ELECTRICAL REVIEW

FOUNDED 1872

Vol. CXXXVII. No. 3544 OCTOBER 26, 1945 9d. WEEKLY

NOV. 10

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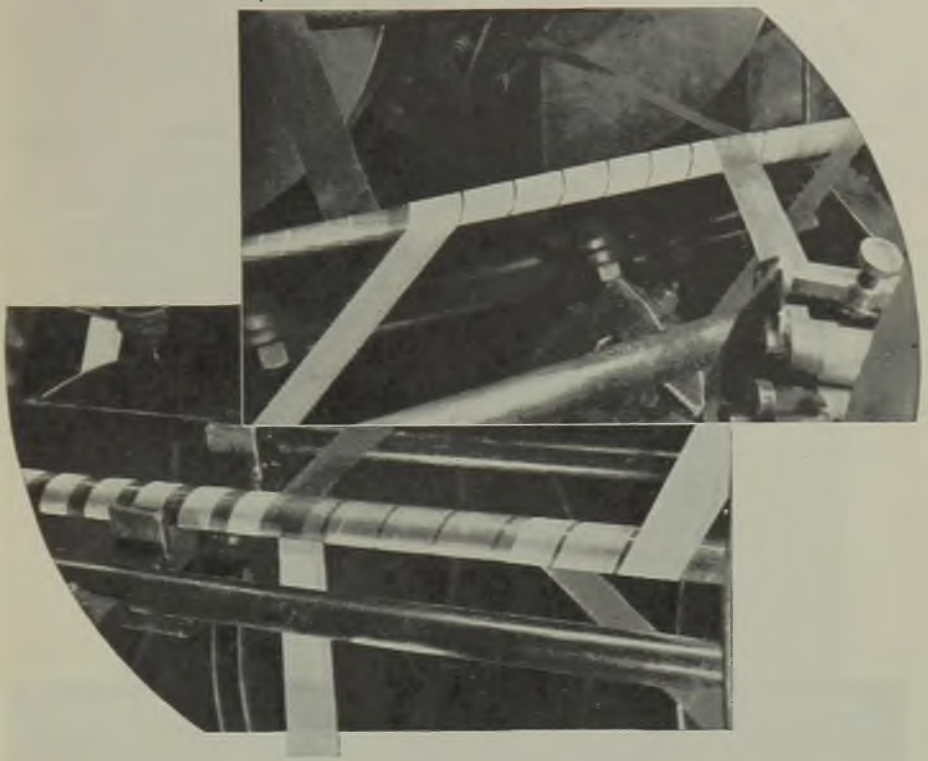

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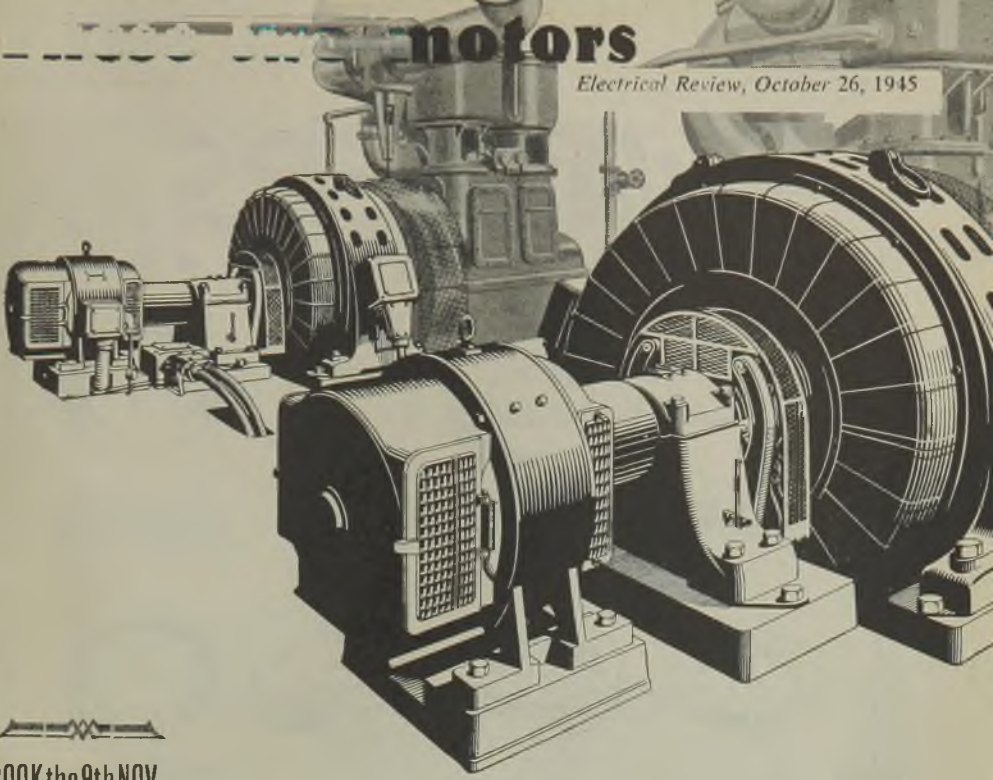

BOOK the 9th NOV.
FOR THE E.I.B.A.
VICTORY BALL

saved £500 a year by P.F. correction.

Two needs existed in a large works. First, equipment was required to maintain the overall power factor at an economical figure. Second, motors were required to drive two large compressors. By ordering two 560 H.P. Crompton Auto-Synchronous Motors both needs were satisfied. The motors provide highly efficient constant speed drives. At the same time they maintain an overall maximum demand of approximately 1,800 kW at a power factor of ·985 lagging. They saved £500 a year on the maximum kVA demand over what it would have been with ordinary induction motors without p.f. correction.

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A

VICTORY BALL

IN AID OF THE

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8.30 p.m. to 1.30 a.m.

AT

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Permutit "Deminrolit" Process cuts cost as much as 95%

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(Note - All figures in parts per 100,000.)

Plant	No. 1		No. 2		No. 3	
Water	Crude	Treated	Crude	Treated	Crude	Treated
Cations						
Calcium Ca	3.2	-	9.4	-	10.7	-
Magnesium Mg	0.8	-	0.36	-	1.09	-
Sodium Na	0.46	0.23	1.0	0.31	1.66	0.44
Total	4.46	0.23	10.76	0.31	13.45	0.44
Anions						
Carbonate CO_3	4.2	0.24	12.4	0.29	10.5	0.57
Chloride Cl	1.8	0.06	2.5	0.12	2.84	0.30
Sulphate SO_4	1.35	-	3.48	0.03	11.95	-
Nitrate NO_3	-	-	-	-	1.15	-
Total	7.35	0.30	18.38	0.44	26.44	0.87
Total ions in solution	11.81	0.53	29.14	0.75	39.89	1.31
COST per 1000 gallons	5.22d		9.83d		16.5d	

The table shows the composition of some types of water before and after treatment by Permutit's "Deminrolit" Process. Water similar to a distillate is produced by this process at a fraction of the cost. Where distilled water was too expensive you can afford "Deminrolit" water. The process has been in practical use in Great Britain for over 7 years. Write for technical publication "Distilled Water without Distillation" to

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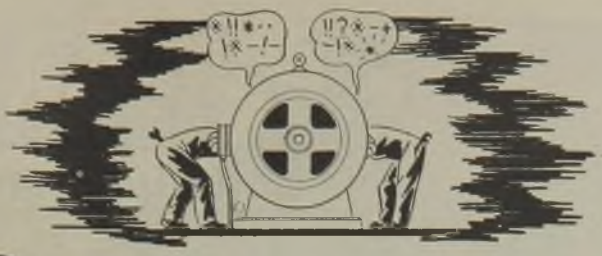


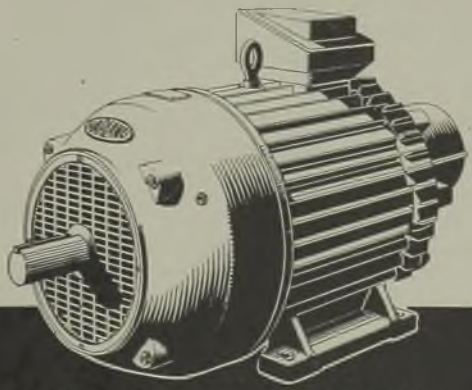
Talking about motors...

When you're talking about motors, it's well worth remembering that little spots of bother like this CAN be quite rare.

We are very proud of the history of our motors and generators working in all parts of the world with unfailing service year after year. Many years' experience has been welded into their production—so that today a Harland Motor is a guarantee of efficiency, reliability and economy in operation. Details of our ranges are given below—may we send you descriptive matter?

Standard A.C. and D.C. Motors from 10 to 2,000 H.P., rib-cooled and core-cooled Motors up to 1,500 H.P., Two-pole Machines in all enclosures—direct coupled drive, Alternators — engine-driven or geared steam turbine, plain and auto-synchronous Motors of all speeds, Motor-Generator Sets, Wide Speed Range shunt-controlled D.C. Motors, Submersible Motors.

The illustration shows one of our range of totally enclosed RIB-COOLED Motors — a design particularly well suited for working under wet or dusty conditions. It is economical in outlay, highly efficient and is available from 7½ to 180 h.p. (at approximately 1,490 r.p.m.). Motors of larger horse-power available in the Harland Core-cooled range.



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Manufacturers of Electric and Hydraulic Machinery

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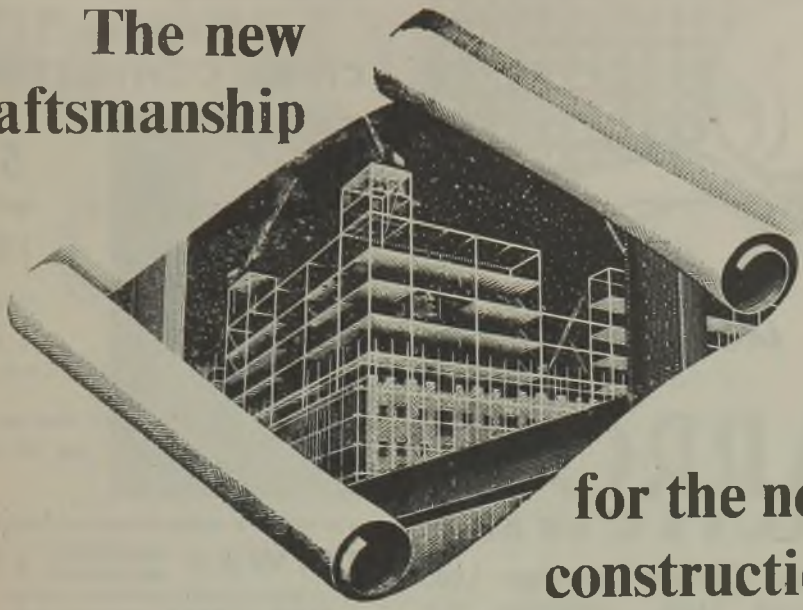

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ELECTRICAL REVIEW

October 26, 1945

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Contents :—

EDITORIAL, ADVERTISING & PUBLISHING OFFICES : Dorset House, Stamford St., London, S.E.1
Telegraphic Address : "Ageekay, Sedist, London." Code : ABC. Telephone No. : Waterloo 3333 (50 lines).
Registered at G.P.O. as a Newspaper and Canadian Magazine rate of postage. Entered as Second Class Matter at the New York, U.S.A., Post Office.
Annual Subscription, Post free : British Isles, £2 7s. 8d. ; Canada, £2 3s. 4d. ; Elsewhere, £2 5s. 6d.
Cheques and Postal Orders (on Chief Office, London) to be made payable to ELECTRICAL REVIEW LTD., and crossed "Lloyds Bank."

ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXVII. No. 3544. OCTOBER 26, 1945 9d. WEEKLY

Facing the Facts

Electrification the Road to Recovery

MANY warnings have been given to the people of this country against expecting an early and automatic return of national prosperity. Such statements when unsupported by facts or reasoned estimates fail to bring home to the public how serious the position actually is. They can be depressing but, offering no clue through the labyrinth, they offer no stimulus to positive action. The outstanding merit of Mr. E. R. Wilkinson's presidential address to the Association of Supervising Electrical Engineers last week was that, through a presentation of co-ordinated data in logical sequence, it compelled perception of a grim reality. It also pointed a way out—the only way as we see it.

Difficult Export Position

An increase of exports by 50 per cent., it was shown, will not be any too much, and this will have to be achieved within a very few years, without the aid on anything like the same scale obtained in the past from textiles, coal, merchant shipping and foreign investments, which were mainly responsible for a favourable pre-war trade balance. Moreover, the contracting volume of labour available, however, improved by training, will clearly not be enough to yield the increased output. Neither can more efficient organisation, although necessary, materially influence the situation.

While data obtained from abroad should be considered with circumspection when applied to conditions in this country, the energetic preparations Mr. Wilkinson observed during his recent visit to the United States that are being made to secure their national future include one provision of particular relevance here. That is the attention paid to economy in man-power through more extensive and intensive mechanisation, which means essentially electrification. Arguments in its favour there have surely additional weight in relation to conditions to be expected in Great Britain.

Solving the Coal Problem

Referring to the very much greater increases in coal prices here than in the United States during recent years with their grave reactions on other main industries, Mr. Wilkinson put the issue pithily as "electrification or extinction." It was good, therefore, to hear the confidence expressed by the Minister of Fuel and Power, Mr. Emanuel Shinwell, at the Institute of Fuel luncheon that the coal problem could be solved with the promised co-operation of scientists, engineers, administrators and miners, and also to receive the testimony of Mr. Arthur Horner on behalf of the mine workers that they also now strongly favour increased mechanisation.

In more than one crisis during the war the British tradition was sustained that, given a full knowledge of the facts, the biggest effort is forthcoming when things look blackest. The effort will need to be sustained, and Mr. Wilkinson's quotation of Drake's saying was particularly apt: "It is not the beginning but the continuing of any great matter until it be thoroughly

finished which yieldeth the true glory." The scope offered to electrical engineers is tremendous and their responsibilities are very great. The spirit with which they undertake their task is as important as is their technical equipment. Their natural zest for their work will be strengthened by the knowledge that the future of the nation depends largely on their whole-hearted efforts now.

Australia and America

BECAUSE the events of the past few years have brought the United States and Australia into closer contact it is frequently assumed that in future the Commonwealth will look to the United States for more and more of her inward and outward trade, and that in consequence Great Britain will be the loser. But there are a number of stern economic facts which militate against this idea. Some of them were very lucidly put by Mr. A. G. Warner, managing director of Electronic Industries, Ltd., an Australian company, in a recent talk. First Australia wants markets for her surplus " primary " products, but the United States is self-sufficient in this respect although she may buy a little wool. The same argument applies in the case of metals. As regards manufactured goods, Mr. Warner is of the opinion that it is hopeless to try to compete with the American home manufacturer.

Disparity of Values

THE possibility of Australia purchasing American goods if she cannot export to the United States seems to be small. In the present state of world economic affairs it is difficult to obtain dollars from other countries which themselves rely upon exports to the United States. Moreover costs have risen in America to a far greater extent than in Australia, the effect being that the prices of American goods have become prohibitive to Australians. The rise in costs continues in spite of efforts to control them. Mr. Warner comes to the conclusion that Australia's policy should be to foster trade within the Empire where values are more in keeping with Australia's rates of exchange. These are markets for the Commonwealth's primary products and their custom should enable Australia to buy the things she wants outside her own secondary products.

Specifications

IT is as undesirable that the user of electrical apparatus should try to teach the manufacturer his job as it would be for the manufacturer to dictate to the purchaser what he should use. Yet this is what many private specifications amount to when they attempt to improve on British Standards, which are sufficiently flexible to allow for unusual operating conditions, without forcing a designer to depart from the compromise between various (and often incompatible) ideals that his experience has shown to give the best overall results. That was perhaps the most important of the many technical issues between manufacturers and purchasers which were dealt with by Mr. E. T. Norris in his chairman's address to the I.E.E. Transmission Section, reported in our last issue. His views on tolerances and guarantees should also be noted.

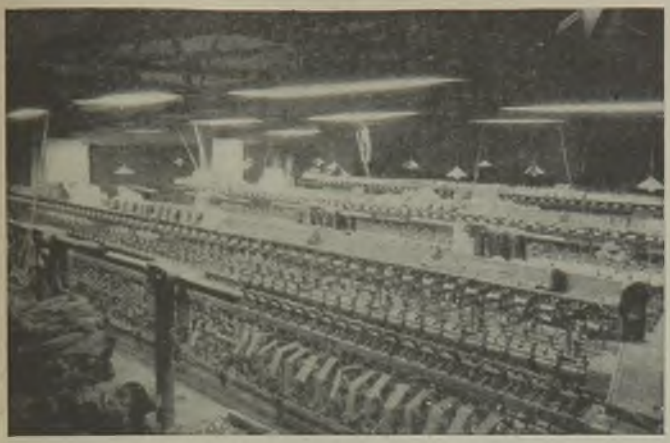
Auto-Reclosure

THE aim of securing a standard of reliability of electricity supply in rural areas approaching that obtained in towns has to be achieved despite more widely flung distribution systems, mostly overhead. In these faults are likely to be more frequent, while their indication, localisation and repair by gangs, possibly sent from considerable distances, present greater difficulties. On the other hand all but a small percentage of faults are transient and would allow of immediate resumption of supply. The saving in man-hours through the use of automatic reclosing switchgear obtained by Mr. A. Kelso, as mentioned in his chairman's address to the I.E.E. North Midland Centre, should partly off-set the higher cost of what is far more valuable—the avoidance of needlessly prolonged interruptions of supply.

Frequency in China

WE are informed by the Colonial Office that it has been decided that the British standard frequency is to be retained in Hong Kong and Kowloon. The distribution system will be three-phase at 200/346 V. This follows upon the recent announcement that the Chinese Government is to adhere to the 50-cycle frequency, a decision which represents a considerable advantage to British electrical manufacturers when tendering for Chinese contracts.

Cotton Mill Conversion



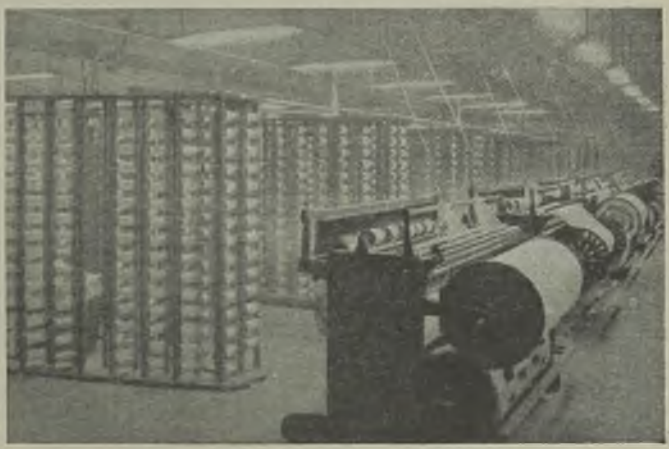
Equipment for Meeting Present-Day Conditions

Electric drive is used for hank winding at Hodgson & Taylor's mill, where there is another example of fluorescent lighting giving 15 ft.-candles

THE urgent need of both the home and export markets for textile goods emphasises the importance of adopting new methods to increase production and lower costs. This must be considered in the light of the scheme for reorganising the cotton industry announced by Sir Stafford Cripps, President of the Board of Trade. During the war a large number of mills were shut down under the industrial concentration scheme and the equipment has had to be dismantled to enable the premises to be used for storage or for other purposes. Those mills that have been kept running have been working overtime to meet the enormous demands of the Services, and to maintain the reduced "civilian" output.

Adding to these conditions the fact that a high proportion of the plant is obsolete and cannot be repaired, that the looms generally are very much overcrowded and that the artificial lighting arrangements as a rule leave much to be desired, it is evident that there is a need for a complete overhaul of existing production arrangements, including the more extensive employment of electrical aids.

To judge by the recent spate of inquiries received by electrical manufacturers and supply authorities, most mill owners are aware of this, but it is difficult to meet their needs owing to the scarcity of labour to manufacture and install the necessary plant. Shortage of labour affects practically every industry: the textile industry itself is one of



Electrically-driven warping frames at the Eclipse Mill which also has fluorescent lighting

the most severely hit and it is largely because of this that many "concentrated" mills have not yet re-started work, although official permission has been given for mills to re-open as soon as labour and materials are available.

In the present circumstances the experiences of the Blackburn Electricity Department in its efforts to meet the needs of the textile industry are of considerable interest. We are therefore grateful to Mr. R. H. Harral, its chief electrical engineer and manager, for helping us to investigate the matter; and also to Mr. J. B. Ashworth, sales and development engineer, who has made a special study of the problem of electrifying cotton mills.

TYPICAL ENTRY FROM REGISTER OF INSTALLATIONS

Estimated annual costs for existing plant

Type of plant:	£	s.	d.
Coal	2381	0	0
Water	6	0	0
Oil	161	0	0
Maintenance	255	0	0
Wages	555	0	0
Insurance	44	0	0
62,190 kWh purchased	427	0	0
Total cost	£3829	0	0

Remarks

Estimated cost of 70 per cent. of steam for power driving purposes	2381	8	0
62,190 kWh purchased charged on Table "K" £437 11s. 5d.			
Less 2½ per cent. for prompt payment £10 18s. 9d.	426	12	8
Total power driving costs	£2808	0	8

Estimated costs for proposed power installation

Estimated maximum demand new load 300 kW
Existing " " " " 69 kW
Total " " " " 369 kW
Estimated consumption for new load 720,000 kWh per annum (50 weeks)

Proposed tariff (Cotton mill tariff)

60,000 kWh per month	£	s.	d.
30,000 kWh at ·65d. per unit	81	5	0
30,000 " " ·5d. " "	62	10	0
60,000 " " ·3d. " " (Coal price adjustmnt)	75	0	0
Total per month £218 15 0 *Less* 2½ per cent. for prompt payment	213	5	8
Net total per annum	£2559	8	0

Existing consumption 62,190 kWh per annum priced on cotton mill tariff			
5183 kWh per month at ·425d.	9	3	7
5183 " (coal price adjustment) at ·3d.	6	9	7
Total per month £15 13 2 *Less* 2½ per cent. for prompt payment	15	5	4
Net total per annum	£183	4	0
Grand net total per annum 782,190 kWh costing	£2742	12	8

Average price per kWh ·842d.

During the past few years, as a means of helping the textile industry, the Electricity Department has set up within its organisation a staff of technicians and craftsmen, and has endeavoured to give all possible assistance to the cotton trade by offering attractive tariffs, providing complete engineering schemes for changing over to modern machinery and installing efficient lighting. It has been impressed upon manufacturers that textile engineering has never been correctly taught and all efforts in the past years seem to have been devoted to production and sales, regardless of the inefficiency of the machinery. Poor factory lighting has adversely affected output and has imposed a severe strain on the health of the workers.

