitable for dynamos and alternators, all sizes from 100 amp. up to 1,500 amp.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1 25

THE Employers Liability Assurance Corporation Ltd. has for disposal Automatic Lister Generating Set, output 4.5 kW at 220 volts D.C., comprising single cylinder radiator-cooled cold starting solid injection Diesel engine, speed 100 r.p.m., coupled by Vee belts to special screen-protected generator mounted on special combination base-plate; switchgear unit arranged in sheet metal cubicle for floor mounting. Complete with special accessories for making plant suitable for continuous operation, including dry sump lubrication, anti-vibration foundation bolts, flexible connections for fuel and exhaust piping, semi-rotary fuel transfer pump and short length of suction hose.—Enquiries to Administration Department, 7, Christchurch Place, Epsom, Surrey. 7357

THE following electricity prepayment meters are for sale:—70 2½ amp., 250 v., Ferranti; 12 2½ amp., 250 v., type B. C. & H.; 5 10 amp., 250 v., type E. P. Aron; 3 5 amp., 250 v., A.E.G.—Slough Estates Ltd., Trading Estate, Slough, Bucks. 2439

TRANSFORMER Lead-in Wire, 7/38 and 14/38 s.w.g., Insu-Glass finished, various colours, stock.—Saxonia, Greenwich, S.E.10. 34

TRANSFORMERS, single and three-phase. All types up to 10kVA.—Woden Transformer Co. (Phone, Bilston 41959), Moxley Road, Bilston, Staffs. 12

T.R.S. Cables and Flexibles, Welding Cables, supplied to M.O.S. requirements.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 7369

7½-h.p. Blackstone Crude Oil Horizontal Engine, complete with water-cooling tank, filter and silencer, and fuel tank and fuel storage tank, 5 ft. long × 3 ft. 6 ins. diameter, direct coupled to a "Bull" Dynamo, 23 amps., 100/160 volts, 320 r.p.m., fitted with a series/shunt switch. The complete unit is in a first-class condition. Best offers to—Messrs. T. S. Bell & Co., 35, Tangier Street, Whitehaven, Cumberland. 49

80-kW, 220-v., 350-revs., S.I., two ped. brgs., on bedplate.—Greenhalgh Bros., Burton's Field Mill, Atherton, nr. Manchester. 2293

100-h.p. "Laurence Scott" Slipring Motor, 400/3/50, screen protected, ball bearing, 930 r.p.m. Complete with "Allen West" oil immersed Starter. Date 1941.—Stewart Thomson & Sons, Fort Road, Seaforth, Liverpool, 21. 55

100-h.p., 400/3/50, S.R., 730-revs., Louvre Vent., B.T.H. (ball bearings), with Ellison O.I. gear.—Greenhalgh Bros., Burton's Field Mill, Atherton, M/cr. 2294

140-kVA Belliss/Crompton Alternator, 400/3/50, 4-wire. Seen running.—Stewart Thomson & Sons, Fort Road, Seaforth, Liverpool, 21. 47

150-h.p., 420-volt D.C. Motor by English Electric Co., oil ring bearings, 716 r.p.m., compound interpole, C.I. bedplate, 3rd pedestal bearing, pulley 21" × 21", and slide rails. "Igranic" floor type starter panel with volt and ammeter. This motor is in excellent condition and is being changed due to an A.C. supply being taken. Best offers to—Messrs. T. S. Bell & Co., 35, Tangier St., Whitehaven, Cumberland. 48

160-kW, 500-volts, 700-revs. S.I., two ped. brgs., on bedplate.—Greenhalgh Bros., Burton's Field Mill, Atherton, nr. Manchester. 2295

250-kVA Alternator, 400 volts, 3-phase, 50 cycles, 750 revs., with direct-coupled exciter; also two 250-kW Rotary Converters, with transformers and switchgear, input 6,600 volts, 3-phase, 50 cycles, output 420/210 volts D.C.—Midland Counties Electrical Engineering Co. Ltd., Grice Street, Spon Lane, West Bromwich. 36

300 18" Benjamin Distributing Reflector Fittings, 200/300-watt type, perfect condition, any quantity.—Hywood, Elect. Eng., 40, Coram St., W.C.1. 2396