Altogether in the city there are seventy-eight mills, comprising sixty-six weaving and preparation, nine spinning and three spinning and weaving. Of these several have been shut down under the Concentration of Industry scheme. Of the 63,818 looms and the 773,130 spindles installed, 3,825 and 30,304 respectively are now driven by electricity. Of the total of seventy-eight mills, sixty-eight take their supplies from the electricity undertaking, sixteen of them having complete lighting installations and fifty-four incidental power and lighting, while eight are all-electric. The estimated development factor of 40 per cent. for lighting and 18 per cent. for power shows a good start despite wartime difficulties, but there still remains plenty of opportunity for further development. Actually the capacity of steam plant still remaining amounts to 51,726 HP, of which 32,398 HP is for weaving and 19,328 for spinning. An all-electric mill with 350 looms has a maximum demand of about 206 kW and a load factor of 21·2 per cent. An estimate of the potential cotton load for the undertaking gives a figure of 56,278 kW, including light, heat and power.

A large number of mills are now waiting for electrification schemes to be carried out. Labour difficulties, however, are making it impossible for the Electricity Department to undertake more than two schemes a month. Mr. Ashworth points out, however, that even if there are no prospects of being able to carry out installations at the moment, now is the time for mill owners to consider electrifying their plant.

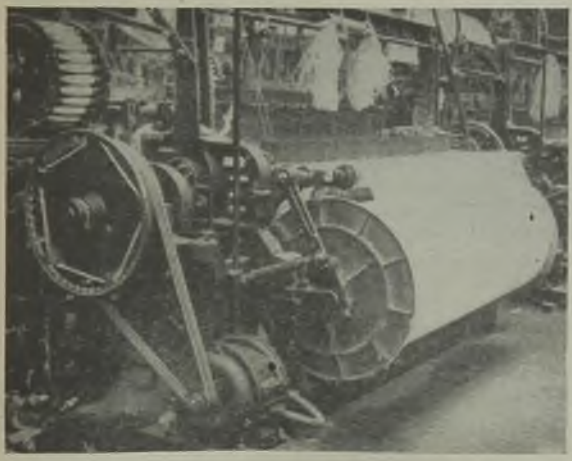
Even the most recently constructed of the mills was built as far back as 1912 and the

majority of the mills are still driven by steam engines of the cross-compound type. The average age of these is 40–50 years, and one of the engines is actually nearly a century old. Although these plants have been paid for long ago maintenance costs are very substantial compared with the trouble-free service provided by electricity. Furthermore when the steam plant fails, as it must do eventually, it is quite impossible to get repairs done (many of the manufacturers having gone out of existence) and conversion to electricity is the only practicable alternative.

Modernisation of the textile industry is almost impossible without electrification. The productive capacity of worker and machinery can be increased to a far larger extent than is appreciated by the manufacturer. It is suggested in Blackburn that a panel should be set up to fix for all running plant a useful maximum "life" after which it would be replaced by new and efficient equipment. Frequently, electricity tariffs are expected to modify completely the cost of production, but power often represents no more than 9 per cent. of the total production costs, compared with 60 per cent. for labour.

With the shortage of accommodation, the rearrangement of mills to eliminate the serious overcrowding of looms is extremely difficult. In general, re-spacing of the looms to meet present-day standards of factory practice would involve the removal of about one-third of the total number. Apart from the alterations necessary to drive the machines remaining, there is considerable work in prospect merely to meet the requirements of the displaced looms which will have to be erected elsewhere, without taking into consideration the provision of any new machines which will no doubt be required.

Instructing a girl how to use an electrically-driven loom at Duckworth's Mill



Direct-driven Northrop automatic loom, individually driven by a 1-HP squirrel-cage motor at J. & J. A. Porter's Greenbank Mill, one of the most up-to-date in Lancashire

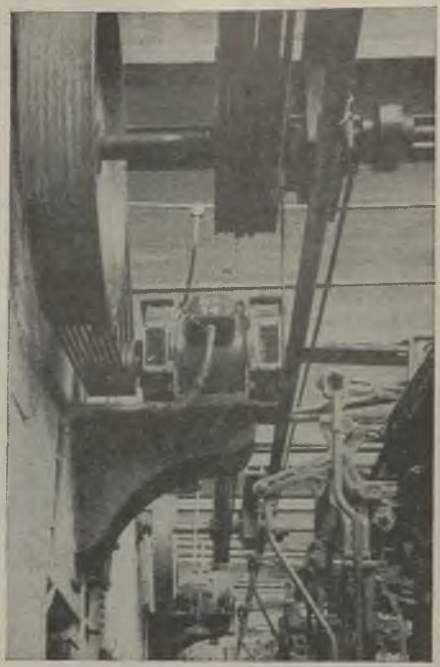
Under existing conditions especially, both capital and running costs of electrical plant are of the utmost concern to the mill owners. In planning the installations this fact has always to be borne in mind by electricity undertakings and at Blackburn much attention is given to ensuring that every job shall justify itself and bring the utmost benefit to the consumer. In fact in all cases where the schemes have been introduced there has been a financial saving and improved efficiency. A great help in securing this result is provided by the use of a register of all mill installations giving both estimated and actual costs. A typical entry is given on p. 580.

It is difficult to deal with consumption details under present abnormal conditions; the effect of dearer coal on special agreements has been to almost double the average price of electricity. In Blackburn two methods have been used in developing textile load, the two-part and the block unit tariffs. The prices offered under the two-part tariff depend on the conditions of the load, but it has been found in practice that it has been possible to supply power under special agreements at an average price of between 0·9d. and 1·2d. per kWh.

Speedy and comprehensive service is a strong feature of the Electricity Department's policy and in more than one instance has resulted in securing the change-over of mills from steam to electricity. On one occasion Mr. Harral had a call from a mill saying that it had had to be closed because a steam engine had broken down and could not be repaired and asking if he could do anything about it. Mr. Harral replied that he could get the installation going in ten days and he actually succeeded in getting half the plant in operation in five days.

With its experience extending over a considerable number of years, the Electricity Department has reduced the provision of electrical installations in mills to a fine art. Special attention is paid to the lay-out of the schemes and all the mills we have inspected are notable for the neat arrangement of switchgear and wiring. Awkward bends in the conduit are avoided wherever possible and local fuseboxes are arranged back-to-back on the walls between the various sheds.

It has been found that the most economic method of carrying out the conversion from steam to electricity in weaving sheds has been the arrangement of group drives. Under this arrangement the whole of the transmission shafting has been cut out up to the last-motion shaft driving the looms. Normally this shaft is driven from right-angle bevelled gears from the main shaft, and all that has been necessary is to remove these and install a motor and "V" rope drive adjacent to the shaft. Where it has been found that insufficient head room was available cross drives have had to be introduced. The general efficiency and power factor of the group driven looms has been at least as high as the individual drive, and the capital cost including millwrighting and installation is from £6 to £7 per loom compared with £25 for individual drive, or roughly 25 per cent.



Group driving of Jacquard looms at Witton Mill

Load conditions vary considerably both between the types of looms, the sizes, looms equipped with special pattern boxes and Jacquards. It is very important to guard against much speed variation on the line shaft and for this reason the HP transmitted through the belting should be equal to the peak demand without any variation of speed. Experience has shown that the following HP per loom are good averages:—Plain looms, 0·4 to 0·5 HP; Dobbie looms 0·5 to 0·55 HP; Jacquard looms 0·6 to 0·7 HP; and Jacquard looms with chains 0·7 to 0·8 HP.

Individual drive is an advantage where the manufacturer is carrying out a re-spacing of the mill and where the overhead line shafting has to be adjusted. Elimination of the overhead gear also means less noise and more light. This, however, is not so obvious where Jacquard looms are used, as overhead gear is necessary to carry the Jacquard frames. The principal advantage of individual drive is the fact that mobility is obtained but against this it must be reckoned that if a high torque motor is used the power factor is comparatively low, and maintenance is higher.

When steam is employed as many as a

thousand looms in a weaving shed may be driven by the same engine. With the electrical methods now used between thirty and seventy looms will normally be driven by a 20–45-HP motor (mostly 25-HP of the squirrel-cage protected type, running at 720 RPM) *via* the last-motion shaft. Conversion of steam installations to electricity therefore involves the removal of the worm wheels and pinions connecting the last-motion shafts with the main cross-drive from the engine and the substitution of electric motors. Generally this is not easy since the roofs of weaving sheds are normally very low and there is little clearance room for erecting the motors in their most convenient position, just below the ceiling close to the shafts. Nevertheless with the aid of V-belts it is usually possible. It is generally reckoned that this arrangement reduces transmission losses by about 15 per cent. compared with the worm drive.

Recently progress has been particularly noticeable in regard to the lighting of mills and production has been found in extreme cases to have been increased by as much as 15 per cent. The Electricity Department has not merely endeavoured to secure that the installations should conform to present-day standards (6/10 ft.-candles, as compared with intensities as low as 1 ft.-candle in some mills), but has aimed at providing 10/15 ft.-candles for general lighting to meet possible future requirements. Fluorescent lighting has been installed in the preparation departments of a number of mills. Where tungsten-filament lamps are used the undertaking makes considerable use of anti-vibration mountings.

One of the problems still confronting the electricity undertaking is the devising of an acceptable electrical method for tape sizing. Experiments have been carried out, unsuccessfully, with infra-red rays, and the solution may be found in the use of electricity indirectly by adopting electrode boilers to raise steam. This would enable mills to do away with the necessity for retaining Lancashire boilers purely for steam raising.

Apart from its use in the actual operation of the mills, electricity is finding increasing favour for catering purposes. The first all-electric canteen in Blackburn, providing 200 meals a day, has just been opened at Newton Street mills. Including the lighting and heating apparatus, the total load is 95 kW. Two more all-electric canteens are in course of construction. Canteens are, however, somewhat rare in the cotton industry, the workers preferring to bring their own food. To meet this situation several mills have been provided with electric hot-cupboards for warming-up food. Trolleys fitted with electrically-heated urns are also being used to take round tea to the various sheds.

Electric urns on trolleys are used for serving teas

The economy in coal secured by the use of electricity operating modern mechanical drives is an important consideration. The quantity used in a mill under the present system is not less than five times greater than that used in a modern power station to produce the same power. Thus there would be a saving of not less than 100,000 tons of coal per annum were all the cotton mills to take the whole of their energy from the electricity undertaking.

Finally it may be said that labour-saving equipment, electrically operated, and the provision of properly planned lighting, with the addition of canteen and welfare facilities, would do much to raise the status of the industry and increase its attractiveness.

Manchester Engineering Students

THE Students' Section of the Manchester Association of Engineers is being restarted during the present session. It has been decided to broaden the scope of the Section by opening it to the widest possible range of junior engineering personnel, including trade apprentices who are attending day or evening technical classes. The age range for the Section is 17 to 25 years.

Weather and Power Systems

Engineers and Meteorologists Meet

HOW the weather affects electric power systems was the subject discussed at a joint meeting in London last week of the Institution of Electrical Engineers and the Royal Meteorological Society. The four short introductory papers contained bibliographies of other works on the subject and meteorological instruments operating on electrical principles were exhibited.

In the first paper MR. J. S. FORREST (C.E.B.) said that the lighting load varied regularly in a predictable manner, but the heating load needed much more serious consideration because it might amount to a significant proportion of the total load. Thermograph charts plotted at Croydon showed that a drop of 25 deg. F. in the mean temperature of the air had caused an increase of 31 per cent. in the mean load and an increase of 22 per cent. (400 MW) in the peak load.

Lightning was responsible for about 60 per cent. of the total breakdowns of overhead power lines and for a large proportion of transformer failures. The C.E.B. had installed recorders in various parts of the country to furnish continuous records of atmospheric disturbances and provide warnings of probable thunderstorms in the districts concerned.

Power system engineers preferred weather statistics to be objective; for example, daytime illumination expressed in ft.-candles was more likely to be useful than subjective estimates of visibility and cloudiness. Forecasts must be highly accurate and promptly cancelled when the weather changed. Co-operation would be mutually beneficial, for highly specialised electrical methods were now being employed in meteorology.

Breakdowns Through Ice-Loading

Ice storm damage to overhead lines was dealt with by MR. H. W. GRIMMITT (Electricity Commission) who claimed that the reliability of overhead power lines in this country was perhaps the best in the world. There had been scarcely ten total breakdowns due to breakage of conductors in bad weather in the past twenty years, although there were approximately 20,000 miles of high-voltage lines in the United Kingdom. Against sleet storms, wind and glazed frost there were no proper precautions. The most frequent kind of damage reported was caused by ice falling off the conductors, causing them to rise abruptly into contact with higher conductors; such short-circuit burning frequently ruptured the conductors.

The next most common form of damage was failure of the conductors under the weight of ice; cross-arms might also bend and sometimes the supports might collapse. The "dancing" or "galloping" of conductors during such storms had been observed, but was rare in this country; so far no satisfactory explanation of such behaviour had been forthcoming.

Tabulated data and a map demonstrated that lines at a height of 1,000 ft. above sea level might be expected to be troublesome every winter. The most prevalent wind direction was N.N.W. The most vulnerable area was the Pennine range followed by South Wales. Ice formed on the conductors up to a maximum diameter of 5 in. irrespective of conductor size and material.

Records of Cold Periods

Climatic statistics were commented on in the paper by MR. A. J. DRUMMOND (Air Ministry, Meteorological Office) who pointed out that while temperature was at the minimum in winter, variation of mean temperature was at the maximum. During 160 winters there had been twelve instances of prolonged cold with pairs of adjacent months having means as low as 35 deg. F. Temperatures of at least 32 deg. and 40 deg. F. prevailed for 30 and 70 per cent. respectively of the time involved during the last three successively cold winters of 1939–42 and there were ten spells of continuous freezing for over 50 hours each. Data of that kind should be fundamental to power engineers for sudden cold spells of short duration superimposed upon the regular trend of air temperature could impose severe strain on electricity supply systems. A line of investigation which might be worth while would be determination of the probability of a cold snap of given severity occurring at various times throughout the year.

Rainfall was perhaps the most variable of all climatic elements. Extensive data on this subject and a humidity expectation (of

value with reference to condensation on insulation) were available elsewhere.

One of the author's graphs reproduced the diurnal variation in frequency of audible thunder at Kew observatory for each season averaged over the last 44 years. To this had been added the relative amounts of electricity transferred to earth by point discharge at one site during the last twelve years.

Exploring the Upper Air

In the last paper the use of radio-sondes for forecasting thunderstorms was described by WING-COMMANDER R. M. POULTER (R.A.F.V.R. Meteorological Branch) who claimed the method to be the most convenient means of ascertaining atmospheric stability. A radio-sonde was a 6-ft. diameter balloon rising at the rate of 1,000 ft. per min. to perhaps 50,000 ft. at which height it burst, allowing the apparatus carried to descend, often to be reconditioned and used again. Each carried pressure, temperature and humidity elements actuating a small radio transmitter which radiated three signal notes at intervals of two minutes, so enabling ground listening stations to make deductions.

The results were passed on immediately by teleprinters to airfields and forecasters who plotted Tϕ-grams (systems of co-ordinate curves) which enabled temperatures to be forecast and also indicated whether cloud would form, how thick it might be and how much of the sky might be covered. From the thickness and vertical development it was possible to proceed to thunderstorm prediction. Briefly, if temperatures aloft were all lower than the saturated adiabatic (wet bulb thermometer) curves, thunderstorms would probably follow.

Rural Overhead Lines

Transformer Oil Acidity

SOME observations on overhead distribution lines in a sparsely populated country district were made by MR. A. KELSO (Harrogate Corporation) in his inaugural address as chairman of the North Midland Centre of the Institution of Electrical Engineers.

He described an 11-kV line 21 miles in length with 63 transforming points feeding 16 miles of "spurs" and carrying a maximum recorded load of less than 1,000 kVA. Automatic reclosing switches battery tripped and closed by motor or solenoid, had restored supply in a few seconds in over 90 per cent. of outages. Lightning arrestors of the thyrite type had been very effective and recent tests on a set which had been in use for eight years, during which period they had functioned many times, had shown that they retained all their original characteristics.

It had been stated that less than 1 per cent. of transformers in service had been affected by oil acidity; if that really were true, then one particular undertaking must be having more than its fair share. Acidity had not been associated with particular makes of transformer or oil, but it had been confined almost exclusively to grade A oil.

Mr. Kelso dealt at some length with circumstances that tended to cause acidity, the limits beyond which it should not be allowed to progress, methods of cleaning transformer cores and windings when it did take place and means of minimising its occurrence.

Excessively acid oil should be re-refined, otherwise it could be reconditioned in several ways. One of the most economical and easy methods was treatment with activated alumina, which could be introduced in a linen bag suspended in the oil inside the transformer tank, or the oil might be pumped slowly through a separate container of alumina. The latter could be successfully reactivated by baking; indeed such heating seemed to improve the capacity of alumina for decreasing acidity.

Expanding Manufacture

Organisation Problems

AN attempt was made to illustrate some problems in administration and finance under present manufacturing conditions by MR. J. O. KNOWLES (Brookhirst Switchgear, Ltd.) in his inaugural address as chairman of the I.E.E. Mersey and North Wales Centre.

For the purpose of this exercise in organisation the expansion of a business making engineering products was reviewed in five stages with annual turnovers ranging from £10,000 to £500,000. Mr. Knowles explained how development might proceed in each case successively in respect of divisional organisation for finance, sales, design and manufacture; including comments on possible variations in staff and division of function with reference to financial reserves for expansion of the business, which was likely to be more rapid at first than in later years when competition grew. Some possible divisions of profit and loss accounts were also indicated in percentages, indicating that in the later stages of growth of the business many of the problems of organisation would have resolved themselves, so transferring chief consideration to financial summaries and budgeting.

Merz Memorial at Newcastle.—The Council of King's College, Newcastle-on-Tyne has accepted the gift of a memorial tablet to the late Mr. Charles Merz, from Merz & McLellan. The tablet will be placed in the Department of Electrical Engineering.

Views on the News

Reflections on Current Topics

MAKING what, I believe, was his first public appearance as agricultural adviser to Edmundsons Electricity Corporation, Mr. J. C. Leslie told a technical development conference of the Wilts War Agricultural Executive Committee at Devizes why he had been appointed. He disclaimed any pretensions to the title of electrical engineer; he secured the job because he was able to interpret the farmer's point of view to the company. Mr. Leslie went on to tell his audience why the grid lines passing over their farms could not be tapped to give them individual supplies; why they couldn't expect the company to carry out long extensions merely to provide lighting; and how they could increase their consumption of electricity with advantage to themselves and to the company.

* * *

When referring last week to his housing plans, Mr. Aneurin Bevan, the Minister of Health, stated that the Government was working to overcome a number of bottlenecks, among them cookers. What the position may be with regard to gas cookers I do not know, but from talks I have had with electrical manufacturers during the past few days, it seems that far from there being a bottleneck in electric cookers, production is more than abreast of the building work and that, if desired, not only a proportion but all the temporary houses so far completed could have been provided with electric cooking facilities.

* * *

Variations of sunlight from mean values have been replaced by those of temperature as the chief weather preoccupation of electricity supply engineers. Its effect is two-fold—on consumers' loads and on the apparatus supplying those loads. The influence of low temperature and also of lightning and atmospheric humidity would be less adverse if the weather changes could be forecast long enough ahead to allow of the necessary preparations being made. Close collaboration with meteorologists is required and the joint discussion last week between the I.E.E. and the Royal Meteorological Society is a step in the right direction.

* * *

Procedure designed to elicit a candidate's aptitude for study manifestly differs from that needed to test the ability of an experienced installation or maintenance electrical engineer to apply his knowledge, even if the latter were not too busy and otherwise unsuited to enter for a normal examination. In his case, too, mature judgment is required as to whether and when a piece of work should be done and the best way of doing it, a mere flair for passing written examinations being of little avail. It seems to me that the method devised for awarding the Swann Diploma of the A.S.E.E. is likely to fulfil its declared purposes. It will incidentally provide an interest in the lives of many and will also indicate the value of knowing where to look for data instead of over-burdening the memory.

* * *

During the past few days I have had a chance to visit a number of domestic electrical appliance manufacturers to see how they are getting on with their transition from war to peace production. As might be expected, with war contracts still occupying an appreciable part of their attention, with the necessity for works to be completely reorganised, and with difficulties of securing suitable labour, progress in these initial stages is not spectacular. Still, I have seen in course of manufacture comparatively large numbers of cookers, irons, kettles, and fires of first-class quality, though not quite up to the pre-war standards in the matter of finish. Nickel-plating is, for example, being used for the time being instead of chromium. Probably 25 per cent. (or perhaps a little more) of the pre-war output is being achieved by manufacturers generally, but production will soon reach the stage when it will go up with a leap, especially as more labour (still the most serious shortage) becomes available. Even when output has attained its pre-war level apparatus is still likely to be scarce for some time to come in view of the accumulated needs of both home and overseas markets.

* * *

I hope that manufacturers in designing their new irons will continue to strive for better flexibles and connectors. Electric iron flex probably has far more violent use than that of any other appliance. Heavy rubber sheathing and ingenious clamps do not seem to get to the heart of the trouble. Perhaps the solution is to be found in the design of the flexible itself. I also express the hope that a radio interference suppressor will be incorporated in every thermostatically-controlled iron. Radio can be a great help to the housewife while she is ironing, but only if it is unaccompanied by crackles and crashes. The same might also be said about vacuum cleaners (and other appliances as well for that matter), but here the noise of the machine itself tends in any case to drown the radio.—**REFLECTOR.**

CORRESPONDENCE

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

Ineffective Earthing

YOUR recent report of a fatal accident caused by ineffective earthing of a conduit system raises again the old argument of "earth-free situations" and earthing. To my reasoning, there is no situation which can be said to be earth-free, since the probability of an electric shock causing a fatality depends on the physical condition of the victim.

The past few years have been catastrophic in respect of adherence to the I.E.E. Regulations for the Electrical Equipment of Buildings, the testing stipulated therein being made impossible by the lack of instruments and general degeneration of installation work. May we hope for a speedy return to better installations and a closer and more consistent regard for these Regulations now that the war is over?

Worcester Park. E. H. WHATTON.

Re-Employment of Civilians

YOUR correspondent Mr. Alex. Milne (September 21st) seems to be under a misapprehension in suggesting that the Ministry of Labour and National Service is penalising engineers over the age of 51 through operation of the Control of Engagement Order, 1945. This Order, which was promulgated after consultation with representatives of both sides of industry, prohibits the engagement of certain classes of workpeople between the ages of 18 and 51, except through an office of the Ministry of Labour, but it imposes no ban on the engagement direct by an employer of workpeople—including engineers—above the age of 51. The Press has adopted the practice of drawing the attention of readers to this restriction by a cautionary notice which in effect confines applications to the older men, and to men who are exempt from the provisions of the Order.

May I point out, however, that the Appointments Department of the Ministry of Labour is being continued as a peacetime service for employers and employees alike. Professional engineers and scientists are dealt with by the Ministry's Technical and Scientific Register, York House, Kingsway, W.C.2 (which is part of the Appointments Department) and this employment service is free and without restriction as to age or whether the candidate performed his war service in H.M. Forces or in a civilian capacity. Many hundreds of candidates are finding new jobs through the Register each month and employers continue to notify large numbers of vacancies. Far from penalising professional engineers, therefore, this Department is offering a service to engineers which did not exist before the war.

London, S.W.1 L. H. HORNSBY,
Director of Public Relations,
Ministry of Labour and National Service.

Calling-up of Skilled Men

AS works manager of one of the leading electrical repair specialists in the Midlands, I am utterly disgusted with the way the Ministry of Labour is ruthlessly dealing with the present labour question. If the committee responsible for calling up men for the Forces fully understood the labour position in this particular trade or asked for some advice from technical men who do, it would still obtain the number required, but not cripple what is definitely a trade with a prior claim to electrical men. The country is calling for reconstruction: in what condition is the electrical plant which has worked non-stop throughout the war? The amount of electrical repair work is now considerably greater than at any period during the war years.

The urgency arises from the following position: The first-class electrical repair man, whether fault locator, fitter, erector, armature winder or bench hand, is between the ages of 21 and 30 years. Not many engineers stay after these ages, as they move on to positions of responsibility either as foremen or managers for firms of similar type, or become maintenance engineers at industrial works. Consequently in the repair shops all talent is to be taken away without any consultation with the employers, because of the routine methods employed. While we are all as willing to co-operate now as we were during the years of war, we are certainly not getting anything like the consideration shown to us when all possible men were needed for the Forces.

The electrical repair man cannot be replaced by the ordinary electrician or wireman,

even if these were available to train. What we require is our own men back from the Forces before others are taken and then we can arrange accordingly. I am sure my views will receive support from every electrical repair specialist in the country.

Birmingham. A. B. THOMAS,
Works Manager,
Electrical Power Maintenance Service, Ltd.

Date or Temperature ?

REFERRING to Mr. Parsonage's letter in your issue of September 21st, the arrangements made for controlling the heating of the temporary head offices of the Yorkshire Electric Power Co., at Bramhope, near Leeds, may be of interest. The offices consist mainly of wooden huts, weather-boarded outside to ground level, match-boarded inside and underdrawn with beaver board to form ceilings. The heating installation consists in the main of " Unity " heating tubes controlled by thermostats in each hut and by a main switch at a central point.

When the need for fuel economy became urgent some years ago, the heating and cooling characteristics of typical huts of the two principal sizes in use were determined by thermographs and were used as the basis of a programme for switching on the heating supply at the central control point in the morning before the staff arrives and switching it off before the staff leaves in the evening. The degree of staggering between the heating hours and working hours is adjusted according to the reading of an outside thermometer. As a simple guide, the night watchman, who switches on in the morning, is provided with a diagram representing the maximum and minimum thermometer used for measuring outside temperature. The diagram is scaled not only in degrees, but also in times of switching on.

The huts are 600 ft. above o.d., but, even in the coldest weather, with many degrees of frost, the heating supply can always be cut off, without causing discomfort, at least a quarter of an hour before the staff leaves. We have had this simple basis of heating according to the temperature in use for three years and marked economies were made when it was initiated. The further smaller economies made successively in each year since have probably given even greater satisfaction to those responsible for the operation of the scheme because of its indication of a high degree of co-operation amongst all concerned.

Regarding the regulation of heating on a national basis according to temperature, it is difficult to see how this could be done; temperatures vary from place to place at a given time and from time to time at a given place. It would not be easy, therefore, to ensure that the national permission to heat, or the national instruction not to, was transmitted to the right people at the right times for action to be taken.

Bramhope, near Leeds. W. R. T. SKINNER,
General Manager,
Yorkshire Electric Power Co.

Registration of Contractors

ALTHOUGH I do not agree with the views expressed by Mr. A. H. Dykes in your issue of October 19th, I am glad to see the question of compulsory registration being raised once more. " Half a loaf is better than no bread " does not apply in this particular matter. The fact that a firm is on the Register does not in itself guarantee the clients good work and this also was adequately proved by the inspector's report at the last annual general meeting. That there are more unregistered firms carrying out electrical installation work is a point that has to be seriously considered as it indicates that voluntary registration can never achieve the good aims and objects intended.

Supply authorities will not confine their installation contracts to the registered and indeed with so many outside the Register, they cannot be expected to do so.

Mr. Dykes's observation regarding medical men is in my opinion, beside the point because conscientious contractors are not curing diseases in humans, but are endeavouring to prevent serious injury or even death by ensuring safe and satisfactory installations. Compulsion is a nasty and perhaps an undesirable word and we have had plenty of experience of it during the past few years but voluntary registration has been well tried and found wanting. Has anyone a satisfactory alternative to compulsory registration ?

Glasgow. ALEX. MILNE, A.M.I.E.E.

Gas Turbine Laboratory

Gifts totalling $500,000 have been made for establishing a gas turbine laboratory at the Massachusetts Institute of Technology. The equipment will include a supersonic wind tunnel and facilities for research on the elements of compressors, combustion devices, jets and gas turbines. Test facilities will also be provided.

PERSONAL and SOCIAL

News of Men and Women of the Industry

AS announced last week, **Mr. E. C. Willis** has been appointed general manager of the Bristol Corporation Electricity Department. He has had over twenty-six years' service in the Department and has been responsible during recent years, as secretary and sales manager, for sales administration, showrooms, publicity, etc. For the past sixteen years he has held an executive administrative position. Before that he was for nine years personal assistant to the late sales manager and secretary, secretary to the late Mr. Faraday Proctor, and later secretary to the Electricity Committee, while Mr. A. J. Newman was chief engineer and general manager.

Mr. E. C. Willis

Lieut.-Cmdr. H. E. Barrett, B.Sc. (Eng.), M.I.E.E., M.I.Mech.E., who becomes chief electrical engineer at Bristol, was assistant manager to Central London Electricity, Ltd., before joining the Royal Navy in 1939. Lieut.-Cmdr. Barrett, who is forty-two, was born at Skipton, Yorks. He was educated at Winchester and gained a London University external degree. After serving as pupil to the chief electrical engineer of the London & North Western Railway, he joined Merz & McLellan in 1924. From 1928 to 1932 he was with the British Thomson-Houston Co. and then joined the Westminster Electric Supply Corporation as commercial manager, being appointed assistant manager to the Central London Electricity, Ltd., in 1937. During the war he served in many ships and in August last he was appointed Engineer Officer (Destroyers), Plymouth.

Lieut.-Col. N. E. Kearley, I.E.M.E., A.M.I.E.E., commanding the Mechanisation Design Establishment (formerly Tank Development Board), Calcutta, has been released from military service and has resumed duty with the Ministry of Supply.

Mr. C. J. Pitt, managing director of Veritys, Ltd., completes fifty years' service with the company on November 9th and a lunch will be given in honour of the occasion and a presentation made to Mr. Pitt.

The employees of the Leigh Corporation Electricity Department on October 9th presented **Mr. J. B. Hudson** with an electric razor as a token of esteem on his retirement as borough electrical engineer and manager. Mr. T. S. Parkinson, the new engineer and manager, presided at the ceremony and was supported by Alderman V. Fairclough, chairman of the Electricity Committee. The presentation was made by Mr. R. Lawton, commercial assistant.

Mr. H. Peake has been appointed a director of the Yorkshire Electric Power Co.

Miss Caroline Haslett, C.B.E., is chairman of the " working party " appointed for the hosiery industry by the President of the Board of Trade. One of the members of the working party for the boot and shoe industry is **Mr. J. J. Gracie,** joint general manager of the G.E.C. Witton Works.

Dr. Percy Dunsheath, O.B.E., President of the I.E.E. and director and chief engineer of W. T. Henley's Telegraph Works Co., Ltd., has been appointed by the Admiralty to act as consultant and adviser to the Director of Electrical Engineering in connection with problems affecting electric cables.

Mr. D. R. Williams, B.Sc., M.I.E.E., deputy chief engineer to the Stretford and District Electricity Board, has been recommended for the appointment of borough electrical engineer of Grimsby, in succession to Mr. G. W. Parker who is retiring.

Brigadier Arthur Levesley, O.B.E., who has been appointed general manager of Edgar Allen & Co.'s. steel foundry and ancillary departments, had already served with the company until 1928 when he went to Hopkinsons, Ltd., becoming assistant to the managing director in 1935. He was a lieutenant-colonel in the Territorial Army when war was declared. He eventually became chief electrical and mechanical engineer in the R.E.M.E., being promoted to brigadier in 1943. Brigadier Levesley succeeds the late Mr. J. A. E. Wells.

Col. H. J. Wellingham, Press liaison officer of Cable & Wireless, Ltd., has been promoted manager of the company's London branches. This means that he will take charge of the central telegraph station, through which all telegrams to and from this country pass by landline between the four wireless stations and the cablehead in Cornwall. Col. Wellingham, who commences his new duties on December 1st, served with the R.E.M.E. in Tunisia and was seconded from the Army in 1944 to establish the new liaison post.

Over 200 members of the West of Scotland branch of the Association of Mining Electrical and Mechanical Engineers were recently entertained by Anderson, Boyes & Co., Ltd., at the company's Flemington Electrical Works, Motherwell. Mr. James Anderson, joint managing director, welcomed the guests and

apologised for the absence of his father, who was the Association's first president. After a tour of the works Mr. Anderson was thanked for his hospitality by Mr. C. S. Buyers, president of the West of Scotland branch, and Mr. Allan, president of the Ayrshire Sub-branch.

Mr. J. Woodhouse, chief clerk in the South Shields Electricity Department, has retired after forty-six years with the undertaking.

Mr. R. W. McOwen, Keswick, has been appointed assistant mains engineer in the Stockton Corporation electricity undertaking.

Lieutenant D. H. Leage, 2nd Battalion East Surrey Regiment, who before the war was London sales engineer to Wild-Barfield Electric Furnaces, Ltd., has now returned to this country after being a prisoner of war in Siam.

Mr. P. S. Grant, A.M.I.E.E., chairman of the I.E.E. Devon and Cornwall Sub-Centre, has since 1937 been engineer and manager of the Teignmouth Electric Lighting Co., Ltd., and the Dawlish Electric Light & Power Co., Ltd. Born in London in 1904 he went to Blundell's School and the City & Guilds Engineering College, South Kensington. After a year with the Metropolitan-Vickers Electrical Co., Ltd., he joined the Minehead Electricity Supply Co., Ltd., as assistant engineer and manager in 1929, taking up a similar appointment with the Bideford & District Electric Co., Ltd., a year later. From 1931 to 1937 he served as district engineer and manager to the Wellington District Electricity Co., Ltd.

Mr. P. S. Grant

In this issue York Corporation is advertising for a successor to **Mr. E. J. Nichols,** the city electrical engineer, who is to retire on reaching the age of sixty-five next February. Tunbridge Wells Corporation is inviting applications for the position of borough electrical engineer; **Mr. R. N. Torpy** reached the retiring age early in the war but his services were retained. In both cases the salary offered is in accordance with the National Joint Committee's scale. A deputy borough electrical engineer and manager is required at Willesden.

A victory dinner, dance and cabaret was recently arranged by the Welfare Society of Birkbys, Ltd., in the company's spacious canteen. After dinner, the evening was devoted to dancing to the music of "The Eloites," the company's own dance orchestra. After the loyal toast, the president, Mr. A. T. Birkby, reviewed the Society's history from its inception, and spoke of many additional services it was proposed to introduce. The toast of "The Directors" was proposed by Mr. T. Whitehead, chairman of the Society, and responded to by Mr. A. T. Birkby. Mr. C. R. Williams proposed "The Welfare Society," and Mr. C. E. Davies, personnel manager, replied. Mr. A. T. Birkby then presented challenge shields to the captains of the winning cricket, and bowls teams, and made special presentations to Miss B. Scholes, and Mr. F. Waller in appreciation of long and loyal service.

St. Marylebone Electricity Committee recommends the retention of the services of **Mr. F. Selley,** chief electrical engineer, for another year.

Mr. W. S. Morrison, M.P., has been appointed a director of the Northmet Power Co., the North Metropolitan Power Station Co., Ltd., and the Bishop's Stortford, Epping & District Gas Co.

Major H. J. W. Bullard (R.E.M.E.), A.M.I.E.E., of the Engineer's Department, Middlesex County Council, has been awarded the M.B.E. in recognition of gallant and distinguished service in N.W. Europe. Major Bullard expects to be demobilised soon, and will be returning to the Middlesex County Engineer's Department.

Mr. P. E. Warden has been appointed manager of the Rugby drawing offices of the B.T.H. Co., Ltd., on the retirement of **Mr. W. Jones,** who held the position for twenty-three years. Mr. Warden has been with the company for forty-three years, having joined as an apprentice in 1902. After a comprehensive engineering training he was transferred to the drawing office in 1908, and was appointed personal assistant to the manager of the drawing office in 1939.

Obituary

Mr. Harry England, whose death occurred last week at the age of seventy-five, was a director of the Lancashire United Transport & Power Co., Ltd., and the South Lancashire Transport Co.

Mr. E. J. Ireland, who died recently after a brief illness, had been in the service of Holophane, Ltd., for many years and was recently appointed manager of the company's street lighting department.

Mrs. N. H. McGuffie.—We regret to hear that Mrs. Nellie H. McGuffie, the wife of Mr. H. A. McGuffie, M.I.E.E. (Stevenson & McGuffie, consultants, Glasgow) died suddenly on October 16th.

Mr. E. J. Edwards, supervisor of the Portland Dockyard power station until his retirement in 1939, has died at the age of sixty-eight.

Sir Connop Guthrie, Bt., who died in London recently, was a director of A.C. Cossor, Ltd.

Will.—The late **Sir William G. Max-Muller,** chairman of the Bagdad Light & Power Co., left estate valued at £24,026 (£23,936 net personalty).

The Swann Diploma

Examination Arrangements

IN view of the ever-growing need for first-rate practical engineers for electrical installation and maintenance work and the difficulty experienced by non-technical employers in assessing the qualifications and status these should possess, the Association of Supervising Electrical Engineers has launched a scheme for certifying technical competence by means of a diploma. This diploma owes its inception to Mr. H. W. Swann (Senior Electrical Inspector, Factory Department) who preceded Mr. E. R. Wilkinson as president. Professor R. O. Kapp is to act as chief examiner.

The examination takes into account that the entrants must be men of over twenty-four years of age who, although not holding the higher professional qualifications, should, nevertheless, be well versed in electro-technology. The procedure is designed to test their capacity to explain the financial and other requirements of their work to, say, managing directors of non-electrical industrial concerns and also to pass on to subordinates the correct methods of coping with practical problems. Entry is not restricted to members of the Association.

Written and Oral Tests

An unusual feature of the examination, which is of the twofold written and oral kind, is that the written work can be done in the applicant's own time (in about nine hours) with access to any books of reference he chooses, though guidance is given to selection. The aim is to enable candidates to prove their ability to express ideas clearly and logically, to marshal facts and present a case. In the first oral test a candidate will be cross-examined on his written answers in order to ascertain his real knowledge, *e.g.*, differentiating ignorance from carelessness. This with the written answers constitutes Part 1, from which exemption can be claimed by the holding of certain qualifications.

Part 2, entirely oral, is divided into three sections covering such matters as the giving of instructions in stated circumstances, estimating loads, choice of tariffs, the amount and grades of labour required, knowledge (rather than memory) of regulations and their specific applications and broad questions intended to indicate the possession of initiative in organising, planning and control (with the exercise of tact) at the higher levels required for earning credits and honours to be marked on the diplomas.

The oral tests (Part 1b and 2a, b and c) will take about one hour in all. They will be conducted by an examiner drawn from a panel of eminent engineers advised by two members of the A.S.E.E., one experienced in installation and the other in maintenance work.

The examination fee will be £5 5s. Candidates who pass in Part 1 only will be permitted to take Part 2 again within two years on payment of a supplementary fee of £3 3s. They should state on the application form (obtainable with full particulars from the general secretary, Mr. A. Brammer, 54, Station Road, New Barnet, Herts) whether they wish to be examined in installation or maintenance work or both and may select optional questions accordingly.

Manchester Proposals

District Heating : Appliance Control

NOTICE has been given by the Manchester City Council of its intention to hold a meeting on October 31st for the purpose of considering resolutions upon matters which it is proposed to include in a Bill to be promoted during the present session of Parliament.

Among the proposals to be put forward is that the Corporation shall be empowered (*a*) to supply hot water from generating stations for the heating of buildings; (*b*) to provide heating by means of hot water to premises in the Wythenshawe Ward of the city; (*c*) to prescribe areas in the city in which the emission of smoke shall be prohibited; (*d*) to prohibit the installation in houses of domestic appliances which cannot be used without producing smoke; and (*e*) to maintain and use trolley vehicles on two routes upon which the Corporation has been authorised to use them by the Manchester Corporation (Trolley Vehicles) Orders 1941 and 1943, and along a new route wholly within the urban district of Droylsden.

British Radio Research

Lecture in Paris

ON October 19th, Sir Edward Appleton, Secretary of the Department of Scientific and Industrial Research and President of the International Scientific Radio Union, gave a lecture before the French Society of Radio Electricians at the Sorbonne, Paris, his subject being "Recent Radio Research in Great Britain." The Society has been suppressed for five years during which time its members have played a prominent part in the French resistance movement. Three of them have been shot by the Germans, and there is still no news of many others, including Professor H. Abraham, president of the Society in 1940, who was arrested and deported to Germany.

In his address Sir Edward Appleton emphasised the world-wide extent of the laboratory of the radio-physicist and the importance of international co-operation in the study of radio problems and particularly the effect of the upper atmosphere on radio communications. Anglo-French co-operation, he said, now so happily resumed, was an essential part of liaison in the wider field.

An Educational Centenary

Imperial College's Celebrations at South Kensington

READERS who remember the establishment at South Kensington of what is now known as the Imperial College of Science and Technology may be surprised to learn that its centenary is being celebrated this week. The explanation is that the present "school" came into being by the fusion of three constituents (the Royal College of Science, the Royal School of Mines and the City and Guilds College) which, in turn, were related to still older foundations from which the Imperial College accordingly claims descent.

The history is a tangled one of divergent aims, revealed by constant changes of names, those they now bear not being assumed until 1907 when a Royal Charter of incorporation federated the three neighbours into a single college (unique in the English educational system) as a "school" of the University of London. The "alliance" concluded last year with the Massachusetts Institute of Technology, with facilities for the regular interchange of staff and post-graduate students between London and the United States, recognises the community of aim and endeavour in advanced specialised instruction and research.

Prince Albert's Foresight

The centenary which actually occurs this year is that of the oldest of the three constituent foundations, originally the "Davy College of Practical Chemistry," whose first president (the Prince Consort) foresaw a century ago the need, which recent events have so forcibly emphasised, for technologically trained men capable of industrial design. The "Great Exhibition" of 1851 was his conception and it was his foresight that caused the profits thereof to be invested in land at South Kensington to be a "locality" reserved for "central institutions" concerned "to increase the means of industrial education and extend the influence of science and art upon productive industry".

Royal patronage has continued ever since and so it was that last evening the King and Queen attended the centenary celebration ceremony in the Royal Albert Hall. To-day (Friday) and to-morrow the several college buildings are open to inspection with departmental exhibits and demonstrations arranged to show normal activities in undergraduate teaching and the prosecution of research. It is the intention to increase residential accommodation and develop a corporate life more comparable with what is enjoyed at the older universities.

Apart from the electro-chemical and physics laboratories of the College of Science and the electrical instruction afforded in the School of Mines, electrical engineering tuition at the City and Guilds College (under Professor C. L. Fortescue, now in his twenty-fourth session) begins with the study of electrical measurements, common to all electrical students, the less advanced parts being taken by all the engineering students. In the more advanced work electrical students have a choice (the alternative to electrical machinery being telecommunications, including radio and higher-frequency work) although the elementary parts are taken by all engineering students.

Wide Scope of Research

Catholicity of outlook is evident in the records of both past and current research. Apart from the achievements of Ayrton, Jones, Mather and Duddell, the electron-diffraction methods (Professor Finch) of studying surfaces have become well-known while the first electron microscope to be built in Great Britain was designed and tested by members of the Optics Section.

More recently much research has been undertaken into electrical measurement at frequencies above a million cycles per second. Work for numerous Government Departments included the development of "Fido" fog dispersal equipment, for aerodromes, involving petrol-valve actuation, remote ignition, pilot-lamp signalling and automatic control from a distance by electrical means.

Early in 1939 Professor Sir George Thomson initiated investigations into probable means of releasing atomic energy (a ton of uranium oxide was lent to the laboratory by the Air Ministry) which yielded results very similar to those obtained independently and somewhat earlier by Dr. Halban working under Professor Joliot in Paris. The search then was for a possible fresh source of power, without military significance, but a committee formed in April, 1941, under Sir George's chairmanship was instructed to re-examine the whole subject and co-ordinate work then in progress. Its report, made in July, 1941, recommended the prosecution of the project on a large scale.

Royal Institution Lectures

THE Royal Institution's programme of lectures before Christmas includes a course of four marking the fiftieth anniversary of the discovery of X-rays. The lectures will be given on four Tuesdays in November by Dr. A. Müller and Dr. Kathleen Lonsdale. A number of topical subjects such as "Operation Pluto," lessons of the war for scientists, the aircraft gas engine, and the utilisation of nuclear energy have been chosen for the Friday Evening Discourses commencing on November 2nd.

Plugs and Sockets

E.C.A. Case Against Up-rating

AMPLIFICATION of the views already put forward against the proposed "up-rating" of the existing standard plug and socket (B.S. 546) comes from the Electrical Contractors' Association. It is said that many of the standard sockets installed in the earlier days were not sufficiently close enough to the specification to permit the use of standard plugs of other makes without becoming too hot. Moreover they often embody 5-A switches which could not be up-rated.

The Association claims that only the installers of plugs and sockets—contractors, supply authorities and Government Departments—can have full knowledge of the considerations involved and these are overwhelmingly in favour of a new design with a fuse in the plug, not in the socket as proposed by the B.S.I. The I.E.E. Wiring Rules Committee, it is said, has had no voice in the decision although intimately concerned with the matter.

It is contended that with a fused plug many portable appliances would either have to be equipped with heavier and more expensive flexibles or their present flexibles would have to be "up-rated," which is undesirable. On the other hand the rating of a fuse in the plug could be related in a more reasonable degree to the rating of the cord and appliance. While on a 230-V circuit the up-rated design would perhaps be good enough to carry 13A, on lower voltages it is probable that there would be serious overheating. The conclusion is arrived at that what is needed is a new 10-A design for most appliances; those 15-A appliances which remain in use should be served by the present 15-A socket-outlets.

The Association says that excellent new designs with fused plugs are available and in use. It is unlikely that users will abandon them for the up-rated design which, it is alleged, contravenes the Wiring Regulations. Finally it is maintained that manufacturers will save nothing by up-rating as regards costs of tools because the socket must be re-designed to contain the fuse and to accommodate more and larger circuit wires, and the plug must be re-designed to receive larger cords.

County Company Changes

TO meet post-war developments the County of London Electric Supply Co., Ltd., and its associated companies are reconstructing their administrative organisation. The group is the largest of its kind in the country; its capital expenditure has amounted to about £50 million and it owns seven generating stations. As a part of the immediate post-war plans the erection of two additional stations is contemplated; the capital expenditure upon these will be about £28 million and contracts have already been placed to the value of £11 million.

Under the reorganisation plans, Mr. W. J. H. Wood and Sir John Dalton, directors of the County Company, become joint general managers and with Mr. T. A. Pond, who was recently elected to the board, will devote their special knowledge and wide experience to the business of the group. Mr. J. M. Graham has been appointed secretary to the companies of the group.