500 v. Evershed's Megger, Faber's Slide Rule, two Yost Typewriters, 1" Micrometers, 1½ h.p. Lalley Electric Lighting Plant. Best offers.—Webb, Engineer, Archer Street, Chelmsford. 7373

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ALL KINDS OF P.V.C. CABLE.
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Church Walk, Albion Road, Stoke Newington, N.16.
CLIssold 4232.
7326

ACETATE and other thermoplastic scrap; polythene and P.V.C. in any form; also scrap cable and insulated wire; urgently wanted.—Elton Levy & Co. Ltd., 18 St. Thomas Street, S.E.1. 30

COIL Winding Machines wanted for essential work.—Box 63, c/o The Electrical Review.

ENAMELLED Copper Wire wanted. Please state quantity, make, gauge and price.—Box 61, c/o The Electrical Review.

ENGINEERING Technical Books (new or secondhand) wanted in any quantity. Attractive cash offers. Call —Third floor, 356, Oxford Street, W.1, or "Stoneleigh," St. George's Avenue, Weybridge. 62

KETTLE Elements, immersion type, with cut-out, required by manufacturer of electric kettles.—Box 2441, c/o The Electrical Review.

QUOTATIONS wanted for Crucifix Lamps, 220/230 volts, 2-5 watts. Quote for quantities up to 25 thousand.—Box T.4099, Kenny's Advertising Agency, Dublin. 2445

REELS and Drums required in fairly large quantities by wire manufacturers. Capacity 2 lbs. to 1 cwt. Details to—Box 2363, c/o The Electrical Review.

ROTARY Converters, 50/230 D.C. input, output ½ to 6 kVA, 230/1/50; also 3/5-kVA Transformer, ratio 100/230/1/50. — Hywood, 40, Coram Street, London, W.C.1. 2397

WANTED, Rotary Converters, any size.—Universal, 221, City Road, London, E.C.1. 22

1/6 h.p., 240/1/50, 1,440-r.p.m., R.I. Motor, preferably resilient mounted for Frig.—Box 2433, c/o The Electrical Review.

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Telephone, BLA. 4321. 7353

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ELECTRO-Plating: Electro Zinc Galvanizing to A.I.D. Specifications. End of Government Contract work. Enquiries invited.—E.M.E. Co., 19 St. Catherine's Road; (works) Fisherman's Quay, Littlehampton, Sussex. 7356

ENGINEERS, North Country, seek orders for production high-grade components, units or complete assemblies such as machines, engines, pumps, control gear, winches or special purpose machines for processing, etc. Organisation includes fully equipped Drawing and Planning offices.—Box 2425, c/o The Electrical Review.

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SMALL Armatures, etc., winding or re-winding, in quantity. High-class work, prompt delivery.—Southern Ignition Co. Ltd., 190, Thornton Road, Croydon. 59

SMALL Firm Instrument Makers (London) are in a position to undertake work to Customers' own drawings or patterns.—Box 7378, c/o The Electrical Review.

WELDING capacity, 300 hrs/wk. available on precision controlled resistance welders, projection and spot, for light alloy and steel components, assemblies and sheets up to 24" wide, thickness 2 by 1".—Box No. 89, C. R. C., 29, Hertford St., W.1. 2429

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AGENCIES required for London, South of England, for the following: (1) Domestic electrical appliances; (2) Brass electrical accessories, switch plugs, etc.; (3) Conduit. Advertisers have clientele with every wholesaler in the territory mentioned. Immediate turnover can be guaranteed. Either commission or buying basis. Post-war arrangements considered. — Box 64, c/o The Electrical Review.

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EXPORT needs expert handling. A specialised organisation in this field will gladly co-operate and advise you on all export problems, and undertake sales development in Overseas Market. A preliminary discussion will place you under no obligation.—Edstone Limited, 30, Great Portland Street, London, W.1. 2419

EXPORT to India: An export house with well-established connections in the Indian market desires to hear from manufacturers of Electrical Accessories, Household Appliances, Refrigerators, etc., who seek to expand their export business. Write, giving full details, to the—Empire Export & Import Company, 2, Broad Street Place, London, E.C.2. 70

LEADING Radio Receiver manufacturers interested to co-operate with one of the foremost Indian industrialist houses for the establishment of radio industry in India are invited to correspond with—Box 2395, c/o The Electrical Review.