Local administration is to be based on a regional, in place of the existing area, basis. Each region will embrace a number of areas and will be under the management of a highly-qualified engineer-manager. The overall management and co-ordination of the regions, generating stations and transmission systems will be in the hands of Mr. F. C. Fenton and Mr. F. M. Sayers, who have been appointed joint managers, and Mr. D. Gray, the chief accountant of the County Co.

The complex technical problems arising out of the heavy programme of engineering works and the expenditure involved in the post-war plans will be dealt with by an Engineering Panel under the chairmanship of Mr. W. J. H. Wood; the members will be Mr. H. C. Wells, technical adviser (transmission), Mr. J. A. Vice, technical adviser (generation) and Mr. F. M. Sayers.

E.D.A.'s Interim Report

THE principal activities of the British Electrical Development Association during the first half of this year are reviewed in an interim report by the general manager and secretary (Mr. V. W. Dale). This shows that six new members have been enrolled:—The Huddersfield, Loughborough and Macclesfield Corporations, the Felixstowe U.D.C., the West Gloucestershire Power Co. and the Brixham Gas & Electricity Co. The subscription for the year has been fixed, in principle, at the full normal scale.

The Executive, Accounts and Campaigns, and Publicity Advisory Committees have been replaced by a General Purposes and Publicity Committee and a Finance Committee. Committees on special subjects which are meeting regularly include those dealing with cooking (general and technical), the Building Centre Electrical Section, street lighting and rural electrification. A small committee has been set up for the purpose of keeping under review the possibility of securing central headquarters for the Association and for other electrical organisations interested in the scheme.

Frequent discussions have taken place with authorities responsible for housing (both temporary and permanent) with a view to ensuring adequate wiring and electrical equipment. A film on the subject will shortly be available and two other films are in course of production. The Association has supported a number of exhibitions relating to post-war homes. The Association is represented on the House Building Committee of the National Federation of Registered House Builders and has

contributed £250 towards the cost of a campaign in connection with post-war housing on condition that the builders concerned could be approached directly on the subject of electrical service and apparatus.

The electrical display at the Building Centre has been maintained and an offer of increased accommodation there is being considered. It is hoped to have an attractive display at the Scottish Building Centre, Glasgow, in the near future.

Investigations into the electrical equipment of established domestic science training colleges have been continued and it is hoped that at least one training college will be equipped and serve as a prototype in the near future. A contribution has been made towards the cost of electrically equipping a national training school for hotel and restaurant cooks.

In collaboration with the E.A.W., consideration is being given to the employment of women in the electrical industry, the numbers required and the qualifications necessary, having regard to the experience and training acquired by girls in the Forces.

Other subjects referred to in the report include cooker hire, purchase tax, electric vehicles, window displays, public lighting, tariffs, lectures and demonstrations, and the work of the Area Committees.

House-Service Units

E.D.A. Three-Chamber Design

FOR the intake, metering and control of 250-V AC supplies to small houses through single meters, the British Electrical Development Association has developed a three-chamber design of standard house-service unit, which can, however, be recessed.

The first chamber, for the supply-intake, contains a 60-A high-rupturing-capacity plain-cap cartridge fuse to B.S. 88 and an insulated meter-connecting block; brass terminals take 0·04 sq. in. conductors; external dimensions are 6¼ by 6¼ by 4 in. deep. In the second or main-switch chamber, of the same dimensions, is a 60-A double-pole switch with terminals for 0·04 sq. in. conductors; where an earth-leakage circuit-breaker is used, the unit is all-insulated in conformity with B.S. 842 and dimensionally interchangeable with the main switch; a shield plate of insulating material, protecting all connections when the cover of the chamber is open but permitting operation of the switch handle, is secured by means of a couple of screws suitable for sealing.

The circuit-fuse chamber, which is 4 in. higher than the others, contains: A nine-way brass earthing connector with clamping terminals for 14 s.w.g. (minimum) earthing conductor; a similar neutral connector but having one way suitable for a 0·04 sq. in. conductor, the other terminals being designed to accept 7/·044 cables with screws long enough to secure 3/·029 cables; a bus-bar not less than 0·04 sq in. and one main terminal for a 0·04 sq. in. conductor; six sets of fuse-base contacts with provision for two more, all suitable for 7/·044 cable with two clamping screws long enough to secure 3/·029 cable; two 5-A and four 30-A fuse carriers with plain-capped h.r.c. fuse cartridges removable without special tool, the smaller fuses (coloured white) being non-interchangeable with the larger (coloured red); a shield plate for covering connections but permitting insertion of carriers when the chamber cover is open and carrying clips for two spare cartridges of each size.

The standard unit with sunk wiring and back connection box.

Left: Covers open with shields removed from switch and circuit-fuse holder

The design of unit as submitted by a national conference (Mr. F. Newey, chairman) was approved by the E.D.A. Council. The technical committee (Mr. R. H. Harral, chairman), which had been appointed by the conference to define fixing centres, will remain in being to consider possible improvements with a view to the production of the unit in plastics and also its adaptation to blocks of flats.

Domestic Water Heating

Present Conditions and Some Practical Recommendations

By Gordon V. Radford

DURING the past twelve months there has been an abnormal demand from domestic consumers for electric water heating, largely because of the restrictions imposed on supplies of solid fuels. Of course, in many instances the substitution of electricity for coal for this purpose results in an actual economy of fuel. This demand is quite distinct from requirements for new houses.

This sudden interest in electric water heating is a good sign, although it comes at a time when the manufacturers' output is very much restricted, and when the supply undertakings are short of equipment and staff.

In the past when an engineer surveyed a consumer's "solid" fuel installation and was confronted with a system which did not lend itself to conversion, in the interest of both the consumer and the supply authority he told the consumer and his observations were generally accepted. In present circumstances this engineer-representative often finds himself in the position of being persuaded by the consumer to carry out the conversion against his better judgment.

Consumers More Than Satisfied

During my twelve years' experience of this most interesting subject I have found that when a good scheme has been put forward and installed the consumer is something more than satisfied, he is often enthusiastic, and brings in further business.

If the tariff offered for thermostatically-controlled water heating exceeds ½d. per kWh, the engineer-representative cannot afford to take chances by converting installations with excessive pipe runs, and numerous secondary circulations which cannot easily be eliminated. It may, of course, be possible in such cases to sectionalise the system, and use thermal storage type heaters with advantage, but each case must be taken on its merits.

It is surprising to find on occasion an immersion heater, fitted with thermostatic control and intended for automatic or semi-automatic operation, with the cylinder containing the heater element left without any attempt at lagging. Good lagging is essential to ensure the best possible thermal efficiency, and together with accurate setting of the thermostat (so as not to maintain an unnecessarily high temperature), ensures most economical operation. Consumers sometimes argue that effective lagging would render the linen cupboard useless for clothes airing purposes, but even with the tank or cylinder lagged sufficient radiation takes place for clothes airing. The exception is the large airing cupboard. Here again the lagging should be effective, and if necessary, a small tubular heater can be installed for airing purposes.

Having regard to economy of operation, and particularly when radiation losses are inclined to be high, a time switch in addition to the normal thermostatic control can be incorporated with advantage.

Thermal Storage Heaters

Even where a particular tank or cylinder, forming an integral part of a boiler system, has been effectively lagged, it is unlikely that the thermal efficiency will approach that of a thermal storage heater. But it is, of course, not always practical to use one of these. When it is decided to use a thermal storage heater it is important that it should be of the correct type and capacity; many otherwise good installations have been marred by the use of unsuitable heaters.

Having decided on the type of heater, it is essential that it is fixed in such a position that maintenance work can be easily carried out. It should be possible to take out the element assembly plate without removing the heater from its fixings. In the case of pressure type heaters provision should be made for "draining down." In this connection, manufacturers could improve "drain off" arrangements especially in the large capacity models, by fitting a suitable cock, so that the flow of water being discharged could be controlled, instead of an ordinary plug. These heaters are often situated above ground floor levels and flooding when draining down before "de-furring" can prove very costly.

A number of supply undertakings provide local control switches for each storage water heater, but I think that such switches are unnecessary, particularly in the case of

non-pressure type heaters; users are apt to switch on and off, and unfairly condemn a perfectly good storage heater, because it does not perform as an instantaneous heater. Thermal storage heaters, being designed for automatic operation, should be controlled by their thermostats.

Many supply undertakings have one or more specially trained engineers to handle water-heating development, supervision and maintenance, and it is to be hoped that all undertakings will consider selecting a suitable specialist for this purpose. If the selected engineer is not already fully conversant with the subject, facilities for adequate training should be offered; in this connection manufacturers are usually willing to offer some assistance. It is not merely enough for these engineers to know the electrical equipment and its application; they should also have a good knowledge of other systems, particularly those of the "solid fuel" type. Such knowledge will enable the specialist to recommend alterations and modifications to existing pipe systems where necessary, in order to ensure that the highest efficiency is obtained when the electrical equipment is installed.

South African Notes

By our Cape Town Correspondent

Electricity Supply Prospects

As soon as the South African electricity supply industry can obtain the bulk of the equipment and machinery it requires from British manufacturers it is likely to enjoy a long period of steady expansion. The consumption of electricity in South Africa per head (excluding the large native population) is claimed to be already greater than in either Great Britain or the United States and the average price per kWh to be lower. As in this country, there is still a difference of opinion over the question of contributions from undertakings' revenues for relief of rates. In some cases the funds have been drawn on heavily during the war.

Imports of Electrical Goods

Manufacturers' representatives in South Africa complain that they could import considerable quantities of electrical goods if only the authorities in South Africa would issue the necessary permits to do so. In reply Government officials state that official advice had been received some months ago from overseas countries that the manufacture of such electrical appliances as irons, kettles and hot-plates was being resumed on a relatively small scale, and in the light of this the Union was requested to keep orders down to a reasonable level. Import certificates had accordingly been issued to importers for relatively small quantities, but any importer who could establish that greater quantities were available would receive a further certificate.

Earthing Arrangements

At the recent convention of the Association of Municipal Electricity Undertakings the view was expressed that asbestos piping was not likely to replace steel piping for water mains to any great extent. Where asbestos piping was used, however, it was agreed that the town engineer should notify the electrical engineer whose responsibility it would then be to adopt whatever earthing system he preferred. The Association's Safety Precautions Committee is considering several communications regarding the Standard Wiring Regulations. A number of modifications have been suggested, the one which has aroused the most discussion relating to the earthing of radio sets.

Each year sees an increase in the number of magisterial districts in South Africa where the Standard Wiring Regulations apply and where unregistered wiremen may no longer operate without conforming to them. The Regulations now apply in all the large urban areas, but in some towns there have been temporary difficulties due to the limited number of registered wiremen available.

Improving the Telephone Service

It is estimated that the Post Office will have to spend at least £2,500,000 every year until 1951 if it is to meet applications for telephone service. To-day about 40,000 persons are waiting for a service of one kind or another. The telephone trunk system is very heavily congested and there are delays all over the country of from 30 minutes to four hours. It is expected, however, that there will be a good long-distance system by the middle of 1946. Carrier equipment, which will greatly increase the present number of circuits between all the main centres, is being awaited.

Tobacco Curing

The Tobacco Board in Southern Rhodesia is co-operating in an experiment in the curing of Virginian tobacco by electricity. The Salisbury City Council is to provide a two-unit electrically controlled and operated tobacco barn for these experiments. A slightly higher average cost per pound of curing by electricity than by wood or coal would be offset by the considerable saving in labour.

COMMERCE and INDUSTRY

A Million Radio Receivers. E.I.B.A.'s Report.

Discussion on Electricity's Future

IN the House of Commons on October 16th Mr. Hobson asked the Minister of Fuel and Power what consultations had taken place between the Incorporated Municipal Electrical Association and the Association of Electric Power Companies on the future of electricity supply since July, 1945. Mr. Shinwell replied that neither of those Associations had communicated with his Ministry since July, 1945, on the future of the electricity supply industry.

Contract Price Adjustment Formulæ

The latest figures for the B.E.A.M.A. contract price adjustment figures are as follows:—(*a*) Rate of pay for adult male labour at October 13th, 95s.; (*b*) Costs of material: the index figure for intermediate products last published by the Board of Trade on October 13th is 182·5 and is the figure for the month of September. Both figures are the same as for the two previous months.

The "Batatron"

Last week the American General Electric Co. exhibited to scientists and journalists its "Batatron" which is said to be capable of producing an electron stream at up to 100 million volts. The apparatus weighs about 130 tons and penetration of 12 in. of the toughest armour plate is claimed. The "Batatron," it is considered, will be of great value in future atomic research.

Radio Set Production

About seventy radio manufacturers have been granted licences by the Board of Trade for the production of about a million receiving sets during the next year of which 400,000 will be for export. About half of the home pro-production will consist of the lower-priced range.

"Power Laundry"

It is announced that the Associated Iliffe Press, Ltd., has bought the fortnightly journal *Power Laundry* from the Hulton Press, Ltd., and as from November 3rd the journal will be published by the Trader Publishing Co., Ltd., one of the Iliffe subsidiaries. The members of the staff are to continue in their present positions. *Power Laundry* is the leading journal devoted to the laundry, dyeing and cleaning industries; it was established in 1903.

Purchase Tax on Car Lamps

To surmount difficulties encountered by retailers in passing on the purchase tax to purchasers of automobile and cycle dynamo lamps, the Electric Lamp Manufacturers' Association has arranged with the Central Price Regulation Committee that the tax chargeable to the public may be passed on in round pence per lamp in accordance with a schedule which has been issued. The amount ranges from 1½d., when the list price is from 5d. to 9d., up to 1s. when the price is from 4s. 6d. to 5s. The tax charged to retailers will continue on the basis of 22 per cent. of the total list value of the invoice. The tax must be passed on in full when lamps are sold to trade users entitled to discount.

A Continental "Radiator"

It is often suggested that British manufacturers should not make some of their equipment so substantial. If they follow this suggestion it is to be hoped that they will not go so far in the opposite direction as the makers of the appliance which we illustrate. This was recently taken to the Birmingham Electric Supply Department's showrooms for repair. Mr. R. H. Rawll, sales and development engineer, who has sent us the photographs, says that he understands that this "radiator" was recently acquired in Holland. The frame is constructed entirely of wood, with a mesh wire protective grid, and the reflector is of *papier mâché* covered with aluminium foil. The price, in present Continental currency, is believed to have been 100 cigarettes.

This strangely-constructed "radiator" was bought in Holland

E.I.B.A. Year Book

The sympathetic methods adopted by the Electrical Industries Benevolent Association in carrying out its valuable work are again illustrated by a number of cases quoted in the Association's Year Book for 1945. A list is given of many substantial contributions to the funds during 1944; it is noteworthy that the Irish Electricity Supply Board is among these benefactors. Special reference is made to the collection scheme organised among its members by the Electrical Wholesalers' Federation. The accounts for 1944 included in the Year

Book show a total income of £21,335, as compared with £21,527 in the preceding year; a surplus of £6,299 (against £7,162) is carried to the balance sheet. Investments at cost are given as £94,412, as compared with £81,412 a year previously. Copies of the Year Book are obtainable from the secretary at 32, Old Burlington Street, W.1.

E.I.B.A. Ball Fully Booked

The Electrical Industries Benevolent Association announces that all tickets for its ball on November 9th have been sold and very much regrets any disappointment this has caused to those who applied too late for tickets. As the large hall at Grosvenor House is still under requisition, this year's event is having to be held in the ballroom, which will not accommodate such a large number, but the Association hopes that next year it will be able to have the larger room.

Australian Electrical Imports

The Australian Government has issued in summarised form statistics of the values of the imports into the Commonwealth of electrical goods in 1943-44 and 1944-45 (year ending June). These are given below. Civil imports

Class	1943-44		1944-45	
	Civil £stg. 000	Total £stg. 000	Civil £stg. 000	Total £stg. 000
Batteries and accumulators	30	86	34	202
Cable and wire, covered	423	1,015	385	662
Dynamo-electric machines	303	478	251	778
Lamps, filament	77	84	93	108
Telegraph and telephone switchboards	443	705	310	1,380
Other electrical machinery and appliances	734	2,483	741	3,316

exclude all goods admitted free for the use of the Government under tariff item 370.

Solder in the War Effort

Multicore Solders, Ltd., claim to have produced 77,683 miles of "Ersin" multicore solder for the radio, electrical and telephone industries during the war, representing well over 20 million joints. One important development was a self-soldering sleeve produced in conjunction with Bryant & May, Ltd. These contained solder and a coating of igniting material so that when the sleeve was struck on the edge of the box in which they were packed the resultant flame heated the tube, solder and cable to over 375 deg. C. Another speciality was lead-free solder for use in the manufacture of electrically-detonated explosives.

Radar in Production

Since early in 1941, when the Radio Gramophone Development Co., Ltd., was "dispersed" to Bridgnorth as a result of enemy action on its factory in Birmingham, it has been very closely associated with the Ministries and with T.R.E., Malvern, and has done its share in the development and manufacture of radar equipment. Its first major contract was for the development and supply of Air Ministry Trainer Type 21, used for training R.A.F. personnel in the use of radar equipment. The company was also concerned in the manufacture of associated gear for "Oboe" installations in I.F.F. equipment, and numerous anti-radar devices for use in aircraft.

Northampton Electrical Association

Mr. O. D. Robinson, A.M.I.E.E., read a paper on "The Telephone Instrument" to the Northampton and District Electrical Association on October 10th. The development of the present type from the earliest form was explained and well illustrated by lantern slides, and the lecturer gave a most interesting account of the way in which technical difficulties were surmounted. A discussion followed on points arising from the paper.

German Inventions

The Government has decided that inventions made in Germany since September 3rd, 1938, shall not be allowed to form the basis of valid applications for the grant of patents, or for registration of designs in the United Kingdom, and accordingly such applications will not be accepted by the Comptroller of the Patent Office. Any rights lawfully acquired by non-enemies before September 3rd, 1939, in inventions for which protection was applied for in Germany in the twelve months preceding that date will be safeguarded.

Small Commutator Motors

In his article on "Three-Phase Commutator Motors" in the *Electrical Review* of October 5th, Mr. K. C. Howison suggested "as a possible development the production of a range below 3 HP." Mr. C. A. Hall, manager, industrial motor sales, of the British Thomson-Houston Co., Ltd., points out that his company has been successfully making stator-fed commutator motors down to 1 HP for many years past.

Waste Paper Salvage

Although the special wartime need for waste paper no longer operates, it is still true that British industry is very dependent upon cardboard and other packing materials which are produced from waste paper. Plaster-board and wall-board which are much used in building are also derived from this source. Without the urge of war it is inevitable that the collection of waste paper should have fallen off but those who have been responsible for salvage should remember that their work is still very necessary.

Stage Lighting

In his lecture on "The Poetry of Light" at the College Theatre, Coventry, on October 16th (to which reference was made in our issue of October 12th) Mr. R. Gillespie Williams gave the first public demonstration of the new "Delicolour" stage lighting control unit. This does away with the need for changing the colours of gelatine slides used in footlights and battens.

Each unit has a colour selection dial upon which the colour desired is pre-selected. The colour change may be effected instantaneously or a slow change-over may be made. The whole range of gelatine colours may be pre-selected on the dial and there are also other shades of colour named on the dial. Each unit

is provided with calibrated individual colour control handles, so that any change may be made to a basic gelatine colour that has been pre-selected. This enables a producer to select any desired shade of colour to meet every possible condition of lighting required.

The units may be operated individually or arranged for group control. One type designed particularly for touring companies is hand operated and mounted on a trolley; electrically operated types are available for permanent installation. The lecturer was introduced by Mr. F. W. Godden, city electrical engineer, Coventry. Lee Beesley & Co., Ltd., were responsible for the arrangements.

E.W.F. List of Members

The Electrical Wholesalers Federation states that due to the unprecedented demand for the 1945 edition of the "List of Members" the original supply was exhausted. A further quantity has now been printed.

Flameproof Gear

At this month's meeting of the Coventry Electric Club, Mr. R. Court lectured on "Flameproof Gear and Installation." In his discourse the speaker dealt with particulars of design of conduit fittings and their installation, general switchgear and control apparatus, motors, generators, lighting fittings, mentioning also the special requirements for gear to be used underground in mines. A description of the various tests carried out by the Ministry of Fuel and Power testing branch at Buxton was followed by comments on some of the hazards in industrial installations and covered industries connected with petroleum and cellulose products. The danger of ether in hospitals and situations where dust laden atmospheres existed were mentioned. Stress was placed upon the necessity for proper maintenance and efficient earthing.

Trade Announcements

As from October 27th the sales department of Measuring Instruments (Pullin), Ltd., will operate from the offices of the parent company, R. B. Pullin & Co., Ltd., Phœnix Works, Great West Road, Brentford, Middlesex (telephone: Ealing 0011).

Erskine, Heap & Co., Ltd., have appointed Mr. S. C. Middleton, Suffolk House, Suffolk Street, Birmingham, 1 (telephone: Midland 5150) as their representative for the Midlands area.

The Ransome & Marles Bearing Co., Ltd., have appointed Mr. A. P. Gibbs north-western area manager with offices at 5, John Dalton Street, Manchester, 2 (telephone: Deansgate 3834-5). He will be assisted by Messrs. E. H. Holmes and Mr. J. Beaumont.

Thermolectrics, Ltd., has acquired new premises and will shortly be moving from its wartime address at Wimbledon to Chapel Works, Church Street, Hampton-on-Thames. The London office of the company will be at Southampton House, 317, High Holborn, W.C.1.

During the war the Victoria Instrument Co., Ltd., maintained its principal factory at Willesden but it also had a number of smaller assembly plants in less vulnerable areas, including Bournemouth. In view of the better conditions in this town it was decided that the establishment there should be extended and made the main works. Arrangements have now been completed and in future all the manufacturing processes of the company will be carried out at Bournemouth. The sales administration offices (to which all communications should be sent) remain at Midland Terrace, Victoria Road, N.W.10.

The British Aluminium Co., Ltd. (temporary head office, Salisbury House, London Wall, London, E.C.2) announces that its telegraphic address has been changed to "Britalumin, Ave, London." The address for cables is "Britalumin, London."

Changes of Name

The name of the Godley Battery Co., Ltd., has been changed to Liberty Battery Co., Ltd.

The Southern Ignition Co., Ltd., has changed its name to the Max Electric Co., Ltd.

Dissolution of Partnership

Davis & Hadley.—S. Davis and C. A. Hadley carrying on business under this style as electrical engineers at 61, St. Thomas Street, Weymouth, have dissolved partnership. C. A. Hadley will carry on the business.

Calendars

The first of the 1946 calendars have arrived. That from Gabriel Wade & English, Ltd., 17, Shakespeare Road, Bedford, bears a coloured view of Portmeirion with tear-off monthly date tabs.

Brown, Boveri & Co., Ltd., Baden, Switzerland, have sent us a calendar with large monthly date sheets each (as in previous years) bearing a handsome view of Swiss mountain scenery.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following:—

Makers of metal-capped neon indicator tubes, for export.

Export Inquiries

WE have received the undermentioned inquiries from firms and individuals overseas who wish to secure agencies for British electrical equipment and appliances or to import them into their territories. We shall be glad to pass on to them replies received from readers which should be addressed to the Editors, quoting the number given in parentheses. We cannot vouch for the standing of inquirers and manufacturers replying to them will no doubt require the usual references:—

Holland.—Agencies wanted for electrical goods. (X.123.)

Electricity Supply in France

Water Power Utilisation and Transmission Voltages

From Our Paris Correspondent

THE development of the French electrical system depends upon the future relationship between the production of new hydraulic power and the increase in consumption in the southern half of France, it was stated at a recent meeting of the French Society of Electricians. Provided the southern region can be equipped quickly, it is estimated that within twenty years the present transfer of power from south to north may be reversed. The effect of construction of further generating stations on improving voltage regulation, the possible installation at emergency points of gas-turbines and the use of synchronous condensers were also considered. Progress it was said would depend on quick re-establishment of a regular service, in order to avoid the risk of a general breakdown in the near future.

Experimental 500-kV Line

For large-scale development of hydraulic power, it would be necessary within a few years to consider higher transmission voltages, *e.g.*, 350, 380 or 400 kV. Researches carried out at Chevilly, near Paris, where a three-phase line has been constructed for experimental working up to 500 kV show promising results.

As a result of increasing demands for electricity in rural areas the Organisation Committee of Electrical Energy has drawn the attention of distributors to the question of raising the general voltage from 115/200 to 230/400. The administrative and technical aspects have been studied by the Committee with representatives of electricity distributors and rural engineers.

A note is to be addressed to the Chief of Control recommending immediate action, especially in devastated areas, before consumers start to re-equip their installations. Many hot-plates with low current densities have been manufactured for 400 V, but there has been less success in producing rapid hot-plates at that voltage, particularly those with exposed elements. To increase reliability they may have to be supplied between phase and neutral, which will give the advantage of lower prices.

St. Denis Power Station

Originally the designs for the power station of the Société d'Electricité de Paris at St. Denis allowed for installed capacity of 150,000 kW, but it was later decided to increase the figure to 400,000 kW. The first unit of the extension includes a 60,000-kW three-cylinder turbo-alternator which was ordered from Alsthom and Jeumont in 1939 and completed in 1943.

Generating plant at St. Denis

Steam conditions remain at 825 lb. per sq. in. and 930 deg. F. Steam is taken to the turbine through two receivers, the valves of which are operated by servo-motors which cannot function unless the oil system is up to normal pressure. Above a loading of 36,000 kW, servo-controlled valves bring the output capacity of the turbine up to its most economic rating of 48,000 kW and further valves similarly controlled enable the full 60,000 kW to be obtained. For the h.p. section molybdenum steel blades are used; for the i.p. and l.p. sections they are of high-nickel steel. The diameter of the alternator is 9·5 ft. compared with 11·2 ft. in the older 50,000-kW machines and its length is 23·3 ft. compared with 26·6 ft. The turbine is 53·5 ft. long as against 51·5 ft.

The station supplies the Metropolitan Railway as well as the Paris Distribution Co. and the Nord Lumière. The original sets of 50,000 kW at 3,000 RPM are each served by two boilers. One was by Brown Boveri, the second by Oerlikon Jeumont and the third by Alsthom.

Directional Relays

Checking Connections for Ring-Main and Parallel-Feeder Installations

By V. Benjamin Shah, B.Sc., Assoc. A.I.E.E.

BEFORE putting a new feeder into commission it is desirable to test the efficacy of its complete protective gear by reproducing fault conditions on the system. If this is not possible, the alternative is to test the gear by primary injection.

When primary injection equipment is not available and artificial fault conditions cannot conveniently be simulated, for testing the behaviour of directional relays, the following checks, made after the individual relays have been tested by secondary injection, are useful in testing the various connections and the integrity of the secondary wiring.

On a three-phase system correct discrimination as to direction is obtained only under all conditions of faults to earth or between phases if each voltage coil of the directional over-load relays is connected between the phase of the associated current coil and the phase leading it. The usual method of connecting the voltage coil of the directional earth-leakage element for feeder protection is to connect it in series with the delta secondary of a potential transformer. Fig. 1 shows the connections for combined over-current and earth-fault protection, using a voltage transformer with a tertiary delta winding in connection with an earth-leakage element.

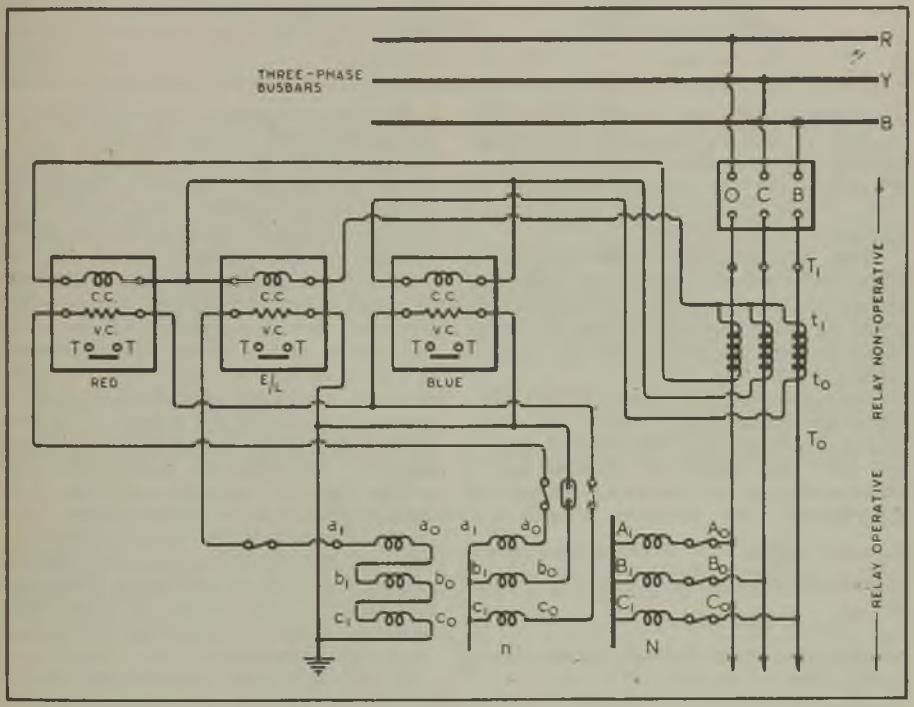


Fig. 1.—Typical connection diagram for directional overcurrent and earth-leakage protection using delta secondary of voltage transformers (standard phase sequence)

Under normal conditions, the voltage coils of over-load relay elements are energised and the corresponding current coils carry current proportional to the load; hence the torque on the directional-element disc tending to close or open the contacts can be easily checked by removing the low-voltage potential fuses in turn.

A vector diagram showing the voltage and current combination in the directional elements of the over-load relays connected as in Fig. 1 is given in Fig. 2 where the direction of normal power flow is away from the busbars and the contacts of the

The corresponding torque on the blue-phase element is:—$T_B = \frac{KV_{BY}}{2} I_a \cos (90 - \phi)$ ..... (4) which is zero for unity power factor and positive for lagging power factors.

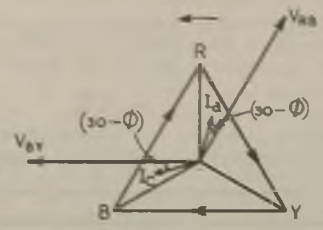


FIG. 2

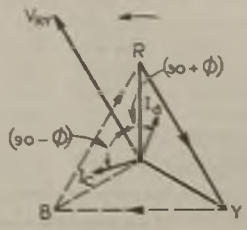


FIG. 3

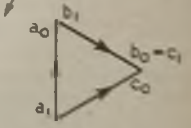


FIG. 4

directional-element disc remain closed when the relay is correctly connected. The torque tending to close the contacts is:—$T_R = KV_{RB} I_a \cos (30-\phi)$ for red phase element...(1)

$T_B = KV_{BY} I_a \cos (30-\phi)$ for blue phase element ..... (2)

When the red-phase low-voltage fuse is removed the potential coil of the directional element of this phase does not get its potential, while the blue-phase element gets its correct potential with the result that its contacts remain closed.

The vector diagram when only the blue-phase low-voltage fuse is removed is shown in Fig. 3. In this case the potential coils of the red- and blue-phase elements are in series across the red and yellow phases and consequently the potential across each potential coil is $\frac{V_{BY}}{2}$. The torque on the red-phase directional-element disc is:—$T_R = \frac{KV_{BY}}{2} I_a \cos (30+\phi)$ ..... (3) which is positive for all lagging power factors greater than 0·5 and zero for 0·5 lag.

With the earth-leakage relay, under normal conditions there is no resultant voltage across the voltage coil or residual current in the current coil; hence for checking its connections its potential and current coils must be energised. When primary impressed voltages of the potential transformer are unequal in magnitude or have been displaced in phase from their normal relative phase positions, there is a resultant voltage across the ends a_1 and c_0 of the tertiary winding. If one of the current transformers is short-circuited, a resultant current equal to and in phase opposition to the current in it flows through the current coil of the earth-leakage element. If, therefore, one of the high-voltage fuses is removed and one of the current transformers short-circuited when the feeder is on load, the current and potential coils of the earth-leakage relay will be energised and the torque on the directional-element disc will depend on the phase relations between the resultant voltage and current in the element.

If the blue-phase high-voltage fuse is

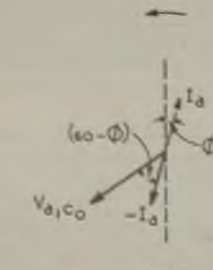


FIG. 5

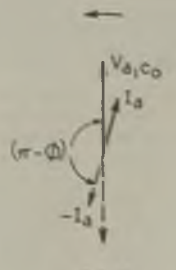


FIG. 6

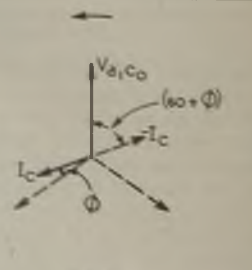


FIG. 7

removed, the voltage across terminals a_2 and c_0 of tertiary delta is given by a_2 c_0 in Fig. 4. If the red-phase current transformer is also short-circuited, the current flowing through the current coil of the directional element is equal to and in phase opposition to I_a. Fig. 5 shows the voltage and current combination in the relay element under these circumstances and the torque tending to close the contacts is $T_4 = \frac{KV}{\sqrt{3}} I_a \cos (60 - \phi)$ ..... (5)

which is positive for all lagging power factors. The element will undergo the same torque if the red—or the blue—phase high-voltage fuse is removed and the yellow-phase current transformer is short-circuited or if the yellow-phase high-voltage fuse is removed and the blue-phase current transformer is short-circuited.

Where the high-voltage fuse of one of the phases is removed and the secondary of the current transformer on the same phase is short-circuited, the torque on the directional element is negative. The vector diagram showing the current and voltage association when the red-phase high-voltage fuse is removed and the red-phase current transformer is short-circuited is given in Fig. 6. The torque, $T_5 = \frac{KV}{\sqrt{3}} I_a \cos (\pi - \phi) = -\frac{KV}{\sqrt{3}} I_a \cos \phi$ ..... (6)

The torque on the directional element when one of the high-voltage fuses is removed and the secondary of the current transformer in the phase leading it is short-circuited is given by $T_6 = \frac{KV}{\sqrt{3}} I \cos (60 + \phi)$ ..... (7)

The vector diagram where the red-phase high-voltage fuse is removed and the blue-phase current transformer is short-circuited is shown in Fig. 7.

If directional over-load and earth-leakage relays are installed in a ring-main feeder at a substation where the direction of normal power flow is towards the busbars or on receiving ends of parallel feeders, the contacts of the directional-element discs of the over-load elements remain open when the feeders are on load. The torques tending to open these contacts are given by $T_R = KV_{RB} I_a \cos (150 + 60 - \phi) = - KV_{RB} I_a \cos (30 - \phi)$ for the red-phase element ..... (8)

and $T_B = KV_{BY} I_c \cos (150 + 60 - \phi) = - KV_{BY} I_c \cos (30 - \phi)$ for the blue-phase element ..... (9)

In checking the connections of these relays by the above methods the direction of torque on the directional-element discs for correct connections is opposite to the corresponding torques for the various tests.

In case of three-phase three- and five-limb potential transformers, it is necessary while carrying out checks on earth-leakage relays to short-circuit the secondary of the phase of which the high-voltage fuse has been removed at the instant of noting the direction of torque on the earth-leakage directional-element disc.

Institute of Fuel

SPEAKING at a luncheon given by the Institute of Fuel on October 17th, Mr Emanuel Shinwell (Minister of Fuel and Power) said that he would be a poor politician who under-rated the importance of scientists and technologists. The co-operation of these and also of administrators with the Government, irrespective of politics, would be necessary to the reorganisation of the coal mines, which the country had decided should be on national lines. The mandate would not, however, be implemented in doctrinaire fashion, nor would the mines be administered by civil servants. Electricity, gas and oil also were the foundations of national prosperity and would come under consideration later. The public should be asked to eliminate waste (rather than to go without) as a counterpart to increased production, for which depleted man-power would have to be utilised to the greatest advantage. Such problems were not peculiar to this country and Great Britain would take its share in their solution generally beginning at home.

Mr. Arthur Horner (National Coal Production Officer), explained that his appointment was made by the Mineworkers' Union, whose members had been converted to the need for scientific methods in coal production, and whose support he pledged to the Minister's efforts.

An important feature of this annual function was the presentation of the Melchett Medals for 1940 and 1945, which were handed by Dr E. W. Smith (president, Institute of Fuel) to the French Ambassador (M. Massigli) on behalf of M. Etienne Audibert in the former case and to Dr. C. H. Lander in the latter. The Students' Medal for 1945 was then presented to Mr. J. M. Austin for a paper on pulverised-fuel firing. Dr. Smith referred appreciatively to the work of Mr. P. C. Pope, honorary secretary from the inception of the Institute in 1927, who is to retire shortly. Mr. Pope responded briefly. The membership is now 2,400, and included the very large majority of the 640 people present.

ELECTRICITY SUPPLY

Hire Arrangements at Hull. New North Wales Lines.

Bedford.—SERVICE CABLE CONCESSION.—At present the length of service cable laid free of cost is limited to 60 ft. on public property, any excess and the whole of the cable on private property being chargeable to the consumer. The Electricity Committee recommends that all service cable laid on public property and the first 30 ft. on private property shall in future be installed at the expense of the undertaking.

Chesterfield.—PROPOSED AREA EXTENSION.—The Corporation's proposals for the extension of its area of supply are published in the *London Gazette* of October 16th. Copies of the draft Order (2s. each) may be obtained from the Town Clerk and the Clerks to the Derbyshire County Council, Staveley U.D.C., the Clown R.D.C., the Chesterfield R.D.C., and the Parliamentary Agents, Sharpe, Pritchard & Co., Palace Chambers, Bridge Street, Westminster, S.W.1. Copies of the Order and of the relative Ordnance map may also be seen at these addresses. Objections to the proposals must be made to the Electricity Commissioners by November 13th, copies being sent to the Town Clerk or Parliamentary Agents.

Farnham.—PAINTED "PYLONS." — A proposal by the Electricity Commissioners to erect an overhead line in Farnham Park was recently discussed by the Urban District Council. The Council instructed the clerk to arrange the best conditions possible with the Commissioners, including painting the "pylons" a colour which would blend with the amenities of the park.

Hammersmith. — BULK SUPPLY ARRANGEMENTS.—Referring to the complete breakdown of the bulk supply which occurred on September 18th the Electricity Committee says it is advised that the present position is unsatisfactory because the bulk supply is afforded only by spur transmission mains of the C.E.B. from the Fulham Borough Council's power station. The bulk supply to the Barnes Council is given by a continuation of these spur lines. Before the war the C.E.B. is understood to have contemplated certain extensions of the main transmission system designed to safeguard the continuity of bulk supply to Hammersmith, but owing to the war these have not been proceeded with. The Electricity Committee proposes to ask the London and Home Counties J.E.A. to make representations to the Central Board to take the necessary steps without delay to safeguard the continuity of the bulk supply to Hammersmith, and the Barnes and Brentford and Chiswick Councils are to be asked to support the representations.

Hull.—HIRE AND H.P. ARRANGEMENTS.—Limited quantities of cookers and wash boilers being now available, the Electricity Committee, on the recommendation of the general manager (Mr. D. Bellamy) has approved the resumption of the hire and hire-purchase schemes. For the former application is being made to borrow £75,000 and for the latter permission is sought to exercise the remainder of the £50,000 sanction granted in 1939.

The cookers available are of the pre-war type but include thermostatic oven control and quicker boiler and simmering facility, and an extra 3s. a quarter will be charged above existing rentals. There will also be an additional 5s. a quarter for five years (subject to withdrawal or adjustment) to meet the cost of purchase tax. New wiring is to be provided by the consumer. Existing hirers may have their cookers modified, where possible, the additional quarterly charges being: thermostatic oven control, 1s. 6d.; new hot-plate equipment, 1s. 6d.

For wash boilers the hire charge will be 4s. a quarter for ten years, exclusive of wiring (1s. 6d. a quarter where not installed by the consumer), with an additional 2s. a quarter for five years on account of purchase tax.

The pre-war short-term (three years) hire-purchase scheme which it is also proposed to resume will be applicable to cookers, wash boilers and other domestic apparatus.

Kendal.—PROPOSED PRICE INCREASE.—After considering a report by the engineer and manager of the Electricity Department the Town Council recently agreed to apply to the Electricity Commissioners for permission to increase tariffs (other than those with a coal clause) by 30 per cent. as from April 1st next.

North Wales.—NEW TRANSMISSION LINES.—At a meeting of the North Wales and South Cheshire Joint Electricity Authority Mr. J. Rankin (North Wales Power Co.) stated that construction work was in progress on an alternative high-voltage supply to the Rhyl and Prestatyn area, consisting of a new 11,000-V overhead line from Rhuddlan to Rhyl. A 33,000-V line was also being constructed from Rhydymwyn to supply Ruthin and Denbigh. The high-voltage line between Caergeiliog and Holyhead had been duplicated.

Richmond (Surrey).—LOWER FLAT RATE.—It was reported to the Town Council last week that the Richmond (Surrey) Electric Light & Power Co., Ltd., had agreed to reduce the lighting flat rate for ordinary consumers by ½d. per kWh as from the beginning of the December quarter.

Silsden. — CONDITIONS FOR INSTALLING ELECTRICITY.—The Council has decided that tenants of houses may install electricity at their own expense subject to the conditions which the Council may lay down as to its use. Tenants are to be allowed to use electricity for all purposes except clothes washing, cookers or grillers, and fires. The Gas and Water Committee says it has considered the effect of the use of electricity in Council houses on the finances of the gas undertaking and has decided to raise no objection to the installation of electricity for lighting purposes.

Skelmersdale.—ELECTRICITY FOR WORKS SITE.—At a recent Council meeting the chairman reported the receipt of a letter from a firm stating that for a considerable time they had been endeavouring to obtain a supply of electricity to the site of their works and they had now been informed by the Lancashire Electric Power Co. that a supply could not be

installed without a priority order. The Council authorised the chairman and vice-chairman to take whatever action they thought necessary to expedite the supply of electricity to this site.

Torquay.—RURAL EXTENSIONS.—The supply of electricity to scattered rural areas involving considerable capital expenditure was recently discussed by the Electricity Committee. It was decided that the condition regarding minimum annual revenue (20 per cent. of the capital expenditure) should continue for the present and that where the revenue would not reach this amount applicants should be asked to make good the difference by a lump sum payment.

TRANSPORT

Glasgow.—EXPERIMENTAL TROLLEY - BUS SERVICE.—The Transport Committee at its last meeting considered a report by Mr. E. R. L. Fitzpayne, general manager, on the proposal to run an experimental service of trolley-buses in the city. The manager advised the introduction of the vehicles on the present tram service between Provanmill and Aitkenhead Road, a distance of 4·37 miles. The proposed change-over would require 25 trolley-buses each costing £3,000. With overhead equipment and other plant, the complete conversion would cost approximately £126,000. The Committee agreed to delay consideration for a fortnight. The manager also suggested the construction of 100 new tramcars at a cost of approximately £500,000.

Liverpool.—PROPOSED CHANGE-OVER TO BUSES. A report by the general manager (Mr. W. G. Marks) which has been unanimously approved by the Passenger Transport Committee envisages the abolition of trams and their replacement by buses within ten to fifteen years. The general manager considers that trolley-buses are not suitable for Liverpool because of the many junctions to be negotiated.

TELEPHONY

London. — LONG-DISTANCE TELEPHONY. — After the long wartime break the International Telephone Consultative Committee, set up for the co-ordination of European long-distance telephone services, has been meeting again in London this week.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Murex, Ltd.—The accounts for the year ended June 30th last show a profit of £232,535 (against £505,701). After adding other income and estimated E.P.T. refund, and providing for depreciation and tax, the net profit is £213,032 (£239,446). The dividend and bonus for the year are maintained at 20 per cent., £90,000 (£25,000) is allocated to general reserve and £20,000 (£11,400) to pension fund contingency account, and £126,680 (£125,398) is carried forward.

In his statement issued with the accounts Mr. G. P. Joseph (chairman) says that plans for expansion are under consideration which, when carried out, will call for a substantial addition to the cash resources. These resources have been depleted by the heavy incidence of war taxation and the expenditure of over £1,000,000 during the war years on additional buildings and plant.

Electric & Musical Industries, Ltd.—The directors recommend a dividend of 6 per cent. and a bonus of 2 per cent. on the ordinary stock, less tax at 9s. 9d. in the £. The same dividend and bonus were paid last year, less tax at 8s. 6d. The profit of the company for the year ended June 30th last was £150,085 (against £149,250), the total profit of the group being £185,702 (£182,024), after providing £1,043,844 (£895,267) for taxation.

The Atlas Electric & General Trust, Ltd., in its accounts for the year to March 31st shows a revenue of £308,365 (£289,394) and a net profit of £132,244 (£121,150). After payment of the preference dividend, £188,870 (£168,189) is carried forward. No ordinary dividend has been paid since 1931-32 (1 per cent.). The gross receipts of the subsidiary, Sociedad Commercial de Montevideo (tramways) were $6,593,497 ($6,179,572), the balance of revenue over operating costs being $211,109 ($263,689) and the debit balance carried forward $760,364 ($971,473).

Cables Investment Trust, Ltd.—The chairman (Sir Edward Wilshaw) stated at the annual meeting last week that the investments of the trust showed additional improvement during the year and the market value at June 30th of £7,811,244 represented an appreciation over the book value of approximately £500,000, or 6¾ per cent. This market value was nearly £3,000,000 higher than the amount shown in the accounts in 1940.

The Skefco Ball Bearing Co., Ltd.—Announcing an interim dividend of 5 per cent. free of tax on the ordinary stock the directors state that taking into account current trading results and problems of transition it is considered prudent to limit the interim dividend to this amount as against the 6⅔ per cent. paid last year.

Barcelona Traction, Light & Power Co., Ltd.—A poll taken at meetings of bondholders resulted in substantial majorities in favour of the proposals for the revision of their rights submitted (amended in the case of prior lien bonds).

Babcock & Wilcox, Ltd., have announced an interim dividend of 4 per cent. on the ordinary shares (same).