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MANUFACTURERS' Agent, large connection in London and district, radio and electrical, desires to represent Northern and Midland firms. Write—Box 7351, c/o The Electrical Review.

MANUFACTURERS' Agents, covering the whole of Great Britain and Colonies, are desirous of contacting manufacturers with a view to sole selling rights (either commission or buying), post-war arrangements considered. —Box 23, c/o The Electrical Review.

MANUFACTURERS of all kinds of high-class Electrical Accessories, Lighting Fittings, Motors and Radio Receivers, etc., are invited to communicate with the British representative of a substantial group whose interests cover India, Burma and Ceylon. Fidelity bonds will be lodged.—Box 7350, c/o The Electrical Review.

SCOTTISH firm desires to contact manufacturers of Radio Condensers, Resistances and Valves. Solid connection with the trade. Sole agency only considered.—Box 2412, c/o The Electrical Review.

SPAIN. Electrical Engineer with extensive connections in electrical and radio branches all over the country, desires representations. Address—Apartado 9119, Madrid. 2310

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FOR sale, Electrical Contracting business (going concern), including stock, equipment, etc., £1,000. Lincolnshire. Owner obliged to leave district, but prepared to re-invest in lieu of payment if taken over by capable, energetic man.—Box 7349, c/o The Electrical Review.

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AN English Company in England, having been manufacturers of certain well-known electric domestic appliances, and shortly to recommence, is seeking an opportunity of forming a separate organisation to handle the sales and servicing of its products. A large section of its business has been with the supply authorities, with whom it is proposed to operate again. Capital will be required and interested parties in the trade must only apply on their appropriate business heading being signed by the responsible person. As conditions permit, extended proposals would follow.—Box 7325, c/o The Electrical Review.

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APPLICATIONS for part-time employment are invited from specialists in the engineering industry who can write interesting subject surveys and abstracts for production managements. Present contact with literature desirable. Send an example of your work with your application. Reply—Technical Information Service, Bank Chambers, Brentwood, Essex. 2399

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EDUCATIONAL NOTICES

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UNIVERSITY COLLEGE OF SWANSEA
(A constituent College of the University of Wales)

Principal: C. A. Edwards, D.Sc., F.R.S.

APPLIED SCIENCE DEPARTMENTS

Engineering

Professor: R. N. Arnold, D.Sc.(Glasgow), Ph.D.(Sheffield), M.S.(Illinois), A.R.T.C., M.I.Mech.E.
Lecturer in Electrical Engineering: R. G. Isaacs, M.Sc.(Bristol), B.Sc.(London), A.M.I.E.E.
Lecturer in Civil Engineering: A. A. Fordham, Ph.D.(London), Assoc.M.Inst.C.E., M.I.Struct.E.
Lecturer in Mechanical Engineering: J. Selwyn Caswell, M.Sc.(Wales), M.I.Mech.E., Assoc.M.Inst.C.E.
Lecturer: W. E. J. Farvis, B.Sc.(Bristol).

Metallurgy

Professor: C. A. Edwards, D.Sc.(Manchester), F.R.S.
Assistant Professor: R. Higgins, Ph.D.(Glasgow).
Lecturers: R. Griffiths, M.Sc.(Wales); T. B. Wilkinson, Ph.D., B.Eng.(Liverpool), A.M.I.Mech.E.; D. W. Hopkins, B.Sc.(Wales).

The College offers a number of exceptional advantages to students who aim at entering upon professional careers in Engineering or in Metallurgy. It is situated in the heart of an industrial area which includes a large number of works of very varied character, and presents an unrivalled variety of metallurgical practice. The Manufacturers of the district, who contribute largely to the support of the College, give the Staff and Students of the Applied Science Departments every access to the Works, and the Managers, Engineers and Technical Officials co-operate with the Staff of the College in making visits to Works of practical educational value to the students.