J. & F. Stone Lighting & Radio, Ltd.—A statement by the chairman (Mr. N. W. Wild) accompanying the report and accounts for the year ended June 30th last refers to the destruction of the company's head office and eleven branches by enemy action while 102 branches were damaged, including the present warehouse and offices. In the face of these

handicaps the organisation had continued to function efficiently and profitably. Apart from their activities as distributors of radio and domestic equipment, the manufacturing subsidiary company turned its plant over to war production and the profits from this source alone last year increased by £30,000.

Calcutta Electric Supply Corporation, Ltd.—Mr. R. G. Casey, Governor of Bengal, announced this week that the terms on which the Provincial Government proposed to acquire the company's undertaking on January 1st, 1950, would be the fair market value plus 20 per cent. and a sum equivalent to a year's gross revenue in certain licence areas. If the option were postponed until 1970 or later the purchase price would be based on the original cost of land, buildings, plant, etc., less depreciation at agreed rates. If the option were exercised the Government would set up a semi-autonomous non-political board to operate the undertaking.

Strand Electric Holdings, Ltd., report a profit, after meeting taxation, of £8,115 for 1944-45 (against £15,186). The dividend is again 10 per cent. with a bonus of 2½ per cent.

Hopkinsons, Ltd., announce the payment of an interim dividend of 5 per cent. (same).

New Companies

Hotray Wires, Ltd.—Private company. Registered October 11th. Capital, £2,500. Objects: To carry on the business of manufacturers of, and dealers in, electrical and mechanical apparatus and accessories, and in particular electrical resistance wires and tapes, mica or other refractory materials, elements and electrical appliances for domestic and industrial use, etc. Directors: F. H. Greenhalgh, 105, Styal Road, Gatley, Cheshire, and J. P. Suggitt, 7, Seymour Grove, Hale, Cheshire. Registered office, 157, Chester Road, Manchester, 15.

Ceramic Heaters, Ltd.—Private company. Registered October 11th. Capital, £2,000. Objects: To carry on the business of manufacturers of electrical appliances, including electrical boiling rings, heaters and irons for domestic and industrial purposes, etc. Subscribers: F. Renton, 2, Great Winchester Street, E.C.2, and Jessie Renton, 9, Southampton Place, W.C.1. Secretary: E. V. Varley. Registered office, 32a, Wrotham Road, St. Pancras Way, N.W.1.

Watters & Gibson, Ltd.—Private company. Registered in Edinburgh October 5th. Capital, £500. Objects: To carry on the business of electrical engineers, dynamo and motor manufacturers, manufacturers of electrical switchboards and gear, etc. Directors: Mrs. Elizabeth Watters, 128, Ledard Road, Glasgow, S.2, and Mrs. Helen S. Gibson, 39, Deanston Drive, Glasgow, S.1. Registered office: 135, Buchanan Street, Glasgow, C.1.

P. L. Dwyer & Co., Ltd.—Private company. Registered October 10th. Capital, £2,000. Objects: To acquire the business of wholesale and retail suppliers of electrical goods formerly carried on by the late Philip L. Dwyer, with the assistance of Edmund J. Dwyer, at 30, Grosvenor Place, S.W.1. Directors: E. J. Dwyer and Mrs. Mary N. Dwyer, West End Bungalow, Pulham St. Mary, Norfolk. Secretary: Edmund J. Dwyer. Registered office: 46 and 47 London Wall, E.C.2.

Kiltyclogher Electricity Co., Ltd.—Private company. Registered in Dublin on October 8th. Capital, £1,000. Objects: To carry on the business of electricians, mechanical engineers, suppliers of electricity, etc. First directors: Mrs. Clare Feely, Collins Barracks, D. O'Donnell, 25, Westmorland Street, A. N. Byrne, 9, Fortfield Park, Terenure, all Dublin.

Companies' Returns

Statements of Capital

Davey Paxman & Co., Ltd.—The nominal capital has been increased by the addition of £50,000 in 50,000 ordinary shares of £1, beyond the registered capital £160,000.

Mico, Ltd.—The nominal capital has been increased by the addition of £1,000 in £1 shares, beyond the registered capital of £500.

Mortgages and Charges

Sterling Industries, Ltd.—Charge on property at Grenaby Avenue, and Tavistock Grove, Croydon, dated September 27th, 1945, to secure £7,500. Holder: Wing Comdr. Donald Salisbury Green, Ladye Place, Shepperton, Middlesex.

Painter & Madew, Ltd.—Mortgage on 10, Albion Street, Hanley, dated September 26th to secure £600 and further advances. Holders: Hanley Economic Building Society.

Days Stores (Luton), Ltd.—Satisfaction in full on December 31st of a series of debentures authorised November 5th, 1937, and registered February 14th, 1938, securing £1,300. (Notice filed October 5th.)

Dowsing Company (Electrical Manufacturers), Ltd.—Satisfaction to the extent of £500 on September 30, 1945, of series of debentures authorised July 16th, 1937, and registered July 19th, 1937, securing £500.

Liquidations

Dome Electric Co., Ltd.—General meeting of members October 31st at the office of Harry L. Price & Co., 47, Mosley Street, Manchester, to hear an account from the liquidator, Mr. A. T. Eaves.

Anglo-American Electrical Appliances, Ltd.—Winding up voluntarily. Liquidator, Mr. E. C. Cooper, Capel House, New Broad Street, E.C.2.

Bankruptcies

W. B. Ralphs, lately carrying on business at 2, Mulgrave Road, Middlesbrough, electrical contractor.—Discharge suspended for ten days; date of discharge September 30th.

D. A. McD. Trew, lately carrying on business as "Trew Electrical Service" at 59, Primrose Hill Street, Coventry, electrical dealer.—First and final dividend of 6s. 8d. in the £ payable November 14th at the office of the Official Receiver, Somerset House, 37, Temple Street, Birmingham, 2.

STOCKS AND SHARES

THE interim Budget introduced this week by Mr. Hugh Dalton was awaited in Stock Exchange market with composure and a mild measure of hopefulness. It had been well and truly discussed in advance. Optimism was stimulated by the terms given to holders of Bank of England stock and these, justly or otherwise, were regarded as a kind of lead as to what might happen in the industries affected by the forthcoming nationalisation—railways, electricity and other branches which are to be taken over by the Government. It is taken for granted that the task with which the Government is faced has assumed such formidable proportions that some time must inevitably elapse before anything tangible can be effected in these directions.

In the meantime, the weight of money requiring investment is such as to force capital into Stock Exchange securities even at what appear to be the high prices of to-day. This factor received noteworthy stimulus from the Government's declaration of a lowering of interest rates. The ordinary shares of the electricity supply companies responded with a general rise in prices.

The Rising Prices

The assumption is that, under nationalisation, proprietors of shares in the Home electricity supply companies will receive, in exchange for their holdings, either cash or some form of Government stock, though on what basis this will be reckoned is wholly in doubt. The procedure followed in the case of the Bank of England is by no means necessarily the same as that which will be adopted in other directions. Each company may possibly be treated individually.

With the position manifestly so uncertain, however, it is only academically interesting to estimate what may lie ahead. The Stock Exchange market in the shares has taken a strong turn for the better during the past week. All sections have participated. London, Scottish, provincial shares alike advanced. Over the month, rises range from 6d. to 6s. the last-named having been secured by Bournemouth & Poole at 62s. 6d. on talk of an increase in the dividend. The ordinary shares in a score of other Home electricity supply companies show improvements.

Overseas Electric

Revival of optimistic talk resulted in Calcutta Trams, which had been a dull market at 74s. 6d. recovering to 77s. 6d. Calcutta Electrics are unchanged on the month at 65s. 6d. Madras Electrics fell 1s. to 45s. but Cawnpores jumped 5s. to 64s. 6d. Palestine Electric "A" and Jerusalem Electric went back to 35s. and 26s. 6d. respectively, on the friction in the Near East. Interest in Tokyo Electric "sixes" has subsided, and the bonds are 2 down at 52. Canadian utilities failed to derive benefit from the decision to reduce E.P.T. in Canada.

Home Railway Outlook

Speculative interest is more concerned at the present time with South African mining shares than it is with domestic securities, but a certain amount of attention is directed to Home Railway stocks, where the political prospects afford wide scope for guesswork and prophecy. London Passenger Transport "C" stock has improved to 65, apparently on the impression that the Board will be treated fairly in any socialising scheme which may be put forward by the Government. The Board's prior charge stocks remain steady, and in the case of the Southern Railway the preference and preferred are better. As compared with a month ago, the preferred is 6 points up at 73 and the 5 per cent. preference 3 better at 107½. Thomas Tilling shares at 54s. 6d. are 3s. higher. British Electric Traction deferred is changing hands around 1010 and the 8 per cent. preferred is harder at 180.

Equipment and Manufacturing

The majority of prices make a distinctly better showing this month than they did towards the end of September. The changes in some cases have been noted here week by week as they occurred. On the month, Midland Electric Manufacturing are 5s. better at 7½; Westinghouse Brake 4s. 3d. and Consolidated Signal 2s. 6d. at 78s. 9d. and 6⅝ respectively. Lancashire Dynamo put on $\frac{3}{16}$ at 106s. 3d. De la Rue at 11¼ have gained 7s. 6d. and British Insulated Callender's 3s at 47s. Revo are better at 47s. Ever Ready at 43s. and Reyrolle at 73s. 3d. British Thermostat gained a florin at 22s. and Telegraph Constructions 1s. 6d. at 59s. Various other rises have occurred. Murex at 96s. 3d. lost their gain of a month ago. Mather & Platt are down 6d. to 50s. 9d. and H.T.A. fell a further 1s. to 27s. British Aluminium at 38s. 3d. are 3s. 9d. lower by reason of the reduction of 1 per cent. in the interim dividend. Estimates put the possible dividend for the full year at 8 per cent. as against the previous 10 per cent.

Radio and Cables

As previously mentioned, the Philco dividend proved disappointing and the price dropped from 15s. to 11s. 9d. Cossor, after being better, went back to 42s. 6d. while Pye deferred at 32s. 6d. and E.M.I. at 33s. have been sympathetically affected by the fall in Philco. Maintenance of the 8 per cent. dividend on E.M.I. shares was in accordance with expectation. Amongst communication stocks, Anglo-American are better and Globe Telegraphs rose 1s. to 43s. 6d. Cable & Wireless preference eased off to 112½ and the ordinary to 91. Oriental Telephones, after a rise to 64s. 6d. reacted to 63s. Great Northern Telegraphs are 45s. lower, following upon their

(*Continued on page* 609)

ELECTRICAL INVESTMENTS

Past Month's Price Changes

Company	Dividend Previous	Dividend Last	Middle Price Oct. 19	Month's Rise or Fall	Yield p.c.
Home Electricity Ordinary					
Bournemouth and Poole	12½	12½	62/6	+6/–	£ s. d. 4 0 0
British Power and Light	7	7	29/–	+1/6	4 16 7
City of London	5½	6	29/6	..	4 1 4
Clyde Valley	8	8	41/–	+3/–	4 0 0
County of London	8	8	41/–	–1/–	3 18 1
Edmundsons	6	6	30/–	+½	4 0 0
Elec. Dis. Yorkshire	9	9	41/–	+2/–	4 7 10
Elec. Fin. and Securities	12½	13½	58/9	+⅛	4 11 9
Elec. Supply Corporation	10	10	46/6	..	4 6 0
Lancs. Light and Power	7½	7½	35/6	+2/–	4 4 6
Llanelly Elec.	6	6	26/–	+1/–	4 12 0
Lond. Assoc. Electric	3	4	26/6	+2/–	3 0 7
London Electric	6	6	29/–	..	4 2 9
Metropolitan E.S.	8	8	40/6	+2/–	3 19 0
Midland Counties	8	8	40/6	+2/3	3 19 0
Mid. Elec. Power	9	9	42/–	+6d.	4 5 9
Newcastle Elec.	7	7	28/9	+6d.	4 17 5
North Eastern Elec.	7	7	32/6	+2/3	4 6 2
Northampton	10	10	47/3	+1/–	4 4 6
Northmet Power	7	7	39/–	+2/–	3 11 10
Richmond Elec.	6	6	26/6	..	4 10 7
Scottish Power	8	8	38/–	+2/–	4 4 3
Southern Areas	5	5	23/6	+1/6	4 5 0
South London	7	7	29/–	..	4 16 7
West Devon	5	5	25/–	..	4 0 0
West Glos.	4½	3½	25/6	+6d.	2 15 0
Yorkshire Elec.	8	8	40/6	+1/6	3 19 0
Public Boards					
Central Electricity :					
1955–75	5	5	114	..	4 7 9
1951–73	4½	4½	106	..	4 5 0
1963–93	3½	3½	105	..	3 6 8
1974–94	3½	3½	101	–1	3 4 4
London Elec. Trans.	2½	2½	98	..	2 11 0
London & Home Counties 1955–75	4½	4½	112	+1	4 0 4
Lond. Pass. Trans. Bd.					
A	4½	4½	119½	..	3 15 4
B	5	5	119½	–1	4 4 0
C	3½	3	65	+3	4 12 4
West Midlands J.E.A. 1948–68	5	5	105½	–1	4 14 9
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	8/–	–3d.	—
Calcutta Elec.	6*	6*	65/6	..	1 16 7
Cawnpore Elec.	7	13	64/6	+5/–	4 0 10
East African Power	7	7	37/–	..	3 17 9
Jerusalem Elec.	7	5	26/6	–6d.	3 15 6
Kalgoorlie (10/–)	5	5	11/6	..	4 7 0
Madras Elec.	4	6	45/–	–1/–	2 13 2
Montreal Power	1½	1½	25/–	–1/2	—
Nigerian Elec.	10	10	40/–	+1/–	5 0 6
Palestine Elec. "A"	5*	5*	35/–	–½	2 17 4
Perak Hydro-elec.	6	7	18/–	..	—
Tokyo Elec. 6%	6	6	52	–2½	—
Victoria Falls Power	15	15	96/3	+2/6	3 2 3
Whitehall Inv. Pref.	—	6	25/–	–3d.	4 16 1

Company	Dividend Previous	Dividend Last	Middle Price Oct. 19	Month's Rise or Fall	Yield p.c.
Equipment and Manufacturing					
Aron Elec. Ord.	10	15	62/6	..	4 16 6
Assoc. Brit. Eng.	6	7	52/6	..	2 12 4
Assoc. Elec. :					
Ord.	10	10	58/–	+1/–	3 19 2
Pref.	8	8	41/3	+⅛	3 17 7
Automatic Tel. & El.	12½	12½	70/–	+1/9	3 11 5
Babcock & Wilcox	11	12	58/–	+1/–	4 2 9
British Aluminium	10	—	35/3	–3/9	—
British Insulated & Callender's	..	..	47/–	+3/–	—
British Thermostat (5/–)	..	..	18½	18½	22/–	+2/–	4 4 1
British Vac. Cleaner (5/–)	..	..	30	30	37/–	+6d.	4 1 2
Brush Ord. (5/–)	9	10	10/6	+9d.	4 15 4
Burco (5/–)	15	15	17/3	+1/2	4 7 0
Chloride El. Storage	15	15	83/9	+¼	3 11 10
Christy Bros.	12½	17½	75/–	..	4 13 4
Cole, E. K. (5/–)	15	20	37/6	..	2 13 4
Consolidated Sig.	24	27½	8½	–½	4 3 8
Cossor, A. C. (5/–)	10*	12½*	42/6	..	1 9 6
Crabtree (10/–)	17½	17½	43/9	..	4 0 0
Crompton Parkinson Ord. (5/–)	22½	22½	32/6	..	3 9 2
De La Rue	40	40	11½	+½	3 11 3
E.M.I. (10/–)	8	8	32/–	–9d.	2 8 4
Elec. Construction	10	12½	59/6	+6d.	4 4 6
Enfield Cable Ord.	12½	12½	64/–	+6d.	3 18 2
English Electric	10	10	55/6	..	3 12 3
Ericsson Tel. (5/–)	22*	20*	52/6	–½	1 18 9
Ever Ready (5/–)	40	40	44/–	–1	4 11 0
Falk Stadelmann	7½	10	36/–	..	5 11 1
Ferranti Pref.	7	7	33/6	..	4 3 7
G.E.C. :					
Pref.	6½	6½	34/6	+6d.	3 15 4
Ord.	17½	17½	96/6	..	3 12 5
General Cable (5/–)	15	15	17/–	..	4 8 3
Greenwood & Batley	15	15	42/6	..	7 1 2
H.T.A. (10/–)	12½	12½	27/–	–1/–	4 12 7
Henley's (5/–)	20	20	28/3	–9d.	3 10 9
4½% Pref.	4½	4½	24/6	..	3 13 6
Hopkinsons	17½	20	83/9	..	4 15 6
India Rubber Pref.	5½	5½	24/–	..	4 11 9
Intl. Combustion	30	32½	8	..	4 1 3
Johnson & Phillips	15	15	80/–	..	3 15 0
Lancashire Dynamo	22½	22½	5⅛	+⅛	4 6 6
Laurence, Scott (5/–)	12½	12½	13/6	..	4 12 5
London Elec. Wire	7½	7½	40/–	..	3 15 0
Mather & Platt	10	10	50/9	–6d.	3 18 9
Metal Industries (B)	8½	9	50/–	..	3 12 0
Met. Elec. Cable Pref.	5½	5½	21/3	..	5 3 6
Mid. Elec. Mfg.	25	25	7½	+½	3 4 5
Minrex	20	20	9/3	–5/9	1 12 8
Newman Ind. (2/–)	20	20	7/6	..	5 6 5
Philco (2/–)	25	10	11/9	–3/3	1 14 0
Power Securities	6	6	27/–	..	4 9 0
Pye Deferred (5/–)	25	25	32/6	–9d.	3 17 0
Ransome & Marles	20	20	93/9	–½	4 5 6
Revo (10/–)	17½	17½	47/–	+1/6	3 14 6
Reyrolle	12½	12½	73/3	+⅛	3 8 5

(Continued on next page)

* Dividends are paid free of Income Tax.

Company	Dividend Previous	Dividend Last	Middle Price Oct. 19	Month's Rise or Fall	Yield p.c.
Equipment and Manufacturing (*Continued*)					£ s. d.
Siemens Ord. ..	7½	7½	39/–	..	3 17 0
Strand Elec. (5/–)	10	12½	10/3	+3d.	6 2 0
Switchgear & Cowans (5/–) ..	20	20	21/–	+1/–	4 15 2
T.C.C. (10/–) ..	7½	10	24/–	..	4 3 4
T.C. & M. ..	10	10	59/–	+1/6	3 7 6
Telephone Mfg.(5/–)	9	9	12/9	+1/–	3 10 8
Thorn Elec. (5/–)	20	20	28/9	..	3 9 6
Tube Investments	20	22½	5⅛	+⅛	4 0 0
Vactric (5/–) ..	Nil	22½	22/–	+1/–	5 2 3
Veritys (5/–) ..	7½	7½	7/9	..	4 16 9
Walsall Conduits(4/–)	55	55	57/–	+9d.	3 17 3
Ward & Goldstone (5/–)	20	25	32/–	..	3 18 2
Westinghouse Brake	14	14	78/9	+4/3	3 11 3
West, Allen (5/–)	7½	7½	8/3	+3d.	4 11 0
Traction and Transport					
Anglo-Arg. Trams :					
First Pref. (£5)	Nil	Nil	2/6	..	—
4% Inc. ..	Nil	Nil	6½	+½	—
Brit. Elec. Traction :					
Def. Ord. ..	45	45	1005	..	4 9 7
Pref. Ord. ..	8	8	180	+2	4 9 0
Bristol Trams ..	10	10	53/3	..	3 15 0
Brazil Traction	2	2	29	–1½	6 18 1
Calcutta Trams	6½	7½	77/6	+1/–	1 18 3
Cape Elec. Trams	5	6	28/–	+3/–	4 5 9
Lancs. Transport	10	10	41/3	–2/–	4 13 0
Southern Rly. :					
5% Prefd. ..	5	5	73	+6	6 17 0
5% Pref. ..	5	5	107½	+3	4 13 0
T. Tilling ..	10	10	54/6	+3/–	3 13 0
West Riding ..	10	10	40/–	–½	5 0 0
Telegraph and Telephone					
Anglo-Am. Tel. :					
Pref. ..	6	6	128	+1½	4 13 9
Def.	1½	1½	31⅛	+1	4 15 4
Anglo-Portuguese	8	8	30/–	+6d.	5 6 8
Cable & Wireless :					
5½ Pref. ..	5½	5½	112½	–1½	4 17 9
Ord. ..	4	4	91	–½	4 8 0
Canadian Marconi	$1	Nil	4 cts.	18/3	–1/– —
Globe Tel. & Tel. :					
Ord. ..	8¼*	5*	43/6	+1/–	2 6 0
Pref.	6	6	30/6	..	3 18 8
Great Northern Tel. (£10) ..	Nil	Nil	34½	–2½	—
Inter. Tel. & Tel.	Nil	Nil	33	+1	—
Marconi-Marine	7½	7½	37/–	..	4 1 1
Oriental Tel. Ord.	4	4	63/–	–1/–	—
Telephone Props.	Nil	6	22/–	..	5 9 1
Tele. Rentals (5/–)	10	10	13/9	+⅛	3 12 9

* Dividends are paid free of Income Tax.

Stocks and Shares (*continued from page* 607)

advance of 50s. on the defeat of Japan. Canadian Marconi have gone back 1s. to 18s. 3d. International " Tel. & Tel." at 33 are a dollar higher.

Telephones Better

Ericsson Telephones at 52s. 6d. are up 2s. 6d. on the month. This brings down the yield to £1 18s. 9d. per cent. net, equivalent, of course, to £3 17s. 6d. per cent. gross, taking tax at 10s. in the £. Other telephone issues are better, rises occurring in Automatic Telephones to 70s., Telephone Rentals to 13s. 9d. and Telephone Manufacturing to 12s. 9d. Telephone Properties at 22s. are unchanged, the fairly high yield of £5 9s. failing to attract investment to a Venezuelan undertaking. Anglo-Portuguese Telephones have hardened to 30s.: the yield on these at the current rate of dividend is 5⅓ per cent.

Surface and Aerial Transport

The President of the Institute of Transport, speaking recently, said that the possibility of passenger fare rates coming very close to first-class railway fares, was getting nearer. He mentioned the vague impression now current that transport may cut into message traffic by Cable & Wireless. He thought, however, that a more likely result is that new traffic will be created. " The three forms of transport—shipping, surface and aeroplane—should aim," Sir Frederick Handley Page declared, " at occupying the rôle of partners, not of antagonists."

Engineers and the Community

TECHNICIANS were urged to abandon their tendency to remain aloof from affairs outside their profession by MR. F. J. ELLIOTT (Wolverhampton) in his chairman's address to the I.E.E. South Midland Centre.

The war story had been one of intensive research followed by rapid development and production in quantity under great difficulties. One large manufacturer, the transformer section of whose works had to be completely rebuilt owing to its destruction by enemy action, nevertheless produced over one million kVA of transformers. One firm alone made two million kW of generating plant as well as two and one-third million HP of motors.

The parts played by researchers and technicians had created some appreciation of the need to place a higher value on their services, but there was still a tendency to deny to the engineer that administrative ability and economic knowledge which were in fact integral parts of his training and career.

There was a duty beyond the confines of education, research and production. It was incumbent upon scientists and engineers to take a part, commensurate with their knowledge, in the social and economic affairs of the community. There was growing awareness of the need for technicians to abandon their tendency to remain aloof from affairs outside their professions. They had a duty to apply their specialised knowledge to the planning, socially and economically, of this country.

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.

AKTIEBOLAGET Elektrolux. — "Absorption refrigerating apparatus of the continuous cycle type." Cognate applications 2769/44 and 2770/44. January 14th, 1943. (572351.)

Bakelite, Ltd.—"Moulding of thermosetting plastics." 16680/43. December 11th, 1942. (572425.)

W. Blain and K. R. L. Van Gelderen.—"Electrical wiring and fittings used therein." 13628. August 20th, 1943. (572314.)

British Thermostat Co., Ltd., and C. K. Brown.—"Temperature regulating and indicating apparatus." 354. January 9th, 1942. (572302.)

British Thomson-Houston Co., Ltd.—"Dielectric and insulating compositions." 2541/43. February 25th, 1942. (572329.) "Hydraulic jack arrangements for vertical generators and the like." 18001/43. October 31st, 1942. (572343.)

A. F. Burgess (Wincharger Corporation).—"Wind plants." 5881. March 30th, 1944. (572399.)

Chloride Electrical Storage Co., Ltd., and R. Gray.—"Electric accumulators." 18889. November 12th, 1943. (572370.)

Dorman & Smith, Ltd., and T. Atherton.—"Devices for stripping electric cables." 5866. March 30th, 1944. (572398.)

T. Dryden & Sons, Ltd., and J. W. Barrs.—"Electric heaters of the radiator type." 18576. November 9th, 1943. (572427.)

Duratube & Wire, Ltd., and J. Veit.—"Insulation of electrical conductors." 15459. September 21st, 1943. (572424.)

English Electric Co., Ltd., G. F. Tagg and R. K. Whitehead. — "Prepayment meter mechanism." 6772. April 29th, 1943. (572389.) "Prepayment meter mechanism." 14903. September 10th, 1943. (572395.) "Prepayment meter mechanism." 6662/45. April 29th, 1943. (Divided out of 572389.) (572403.)

General Electric Co., Ltd., and E. Gallizia.—"Vapour discharge apparatus." 7185. June 6th, 1941. (572299.) "Sandwich seals in electric discharge devices." 7808. June 20th, 1941. (572300.)

V. Hope.—"Protecting devices for electric circuits and apparatus." 17719. October 27th, 1943. (572342.)

Philco Radio & Television Corporation.—"Viewing device for cathode ray tube screens." 14882/43. September 10th, 1942. (572338.)

F. T. Powers.—"Traffic and other signal lights." 10090/44. April 3rd, 1943. (572355.)

H. Sonnenfeld.—"Methods and means for wiring system." 17144. October 19th, 1943. (572339.)

Standard Telephones & Cables, Ltd., and G. Gilliver.—"Apparatus for joining wires and the like by fusion." 5136. March 20th, 1944. (572324.)

J. Stone & Co., Ltd., A. H. Chilton and L. R. Nixon.—"Dashpot devices particularly applicable for use in electric regulators." Cognate applications 13033/43 and 18096/43. August 12th, 1943. (572392.)

H. Ward.—"Electric alarm clocks and time switches." 7452/45. September 5th, 1943. (Divided out of 571541.) (572359.)

Westinghouse Brake & Signal Co., Ltd., and A. H. B. Walker.—"Inductive pick-up devices for cab-signalling systems of the track circuit type for railways and the like." 12172. June 27th, 1944. (572356.)

Westinghouse Electric International Co.—"Lubricating systems for marine gearing." 9152/44. May 26th, 1943. (572325.)

Zenith Radio Corporation.—"Adjustable inductances." 18394/43. September 14th, 1942. (572426.)

TRADE MARKS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be made within one month from October 17th:—

ACCROMETON. No. 635,380, Class 9. Electrical apparatus and instruments not included in other classes; cinematographic apparatus.—Lum-Arc Manufacturing Co., Ltd., 22, High Street, Kingston-onThames.

DUROTEST. No. 632,226, Class 11. Incandescent lamps and fluorescent lamps; fittings therefor and parts thereof, none being included in other classes.—Duro-Test Corporation, North Bergen, Hudson, New Jersey, U.S.A. Address for service:—c/o Frank B. Dehn & Co., Kingsway House, 103, Kingsway, W.C.2.

KENLOSITE. No. 635,457, Class 17. Electrical insulating parts made of ceramic material.—William Kent (Porcelains), Ltd., Wellington Street, Burslem, Stoke-on-Trent.

Atomic Energy

BASED on the official "Statements Relating to the Atomic Bomb," Brochure A.G. 748 of the British Thomson-Houston Co., Ltd., gives a condensed account of the discoveries in nuclear physics from the beginning of the present century that led to atomic fission, which made possible the production of the atomic bomb. Two members of the B.T.H. research laboratory, Dr. C. S. Milner and Mr. K. J. R. Wilkinson, were actively engaged on this work in the United States.

Among the work latterly carried out in Great Britain has been an investigation into the possibility of converting the mass spectograph used in the laboratory for the separation of minute quantities of isotopes into large-scale production apparatus. Last March, on the return of Prof Oliphant of Birmingham University from America, research was started on some of the electrical engineering problems involved, the B.T.H. being one of the manufacturing companies concerned.

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.

Burnley.—October 31st. Education Committee. Equipment for Burnley Technical College. (October 12th.)

Blackpool.—November 12th. Electricity Department. Cable, fire-extinguishing system and transformers. (October 19th.)

Connah's Quay. — November 5th. Urban District Council. Electrical wiring of 60 houses, Clough's estate; and supplying 60 electric cookers and 60 electric wash-boilers. H. Jones, surveyor, Council Offices, Connah's Quay.

Gainsborough.—October 29th. Electricity Department. One 500-kVA, 3-phase static transformer. (October 12th.)

Plymouth. — November 10th. Electricity Department. Meters and joint boxes. (See this issue.)

Scotland.—November 6th. North of Scotland Hydro-Electric Board. 11-kV distribution lines, Morar area, Inverness-shire. (October 5th.)

Sheffield.—November 5th. Electricity Committee. 20-MVA, 33/11-kV transformer. (October 5th.)

Tayport.—October 31st. Town Council. Electric lighting installations in 28 brick houses to be erected at Bobbin Mill, Elizabeth Street. C. R. Douglas & Co., surveyors, 15, East Port, Dunfermline.

Orders Placed

Stockport.—Electricity Committee. Accepted. Cables (£3,224).—Scottish Cables.

Stockton-on-Tees. — Corporation. Accepted. Transformers (3) for substations.—C. A. Parsons & Co. H.v. switchgear.—A. Reyrolle & Co. L.v. switchgear.—W. Lucy & Co.

Watford.—Electricity Committee. Accepted. Transformers.—Metropolitan-Vickers (£1,105); Brush Electrical Engineering Co. (£708).

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.

Ashington. — Houses (54), Woodhorn Demesne; U.D.C. surveyor.

Barnsley.—Houses: H. Hibbert, Barnsley (28); W. Goodyear & Son, Barnsley (52); and C. W. Squire & Son, Ltd., Barnsley (35).

Billingham-on-Tees. — Houses (75), Billingham Junction; U.D.C. surveyor.

Buckingham. — Extensions, Buckingham Hospital; L. Hartridge, hon. secretary, Buckingham Hospital Board.

Burnage.—Additions to Duchess of York Hospital for Babies, Cringle Hall Road; Bradshaw Gass & Hope, architects, 19, Silverwell Street, Bolton.

Burnley.—Permanent houses (236), in three groups; borough engineer, Town Hall.

Chatham.—Houses (58), Wayfields Avenue; Stoner & Sons, surveyors, 69, Lincoln's Inn Fields, London, W.C.2.

Cheshire.—Nurses' quarters at West Park (County) General Hospital, Macclesfield; E. M. Parkes, county architect, The Castle, Chester.

Cupar.—Permanent houses (24), with electrical work, Braehead site; A. D. Haxton, architect, 5, Scoonie Place, Leven.

Dartford.—Houses (74), Broomhill Road; H. C. Richardson & Co., Ltd.

Doncaster.—Permanent houses (156), on various sites; estates surveyor, 3, Priory Place.

Dumbarton.—Housing scheme (electric), for County Council; J. Weekes, county architect, 18, Park Circus, Glasgow.

Dunblane (Perthshire).—32 houses for Town Council (electrical work); town clerk.

Ennerdale (Cumberland).—Houses (50), for key workers; R.D.C. surveyor.

Forehoe and Henstead.—Houses (72), for R.D.C.; C. H. Dann, architect, 7, The Crescent, Norwich.

Glasgow.—Electrical repair workshop at Dalmarnock Works; Sir Wm. Arrol & Co., Ltd.

Proposed erection of annexe at Blairvadach Home (£17,500); city architect.

Hinckley.—Houses (50), for U.D.C.; F. Garner & Sons, builders, Loughborough Road, Leicester.

Hull.—Blocks of flats, William Street area; city architect.

Kettering.—Omnibus station, Northampton Road; United Counties Bus Co., Ltd., Houghton Road, Northampton.

Kilmarnock.—Houses (24) with electrical work; T. C. Stewart, measurer, 61, Portland Street.

Kirkcaldy.—Houses (50); burgh engineer.

Lancaster.—Laundry and alterations to school at the Royal Albert Institution; T. W. Helme, J.P., Springfield Hall.

Houses (72), Hare Runs estate; J. Parkinson & Son, Ltd., builders, Parliament Street.

Liverpool.—Permanent kitchen and dining hall block at Alsop High School for Boys, Queen's Drive; L. H. Keay, city architect, Blackburn Chambers, Dale Street.

Mold.—Permanent houses (40), Bridge Street, for U.D.C.; F. A. Roberts, architect, Earl Chambers.

Newcastle-on-Tyne. — Laboratories for King's College; W. B. Edwards, architect, 52, Eldon Place.

Northumberland.—New schools at Longbenton Wideopen, Morpeth Stobhill Gate and Wallsend, and completion of Amble Modern School; county architect, County Hall, Newcastle-on-Tyne.

Northwich.—Permanent houses (270), for R.D.C.; J. Birtwistle, surveyor, Whitehall, Hartford, Cheshire.

Nuneaton.—Modern central omnibus station, Harefield Road; Midland Red Omnibus Co., Ltd., Bearwood.

Rotherham.—Cinema, High Street; Union Cinemas, Ltd.

Seaham.—Permanent houses (74), Parkside; U.D.C. surveyor.

Sheffield.—Extensions at Nether Edge Hospital for maternity unit (£23,850); W. G. Davies, city architect.

Staffordshire.—Girls' Secondary Grammar School, Wolstanton; A. C. H. Stillman, county education architect, Stafford.

Stratford-on-Avon. — Permanent houses (32), Tiddington; borough engineer, Municipal Offices.

Swansea.—Rebuilding wards, General and Eye Hospital, St. Helens Road; secretary.

Extensions, Plate Mill, Landore; Imperial Chemical Industries, Ltd.

Urmston.—Houses (42), Kingsway site, and bungalows (14), Milford Avenue site; E. L. Leeming, surveyor, Council Offices, Crofts Bank Road.

Wellington (Salop). — Permanent houses (30), Hadley, for R.D.C.; J. Brian Cooper, architect, 177, Corporation Street, Birmingham, 4.

Wigan.—Church; Rev. J. Lawton, curate in charge, St. Anne's Church, Beech Hills, Wigan.

Worcestershire.—Police houses on 13 sites; S. N. Cooke, architect, Sun Buildings, Bennett's Hill, Birmingham.

York.—Sports stadium and greyhound racing track, Osbaldwick Lane (£50,000); Peacock & Bell, Downhill Street.

Forthcoming Events

Saturday, October 27th.—*Cardiff.*—At South Wales Institute of Engineers, 5 p.m. South Wales Branches of Illuminating Engineering Society, Association of Mining Electrical and Mechanical Engineers and National Association of Colliery Managers. "Lighting in Hazardous Places," by S. W. Richards.

Monday, October 29th.—*London.*—Institution of Electrical Engineers, 5.30 p.m. Informal discussion on "Should Engineering Concerns be Managed by Engineers?" to be opened by the president, Dr. P. Dunsheath, O.B.E.

Bradford.—Technical College, 7.15 p.m. Bradford Engineering Society. "Measurement and Inspection in Engineering Workshops," by T. Curson.

Birmingham. — James Watt Institute, 6.45 p.m. I.E.E. South Midland Students' Section. "Some Mechanical Aids to Engineering Calculations," by G. A. Montgomerie.

Tuesday, October 30th. — *Manchester.* — Engineers' Club, 6 p.m. I.E.E. North-Western Centre Transmission Group. "Operation, Maintenance and Testing of Overhead Lines and Associated Outdoor Equipment on AC Systems," by R. C. Hatton and Dr. J. McCombe.

Rugby.—Corporation Electricity Showrooms, 7 p.m. I.E.E. Rugby Sub-Centre. Address by F. J. Elliott.

Loughborough. — Loughborough College. I.E.E. East Midland Sub-Centre. "Operational Control of Electricity Supply Systems," by W. Kidd and E. M. S. McWhirter.

Coventry.—I.E.E. South Midland Students' Section. "Wave Guides," by C. Stokes.

Thursday, November 1st. — *London.* — Institution of Electrical Engineers, 5.30 p.m. "Practical Aspects of Telephone Interference Arising from Power Systems," by P. B. Frost, B.Sc. (Eng.), and E. F. H. Gould, B.Sc. (Eng.).

Glasgow.—At Institution of Engineers and Shipbuilders in Scotland, 7 p.m. Illuminating Engineering Society (Glasgow Centre). Address by H. C. Weston, president of the Society.

Friday, November 2nd. — *Birmingham.* — Imperial Hotel, Temple Street, 5.30 p.m. Illuminating Engineering Society (Birmingham Centre) and Association of Supervising Electrical Engineers (Birmingham and District Branch). "Circuits for Discharge Lamps," by R. Maxted, B.E., and J. N. Hull, B.Sc. (Eng.).

Newcastle-upon-Tyne. — Neville Hall, 6.30 p.m. I.E.E. North-Eastern Students' Section. "Possible Developments of AC Switchboard Instruments," by H. M. S. Smith.

Newcastle-upon-Tyne. — At Literary and Philosophical Society's Lecture Theatre, 6 p.m. North East Coast Institution of Engineers and Shipbuilders. Andrew Laing Lecture: "Problems of the Metallic State," by Sir Lawrence Bragg, O.B.E., M.C., F.R.S.

Monday, November 5th. — *Birmingham.* — James Watt Institute, 6 p.m. I.E.E. South Midland Centre. "Survey of X-rays in Engineering and Industry," by V. E. Pullin, C.B.E.

Liverpool.—Royal Institution, Colquitt Street, 6 p.m. I.E.E. Mersey and North Wales Centre. "Excess-current Protection by H.R.C. Fuses on Medium-voltage Circuits," by R. T. Lythall, and "Excess-current Protection by Over-current Relays on Medium-voltage Circuits," by A. G. Shreeve and P. J. Shipton.

Sheffield.—University, Western Bank, 6 p.m. Illuminating Engineering Society (Sheffield Centre). "Illumination and Illusion," by P. Hartell, A.M.I.E.E.

Tuesday, November 6th. — *London.* — Connaught Rooms, 12.45 for 1.15 p.m. Institute of Transport. Anniversary luncheon.

London.—Institution of Electrical Engineers, 7 p.m. London Students' Section. "Brains Trust" meeting.

Coventry.—Electricity Showrooms, Corporation Street, 6 p.m. Coventry Electric Club. "Cables for Special Conditions," by P. W. Cave, B.Sc., M.I.E.E.

Friday, November 9th. — *Birmingham.* — Grosvenor Room, Grand Hotel. Birmingham Electric Club. Reunion dance.

Newcastle-upon-Tyne. — Old Assembly Rooms. I.E.E. North-Eastern Students' Section. Annual dance.

Friday, November 16th. — *Bath.* — I.E.E. Bristol Students' Section. "Brains Trust" meeting (questions by November 6th).

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.

THE CHARGE for advertisements in this section is 2/- per line (approx. 7 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.

OFFICIAL NOTICES, TENDERS, ETC.

CITY OF PLYMOUTH

Electricity Supply Department

THE Plymouth Corporation invite tenders for the supply of:—

A. METERS.
B. UNDERGROUND JOINT BOXES.

Applications for specifications and forms of tender should be addressed to the City Electrical Engineer, Armada Street, Plymouth. Completed tenders must reach the undersigned not later than noon on the 10th November, 1945.

COLIN CAMPBELL,
Town Clerk.

October, 1945.

3192

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.

MALVERN URBAN DISTRICT COUNCIL

Electricity Department

Appointment of Mains Assistant Engineer

APPLICATIONS are invited for the above appointment, at a salary in accordance with Class B, Grade 6, of the National Joint Board Schedule (£361 to £375 per annum).

Applicants must have had a sound technical training and practical experience in the installation, maintenance and operation of E.H.T. and L.T. underground cable systems and substations, and be able to undertake work of layout design and planning and the keeping of records.

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.

The selected candidate will be required to provide his own motor vehicle and the Council will pay a travelling allowance in accordance with their current scale.

Applications, endorsed "Mains Assistant Engineer," stating age, full particulars of experience and qualifications, together with copies of three recent testimonials, must be received by the undersigned not later than Saturday, the 10th November, 1945.

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

J. BULMAN,
Clerk of the Council.

The Council House,
Malvern.
20th October, 1945.

3182

BOROUGH OF ROYAL TUNBRIDGE WELLS

Appointment of Borough Electrical Engineer

APPLICATIONS are invited for the appointment as from 1st May, 1946, of Borough Electrical Engineer from Corporate Members of the Institution of Electrical Engineers experienced in the management and administration of an electricity undertaking.

Salary for the position will be in accordance with the agreement dated 9th July, 1941, made by the National Joint Committee of Local Authorities and Chief Electrical Engineers, and in accordance therewith 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 for the third and subsequent years. The full approximate salary for the financial year ending 31st March, 1946, would be £1,323. In addition, a temporary cost of living bonus is 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; the successful candidate will be required to pass a medical examination.

No printed forms of application will be issued. Applications, endorsed "Electrical Engineer," stating full particulars of age, qualifications, past and present appointments and experience, and giving the names and addresses of three persons to whom reference can be made, to be received by the undersigned not later than Thirty-first December, 1945. Testimonials are not required. Members of H.M. Forces who have the necessary qualifications are invited to apply for the appointment.

Canvassing, directly or indirectly, will be a disqualification.

The Control of Engagement Order, 1945, does not apply to this vacancy.

JOHN WHITEHEAD,
Town Clerk.

Town Hall,
Tunbridge Wells.
October, 1945.

3146

COUNTY BOROUGH OF BURY

Electricity Department

Appointment of Switchboard Attendant

APPLICATIONS are invited for the above appointment. Candidates should have had experience in the operation of E.H.T. switchboards and practical experience in a Power Station. Conditions of service and rate of pay will be in accordance with the National Joint Board Schedule, at present Grade 9a, Class G.

The successful applicant will be required to pass a medical examination and to contribute to the Corporation's Superannuation Fund.

Applications, stating age and details of training and experience, together with copies of two testimonials, should be forwarded to the Engineer and Manager, Electricity Department, Bury, endorsed "Switchboard Attendant," not later than 5th November, 1945.

The Ministry of Labour and National Service have given permission under the control of Engagement Order, 1945, to advertise this vacancy.

EDWARD S. SMITH,
Town Clerk.

Municipal Offices,
Bank Street, Bury.
20th October, 1945.

3181

BOROUGH OF WILLESDEN

Electricity Department

Appointment of Deputy Borough Electrical Engineer and Manager

APPLICATIONS are invited for the above position from Engineers who have had a sound technical education and technical, administrative and commercial experience with a progressive electricity supply undertaking, who will be responsible to the Borough Electrical Engineer and Manager for the operation of all departments and activities of the Undertaking. Applicants must be Corporate Members of the Institution of Electrical Engineers, and preference will be given to those possessing also an engineering degree.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, after a probationary period of six months. The selected applicant will be required to pass a medical examination. The salary and conditions of service will be in accordance with the schedule of salaries and conditions of employment, National Joint Board of Employers and Members of Staff Electricity Supply Industry, Class H, Grade 1, at present £867-£920 per annum, plus a car allowance in accordance with the Council's scale, at present £75 per annum.

Applications must be made on the application forms to be obtained from the undersigned, and should be returned to the undersigned, together with copies of three recent testimonials, not later than November 19th, 1945, endorsed "Deputy Borough Electrical Engineer and Manager."

Canvassing in any form is prohibited and will disqualify.

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

W. T. PIRIE,
Town Clerk.

Town Hall,
Dyne Road, N.W.6.
16th October, 1945. 3133

BOROUGH OF MORLEY

Electricity Department

Appointment of Demonstrator and Showroom Attendant (Female)

APPLICATIONS are invited for the above appointment at a salary in accordance with the Corporation's Scale, Grade D, £195-£15-£225, plus war bonus, which at present is £48 5s. per annum.

Candidates must have a good general education and hold a recognised diploma in Domestic Science, be competent to conduct lecture-demonstrations both in the showrooms and on consumers' premises, and to advise customers on the selection and use of electrical appliances.

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

Applications, stating age, qualifications and experience, together with copies of recent testimonials, to be sent to the undersigned not later than Friday, 9th November, 1945.

W. H. METCALFE,
Engineer and Manager.

Electricity Works,
Morley, Yorks. 3106

LINCOLN CORPORATION

Electricity Department

Appointment of Senior Demonstrator

APPLICATIONS are invited for the position of SENIOR DEMONSTRATOR for the above department. Applicants must have a good knowledge of cooking and be able to demonstrate all types of appliances.

Candidates having specialised in "war-time" cookery and having co-operated with the Ministry of Food will receive special consideration.

Salary in accordance with the Corporation's scale, £150-£200 + bonus, at present £48 2s.

Applications, giving full particulars, stating age, whether married or single, should be addressed to the undersigned not later than the 10th November, 1945.

F. NEWEY, M.I.E.E.,
Engineer and Manager.

Electricity Dept.,
Brayford Side North,
Lincoln. 3134

CITY OF YORK

Appointment of City Electrical Engineer

APPLICATIONS are invited for the position of City Electrical Engineer. Applicants must have experience in the operation of a "Selected" generating station as well as in the administration and management of an electricity undertaking, and must be Corporate Members of the Institution of Electrical Engineers.

The person appointed will be required to devote the whole of his time to the duties of the office.

The salary will be in accordance with the scale of the National Joint Committee of Local Authorities and Chief Electrical Engineers.

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 appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the Sick Allowance Regulations of the Council. The successful candidate will be required to pass satisfactorily a medical examination.

The appointment will be determinable by three months' notice on either side.

Applications, stating age, education, training, qualifications, experience and present appointment, accompanied by copies of three recent testimonials, must reach the undersigned not later than 10 a.m. on the 29th day of November, 1945, endorsed "City Electrical Engineer."