Courses of study are provided (1) for the B.Sc. Degree of the University of Wales in (a) Civil Engineering; (b) Mechanical Engineering; (c) Electrical Engineering; (d) Metallurgical Engineering; (e) Metallurgy; and (2) for Diplomas of the College in (a) Civil Engineering; (b) Mechanical Engineering; (c) Electrical Engineering; (d) Metallurgy.

Persons who are not desirous of studying for Degrees or Diplomas may attend selected College classes, provided they satisfy the authorities of the College that they are qualified to benefit by such classes.

Entrance Scholarships will be offered for competition in April, 1946.

Particulars concerning admission to the College, and of the Entrance Scholarships, may be obtained from the undersigned.

EDWIN DREW,
Registrar.

Singleton Park,
Swansea. 2209

INTENSIVE COURSES

for the Higher National Certificate in Mechanical, Electrical and Production Engineering

IT is proposed under the Intensive Training Scheme (Engineering) to conduct a number of full-time intensive courses of six months' duration for the award of Higher National Certificates in Mechanical and Electrical Engineering in the Technical Colleges in Lancashire and Cheshire named below.

The courses are to commence on 1st October (with the exception of Burnley, 17th September) and the Colleges at which the courses will be conducted include:—

Bolton (Mechanical Engineering only)	St. Helens
Burnley	Salford
Oldham	Stockport
	Wigan

A course in Production Engineering will commence on 1st October at the Technical College, Southport.

The courses will be open to engineering apprentices and others whose firms wish them to attend, and who have reached the standard of the Ordinary National Certificate in Mechanical or Electrical Engineering or an equivalent standard.

Application forms, together with full details of the courses, maintenance allowances, etc., may be obtained from the Principal, Royal Technical College, Salford, to whom all applications and correspondence regarding the Mechanical and Electrical courses should be addressed.

Applications regarding the Production Engineering course should be addressed to the Principal, The Technical College, Southport. 2393

COMPANY MEETINGS

THE REVO ELECTRIC CO. LTD.

Increased Output and Profits.

Notable War Activities.

THE thirty-eighth Ordinary General Meeting of the above Company was held on Wednesday, July 18th, at Dudley.

Mr. Bertram Silcock, F.C.A. (the chairman), in the course of his speech, said:—

The net profit for the year is £70,121, as against £66,845 last year. Your directors now recommend a final dividend of 10% and a cash bonus of 2½%, both less tax, and the transfer of £25,000 to general reserve and £10,000 to stock contingencies. Our trading profit has increased from £201,428 last year to £249,227, and our net profit from £66,845 to £70,121, after making provision for deferred repairs. The increased profits are due to increased production, and the directors consider the results satisfactory. If the directors' recommendations are agreed to the company's reserves will total £285,000 and in conjunction with the balance of the profit carried forward will amount to more than the issued capital.

I am now able to give you a brief survey of our wartime activities. Vast quantities of munitions have been produced. For example, some five million 2-in. mortar bombs, three million grenades, two million incendiary and smoke bombs, vast quantities of 4.5-in. 60-lbs. streamline shells and high explosive aero bombs of 500 lbs. and 1,000 lbs. together with small components have been produced. In addition, further vast quantities of electrical equipment and fittings have been supplied to the Admiralty, Air Ministry and Ministry of Supply. Main munitions contracts have totalled some millions of pounds.

In 1943, at the request of the Government Department concerned, when aeroplane and tank production was urgently called for, your company undertook the production of plain bearings for the Meteor engine and produced thousands of complete sets.

It was also during 1943 that oil coolers for the Lancaster type of heavy bombers were commenced, and we were able to introduce new basic features in the fabrication of these units resulting in improved efficiency and simplicity of manufacture.

Normal trade products were also produced in great quantities for Government requirements. For instance, we supplied lighting equipment and landing lights for aerodromes, and special gas-tight fittings for filling factories and underground stores. Your company during the war period took a prominent part in the development of the new fluorescent tubular type of lighting. Ships' electric light fittings of all descriptions have been in great demand and hardly a ship of the Royal Navy or a Naval dockyard are without Revo products.

We are actively engaged in the production and supply of electric cookers for the Government's emergency housing scheme, in addition to cookers supplied to meet current rehabilitation problems. As regards street lighting and industrial equipment, while the departments are working to capacity on priority production, they will be ready to meet the heavy demands that will be made on us, as and when Government control eases and further labour is available.

We have a modern factory, well equipped, and a healthy order book, and with our experienced management we should participate in any prosperity attained by the electrical industry.

The report was unanimously adopted. 2410

TELEPHONE MANUFACTURING COMPANY

Important War Achievements

THE 15th Annual General Meeting of Telephone Manufacturing Company Ltd. was held yesterday at the Institute of Chartered Accountants, Moorgate Place, London, E.C., Mr. Fred T. Jackson, O.B.E. (Chairman and Managing Director), presiding.

The Chairman, in the course of his speech, said: Net profit is £217,719 as compared with £274,083 for the year 1943, and shows a fall of £56,400, which is consequential on the fall of gross profit after taking into account the slight increase in costs this year and the adjustments made last year in respect of costed contracts.

We have set aside £14,376 to the reserve account and after payment of the interim dividend of 2½% we have made provision for the final dividend of 6¼%, which is the same rate as the previous year, leaving £10,010 to be carried forward to the ensuing year, which is approximately the same amount as was brought forward from last year.

War Activities

Since the outbreak of war in Europe this is the first annual general meeting at which I am able to give you an account of your company's activities. Even now the whole story cannot be told, for a most important piece of apparatus developed and designed by our own research engineers is still on the secret list and likely to remain there for some time, but it will be of some interest and satisfaction to you that this apparatus was entirely the result of private enterprise. Other special apparatus of our manufacture proved to be of great value on "D" Day and in the crossing of the Rhine. This apparatus was fundamentally the idea of research workers in one of the Ministry of Supply Research Stations, S.R.D.E.

The Government decided very early on in the war that our experience and technique could best be utilised in the design and production of Telecommunication and Transmission Equipment, therefore we have not had to depart from the industry in which we have made our reputation, but during the war years we have confined all our energies to direct war work, and, as a result, up to the middle of this year we have not been able to get on with research and development work for post-war activities.

It probably would not interest you to give a complete catalogue of the enormous range of items which we have manufactured which come into the category of Telecommunication Equipment, but I think it will be of interest to put on record the approximate totals of some of the principal items we have manufactured: 1,300,000 microphones, 1,200,000 receivers, 920,000 telephone sets, 70,000 switchboards of all sizes up to 200 lines. In addition, a large quantity of component parts was produced.

During the period 1940 to 31st December, 1944, our output grew, expressed in terms of value, from just under a million in the first years to over two millions. This output was achieved with an increase in factory floor space of only 10,000 sq. feet plus a small outworking unit, and at this point in my address I feel it is only right to pay tribute to our General Works Manager, Mr. P. B. Healey, his assistant, Mr. H. Lovesey, and our Chief Engineer, Mr. J. G. Flint, for these results could not have been attained without their untiring energy and organising ability. At the same time I would also pay tribute to the rest of our staff and workpeople for the extraordinary effort they have made during the war years, in spite of the fact that all our works are situated in that part of London which during the blitz by V.1 and V.2 was known as "Southern England." In spite of blitzes our total output expressed in sterling for the period 1940/1944 inclusive amounted to £7,878,000.

Considerable Work in Hand

Now as to the future. I am sure you will not expect me to prophesy, for a great deal depends on the removal of the innumerable control orders to permit private enterprise to get busy once more. I can, however, see fairly well into next year, for we still have a considerable volume of work in hand. We are also able, at long last, to direct some of our research and development engineers on to work for post-war sales. We have established a first-class reputation for the quality of our work and our ability to keep delivery promises.

You will have appreciated by the past several years' accounts that we have had to pay very considerable amounts in E.P.T. On the other hand this is providing us with a very useful cushion, though you must bear in mind that the cushion is still liable to income tax, but in spite of this the amount will be quite substantial. I express a very fervent hope that this tax will be abolished at a very early date.

The report and accounts were unanimously adopted and the dividend recommended was declared. 2400

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