Canvassing, either directly or indirectly, will be a disqualification.

T. C. BENFIELD,
Town Clerk.

Guildhall, York.
16th October, 1945. 3131

CORPORATION OF MAIDENHEAD

Electricity Department

Appointment of Three Switchboard Attendants

APPLICATIONS are invited to fill the above vacancies from applicants experienced in the control of 11,000-volt and low pressure switchboards and rotary converting plant.

Conditions of service and rates of pay will be in accordance with the Home Counties (No. 9 Area) Joint Industrial Council—present rate £5 9s. per week.

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

Applications, giving age, whether married or single, and details of training and experience, together with copies of two testimonials, to be delivered to the undersigned not later than Saturday, November 3rd, 1945.

Publication by permission of the Ministry of Labour and National Service under Control of Engagement Order, 1945.

C. A. BRITTON,
Borough Electrical Engineer.

Braywick Road,
Maidenhead, Berks. 3122

HEYWOOD CORPORATION

Electricity Department

Appointment of Rotary Substation Attendant

APPLICATIONS are invited for the position of Rotary Substation Attendant for shift duty in the Corporation Electricity Works. Applicants should have sound experience in the control of high and low pressure switchboards, and in the operation of rotary converting plant.

Conditions of service and rates of pay are in accordance with District Council No. 3, N.W. Area. Capacity in kWs. 1,001/2,000. The position is NOT subject to superannuation.

Applications, giving age, details of experience and enclosing copies of recent testimonials, to be delivered to the undersigned on or before Monday, November 5th, 1945, and endorsed "R. S. A."

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

H. C. DAY,
Borough Electrical Engineer.

Electricity Dept.,
Egerton Street,
Heywood, Lancs. 3140

URBAN DISTRICT COUNCIL OF HOYLAKE

Electricity Department

Appointment of Mains Superintendent

APPLICATIONS are invited for the above appointment from Electrical Engineers (not over 45 years of age) who have had considerable experience in an Electricity Supply Undertaking in the layout, operation and maintenance of H.T. and L.T. systems, three-phase and single-phase distribution from bulk supply, 11,000 volts, also some administrative experience.

Corporate membership of the Institution of Electrical Engineers is desirable.

The salary will be in accordance with Grade 3, Class E, of the National Joint Board Schedule, at present being £563 per annum. The appointment will be subject to the Local Government Superannuation Act, 1937, and the successful applicant will be required to pass a medical examination.

Applications, endorsed "Mains Superintendent," stating age and giving details of training and subsequent experience, accompanied by copies of three testimonials, should be delivered to the undersigned not later than the 15th November, 1945.

If the successful candidate is serving with H.M. Forces application for his release will be made immediately.

Canvassing, directly or indirectly, will disqualify.

T. ELVED WILLIAMS,
Clerk of the Council.

Town Hall,
Hoylake, Cheshire.
19th October, 1945. 3154

COUNTY BOROUGH OF HALIFAX

Electricity Department

Assistant Mains Engineer

APPLICATIONS are invited for the above appointment, preferably from Electrical Engineers who are Corporate or Graduate Members of the Institution of Electrical Engineers, or hold equivalent qualifications. Experience in the control of workmen and the general operation of high and low voltage distribution systems is essential. Salary and conditions of service will be in accordance with the National Joint Board Schedule, the present salary being £445 (Class G, Grade 7).

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

Applications, stating age and giving full particulars of training and experience, together with copies of testimonials, should be forwarded to the undersigned not later than Monday, 12th November, 1945.

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

A. G. CONNELL,
M.I.E.E., M.I.Mech.E., F.Inst.F.,
Borough Electrical Engineer and Manager.

Electricity Department,
19/23, Northgate, Halifax. 3183

COUNTY BOROUGH OF WALLASEY

Electricity Department

Appointment of Assistant Station Superintendent

APPLICATIONS are invited by the 5th November for the above appointment at a salary in accordance with Class G, Grade 7, of the National Joint Board Schedule—at present £445-£472 p.a. Applicants must be corporate members of the Institution of Electrical Engineers, with sound practical experience in the operation and maintenance of high pressure plant in a modern power station.

A form of application and further particulars will be supplied by the Electrical Engineer and Manager, Wallasey Road, Wallasey, on receipt of a stamped and addressed foolscap envelope.

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

EMRYS EVANS,
Town Clerk.

10th October, 1945. 3097

COUNTY BOROUGH OF ST. HELENS

Electricity Department

Appointment of Junior Mains Assistant

APPLICATIONS are invited for the above position with salary and conditions in accordance with Grade 9a, Class G, of the National Joint Board's Schedule, at present £307 per annum.

Candidates must be experienced in the operation of high and medium voltage A.C. distribution and D.C. systems, and must possess theoretical qualifications at least equivalent to the Higher National Certificate in Electrical Engineering.

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

Applications, accompanied by copies of not more than three testimonials, must be made on the form obtainable from the address given below, and be received not later than 5th November, 1945, endorsed "Junior Mains Assistant."

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

P. BREGAZZI, A.M.I.E.E.,
Electrical Engineer and Manager.

Electricity Works,
Carlton Street,
St. Helens, Lancs. 3113

BOROUGH OF ROYAL TUNBRIDGE WELLS

Electricity Department

Appointment of Assistant Demonstrator (Female)

APPLICATIONS are invited for the above appointment at a commencing salary of £120 per annum, rising to £210 per annum, plus war bonus.

Candidates must have had a good general education and hold a recognised diploma in Domestic Science, and possess a thorough knowledge of the use of electrical domestic appliances; possession of the E.A.W. Electrical Housecraft Diploma will be an advantage. They must be competent to assist in the organising and conducting of Lecture Demonstrations and advise consumers on Kitchen Planning and the selection and use of electrical apparatus.

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

Canvassing, directly or indirectly, will be a disqualification.

Applications, endorsed "Assistant Demonstrator," stating full particulars of age, qualifications, past and present appointments and experience, and giving the names of three persons to whom reference can be made, should be submitted to the Borough Electrical Engineer, Tunbridge Wells, not later than 16th November, 1945. By permission of the Ministry of Labour and National Service under the Control of Engagement Order, 1945.

JOHN WHITEHEAD,
Town Clerk.

Town Hall,
Tunbridge Wells.
October, 1945. 3180

STRETFORD AND DISTRICT ELECTRICITY BOARD

Appointment of Assistant Substation Superintendent

APPLICATIONS are invited for the above appointment from persons who have had experience in a similar position. Candidates must have high technical ability and must be competent to take charge of the commissioning, maintenance and operation of all plant in substations of capacity up to 30,000 kWs, dealing with voltages up to 33,000 on a system having a maximum demand of approximately 70,000 kWs.

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

The salary will be in accordance with Class H, Grade 8a, of the National Joint Board's Schedule, at present £409 per annum, rising to £429 per annum.

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

Applications, endorsed "Assistant Substation Superintendent," giving details of training, experience and qualifications, together with copies of testimonials, should reach the undersigned not later than Saturday, 10th November, 1945.

C. TREWAVAS,
Clerk to the Board.

Town Hall, Stretford.
22nd October, 1945. 3184

COUNTY BOROUGH OF SOUTHPORT

Appointment of Consumers' Engineer

APPLICATIONS are invited for the position of Consumers' Engineer. Candidates at present serving with H.M. Forces will receive every consideration.

Applicants must have had experience in the preparation of estimates for and supervising of consumers' electrical installations for Lighting, Heating and Power, installing and maintenance of Electric Cookers and other appliances; also dealing with consumers' enquiries.

Salary will be in accordance with the N.J.B. Schedule, Class G, Grade 8b. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1922; medical examination necessary.

Candidates should give particulars of their qualifications, experience and age, together with copies of two recent testimonials.

Applications, endorsed "Consumers' Engineer," should be addressed to the Borough Electrical Engineer, 188, Lord Street, Southport, and must be received by Monday, November 5th, 1945.

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

R. E. PERRINS,
Town Clerk.

Southport.
11th October, 1945. 3159

A company in the London area requires a first-class Technical Sales Representative to sell fractional horse power motors in this country. Sound knowledge of markets essential. The product is a precision instrument of the highest quality. The position calls for drive, energy and vision, and offers considerable scope. Age between 35 and 40. Replies to—Box 3088, c/o The Electrical Review.

A Manager required for small progressive Electrical Wholesale business London and Eastern Counties area. Permanency and excellent prospects for capable man with good wholesale trade experience, wiring accessories and appliances. Successful applicant should have initiative to develop and expand a business which has been comparatively dormant during war to ultimately become director. Replies treated in strictest confidence. State experience, age, suggested commencing salary.—Box 7851, c/o The Electrical Review.

APPLICATIONS invited from men becoming available for civilian work on Class A demobilisation, for positions as experienced practical Model makers, in the Instrument Department of a large electrical manufacturer in the Midlands. Only men with previous experience in this class of work need apply. Applicants should state age and previous employer, with details of work in each case, to—Box 2980, c/o The Electrical Review.

ARMATURE Winders, experienced all classes A.C. and D.C. jobs. Class A ex-Servicemen or otherwise exempt M.O.L. control. Permanencies for suitable men.—Service Electric Co. Ltd., Abbey Mfg. Estate, Alperton. Telephone, Wembley 0194. 49

ARMATURE Winders, experienced in A.C. and D.C. work. Permanent jobs for suitable men with firm having good post-war future. Class A ex-Servicemen or otherwise exempt Ministry of Labour control.—Southern & Redfern Ltd., Woodhead Road, Bradford. 3066

ARMATURE Winders used to repair work, for S.W. London. All classes A.C. and D.C. jobs. Good conditions. Permanency for right type of men. Class A ex-Servicemen or over 51.—Box 7852, c/o The Electrical Review.

ARMATURE Winders required. Experienced in all classes of repair work, A.C. or D.C. Class A, or otherwise exempt from Control of Engagement Order.—E. I. Ltd., Faraday Works, Stoney Stanton Road, Coventry. 3153

ASSISTANT Constructional Engineers required by an important firm of engineers and contractors for service at home and abroad. Candidates should be qualified civil engineers with experience in steam, oil, and hydro power stations and transmission line construction. Electrical experience desirable. Salary £30 to £45 per month. Candidates should not be over 45 years of age. Write quoting E.1968XA to Ministry of Labour and National Service, Appointments Department, Technical and Scientific Register, Room 670, York House, Kingsway, London, W.C.2., for application form which must be returned completed by 5th November, 1945. 3123

ASSISTANT Electrical Planning Engineer required by radio valve manufacturers in S.E. London area for design and development of electrical equipment required in the manufacture of radio valves. Must have technical qualifications and experience of complicated light circuit work such as in automatic telephones. Applications from Class A ex-Servicemen or those over 51 only. Write stating age, experience and salary required to—Box 7814 A. K. Advg., 212a, Shaftesbury Avenue, London W.C.2. 3127

ASSISTANT, male (Class A ex-Serviceman or over 51) or female for retail electrical shop in London, must be willing and reliable, state experience and wages expected. Reply—Box 73, c/o The Electrical Review.

ASSISTANTS required in Publicity Department of large electrical manufacturing company in the Midlands. Applicants must have ability to layout trade and technical publications, possess knowledge of commercial art and modern type faces, and be able to prepare good visuals. Applications in confidence, stating age, previous experience and salary required to—Box 3145, c/o The Electrical Review.

CABLE Maker requires first-class Head Foreman, age 30-45, with good general experience T.R.S. synthetic braided cables, good organiser, able to handle labour. Good opportunity for advancement right man. Apply, giving full particulars.—Aerialite Ltd., Stalybridge. 3071

CHARGE Hand Electricians and Electricians required immediately for installation and plant maintenance in South, Midlands and Scotland. Permanency to suitable men, good prospects. Class A ex-Servicemen, men over 51 and those exempt from M. of L. control only need apply, giving full particulars, to—Messrs. Chas. Richardson & Sons, Romiley, Stockport. 3152

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. 24

CONTRACTORS require qualified Engineer experienced cable and overhead line work, preferably aged about 30. Applications invited from Class A ex-Servicemen.—Box 3121, c/o The Electrical Review.

CONTRACTORS require young Class A ex-Serviceman to train as Assistant Engineer, cable overhead and installation work.—Box 3120, c/o The Electrical Review.

COUNTER Assistant, essential good knowledge of the trade, Class A ex-Serviceman. State experience, age, salary, etc., to—General Manager, Sloan Electrical Co. Ltd., 41, Kingsway, W.C.2. 3156

DEPARTMENTAL Manager required by company, West Country area, to take charge of large-scale Loud Speaker production. Applicants must have extensive experience in similar capacity. Write details of qualifications, past experience, etc. to Box 3115, c/o The Electrical Review.

ELECTRICAL contractors in West Midlands require Manager with knowledge of all classes of power and lighting installations. To the right applicant a permanent and progressive position is assured. Full details, in confidence, stating qualifications, age, experience and salary required.—Box 3138, c/o The Electrical Review.

ELECTRICAL Draughtsman, exempt from Control of Engagement Order, for Lift Engineers in Yorkshire. Higher National standard, or equal. Permanent position with good prospects. Apply, stating age, experience and salary required.—Box 3167, c/o The Electrical Review.

ELECTRICAL manufacturers require for London Lighting Department an energetic, well-educated man. Lighting and electrical training and commercial experience essential. For technical commercial office work with all types of lighting fittings and illumination. Correspondence, specifications, sales, etc. British National. Medical examination. Applications from Class A ex-Servicemen or those over 51 only. Detailed particulars and salary required to —Box 3147, c/o The Electrical Review.

ELECTRICIAN wanted immediately. Permanency for good all round man with thorough knowlege of trade. Good prospects. Applications from Class A ex-Servicemen or over 51 only. Write stating age and experience to—Box 3190, c/o The Electrical Review.

ELECTRICIAN - Wiremen for installation and maintenance work. Class A ex-Servicemen or otherwise exempt from Ministry of Labour control.—C. F. Parkinson, Electrical Contractor, 114, West St., Boston, Lincs. 7763

ELECTRICIANS and Assistants required for London and Provinces. Class A ex-Servicemen or over 51.—Geo. E. Taylor & Co. (London) Ltd., 36, Denmark Avenue, Wimbledon, S.W.19. Wim. 5021. 3062

ELECTRICIANS and Assistants required for London housing programme. Best conditions, permanency for right men. Class "A" ex-Servicemen, or otherwise free.—Box 44, c/o The Electrical Review.

ELECTRICIANS and Assistants wanted. Class A ex-Servicemen or over 51. Permanency to right men.—J. H. Plant Ltd., 99, St. Martin's Lane, Charing Cross, W.C.2. 7798

ELECTRICIANS required by East Anglian Electric Supply Co. Ltd., Finborough Hall, Stowmarket, Suffolk. Applicants should be Class A ex-Servicemen or exempt from labour control. 7846

ELECTRICIANS required for industrial installation and maintenance work. Must be used to screwed conduit. Class A ex-Servicemen or otherwise exempt M.O.L. Control. Permanenceis for suitable men.—Service Electric Co. Ltd., Abbey Manufacturing Estate, Alperton, Telephone, Wembley 0194. 48

ELECTRICIANS wanted immediately. A priority work. Class A ex-Servicemen or men otherwise free. Applications from demobilised pre-war employees especially appreciated. Apply—Holliday Hall & Stinson Limited, 36, Victoria Street, Westminster, S.W.1. 7732

ENGINEERS and Draughtsmen, becoming available for civil employment, under Class A demobilisation, are invited to apply for positions in the Switchgear Department of a large electrical engineering manufacturer in the Midlands. Applications stating age, appropriate technical qualifications and industrial experience, and salary required, to—Box 69, c/o The Electrical Review.

ENGINEERS and Draughtsmen, becoming available for civil employment under Class A demobilisation, are invited to apply for positions in the heavy electrical plant departments (comprising electrical machines and transformers of all kinds) of a large electrical engineering manufacturer in the Midlands. Applications, stating age, appropriate technical qualifications and industrial experience, and order of salary required, to—Box 71, c/o The Electrical Review.

ENGINEERS and Draughtsmen, becoming available for civil employment under Class A demobilisation are invited to apply for positions in the Control Gear Department of a large Electrical Engineering Manufacturer in the North East Midlands. Applications stating age, experience, technical qualifications and salary required to—Box 3178, c/o The Electrical Review.

EXPERIENCED Armature and Stator Winders, good opportunity for right men, over 51 or from Class A ex-Servicemen only. Write, giving details of past experience, to—Vickalectric Engineering Co., 503, Walsgrave Road, Coventry. 7804

EXPERIENCED Estimator required for industrial installation work in the Midlands. Class A release or over 51.—The Midland Electric Installation Co. Ltd., Cyprus Works, Upper Villiers Street, Wolverhampton. 3005

EXPERIENCED Purchase Order Progress Clerk required by company engaged in the production of radio and light electrical engineering. Applicants must possess at least two years' experience in this class of work, and must also possess good contacts with companies engaged in the production of radio components and raw materials required for the production of radio receivers, and they must also possess good personality. Applications from Class A ex-Servicemen or those over 51 only. Write stating age, experience and salary required to—Box 7815, A. K. Advg., 212a, Shaftesbury Avenue, London, W.C.2. 3128

FOREMAN Armature Winder, experienced all sizes A.C. and D.C. motors. Class A ex-Serviceman, or otherwise exempt Ministry control. Good wages, small Nottingham firm. State full particulars of training and experience, age.—Box 3111, c/o The Electrical Review.

FOREMAN Electrician to assist in small contractor's business, able to estimate and make up accounts. Applications from Class A ex-Servicemen or those over 51 only. Write in first instance to Mr. O'Brien, c/o H. Hollidge, 70a, Bedford Hill, Balham, S.W.12. 7853

FOREMAN-Electroplater, to take charge of small plant working chiefly nickel, with barrelling, rumbling and polishing, in Felixstowe. Applicants must have sound knowledge and experience of the trade, and a good opportunity is provided. State age, experience and rate expected. Applicants must be free from restrictions of the Control of Engagement Order.—Box 3021, c/o The Electrical Review.

FOREMAN required to take charge of Winding Department employing approximately 100 operatives. Must be thoroughly experienced in both A.C. and D.C. windings for small machines and also capable of winding first samples of special designs. Applicants with experience in handling labour should give full particulars of experience, salary required, etc. Applications only from Class A ex-Servicemen, those over 51, and others exempt from the provisions of the Control of Engagement Order, 1945.—Box 3193, c/o The Electrical Review.

HEAD Foreman for Coil Winding Department required by company engaged in large-scale manufacture of light to medium electrical products, West Country area. Applicants must have extensive experience similar capacity with firms of repute. Write full details of qualifications, past experience, to—Box 3114, c/o The Electrical Review.

IVERSON Electrical Ltd. will welcome the return of all their former Electricians and Electrical Assistants. Work available to all Class A ex-Servicemen, and those over 51, in all parts of London and in most areas of England. Apply personally, or in writing, to—Personnel Manager, 346/352, Kilburn High Rd., London, N.W.6. 3164

LARGE manufacturers of fractional horse power electric motors in East London area (modern factory) require Head Tester and Electrical Designer. Class A ex-Serviceman, or over 51. Apply stating age, experience, salary and full details, to—Box 3168, c/o The Electrical Review.

LARGE manufacturers of fractional horse power electric motors require Stores Control Head Clerk. Able to work on own initiative, and purchase requirements. Class A ex-Serviceman, or over 51. East London area (modern factory). Write stating age, experience, and salary required, to—Box 3169, c/o The Electrical Review.

LECTURERS in Electrical Engineering. Overseas. Applications are invited for posts as Lecturers in Electrical Engineering in the Department of Engineering of the Cape Technical College, Cape Town, South Africa, preparing apprentices for the National and Advanced Technical Certificates of the Union Department of Education. Engineering degree and practical experience in modern engineering plans is desirable. Successful candidates will be required to assume duty by 1st February, 1946. Salary £400 by £20 to £500 by £25 to £600, plus 5% temporary war allowance, plus temporary cost of living allowance at public service rates, at present £112 p.a. for married men and £32 p.a. for single men. An allowance of £60 travelling expenses will be made and half pay, substantive, during the voyage. Commencing salary may be higher than the initial level according to experience and qualifications. Write, quoting D.1510A, to Ministry of Labour and National Service, Appointments Department (Technical and Scientific Register), Room 670, York House, Kingsway, London, W.C.2, for application form, which must be returned completed by 8th November, 1945. 3155

LIFTS.—Evans Lifts Ltd., invite applications for positions on Sales Staff in London, from gentlemen experienced in Civil Engineering and Interviewing. Please write full details in confidence to—Managing Director at Head Office, Abbey Lane, Leicester. 3130

LIGHTING Fittings Designer, British, required for Central London by large manufacturers. Commercial and industrial lighting equipment for tungsten, fluorescent and discharge lamps. Electrical and illumination training and experience essential. Medical examination. Applications from Class A ex-Servicemen or those over 51 only. State salary and full particulars to—Box 3148, c/o The Electrical Review.

MANAGER for electrical department of an established business. Must have good credentials and experience, be able to estimate, take complete control and obtain the business. Good opening for progressive man. Write, stating age, experience and salary required, to—Box 3775, Frost-Smith Advg., 64, Finsbury Pavement, E.C.2. 2998

MANAGER required for electrical contractors, London, capable of handling staff, estimating and supervising. Excellent prospects for live man. Write stating age, experience and salary required to—Box 3191, c/o The Electrical Review.

MANAGER required for Paper Cable Factory in West of England. Applicant should be familiar with manufacture of super tension cables, and preference will be given to one capable of dealing with technical enquiries. Write stating age, experience, and salary required to—Box 3142, c/o The Electrical Review.

MANAGER required to take charge of technical development and research in the design and production of small electric motors. Please send full details of experience and salary required.—Box 3099, c/o The Electrical Review.

MANUFACTURER of electrical transformers in London has vacancies for men with some electrical knowledge in the Winding and Assembly Departments. The company is prepared to give the specialised training necessary to approved applicants, with a view to permanent employment at good rates of pay. Semi-skilled rates would be paid initially, to be increased to full-skilled rates immediately it is clear that the applicant will become a satisfactory tradesman. Five-day week of 47 hours with occasional overtime. Applications from Class A ex-Servicemen and others exempt from M.O.L. control only.—Box 3068, c/o The Electrical Review.

MEDIUM size firm specialising in variety of special small electric motors require Production Engineer, over 51 or Class A ex-Serviceman, for batching up work and issuing shop orders and general progress planning. Full particulars of age, qualifications and experience to—Box 3002, c/o The Electrical Review.

OVERSEAS Employment. Assistant Electrical and Mechanical Engineer required by the Government of Iraq for the Basrah Port Directorate for three years in the first instance. The appointment is not pensionable but there is a Provident Fund. Free passages and liberal leave on full salary. Salary I.D. 80 rising by annual increments of I.D. 2 to I.D. 90 a month (I.D. 1 = £1). High cost of living allowance of I.D. 24 a month. Candidates must have had wide general experience and be able to undertake the supervision under the Chief Electrical and Mechanical Engineer, of the electrical and water distribution systems of the Port, including substations, cold storage, air conditioning and ice plants and also the maintenance of mineral water factory machinery, wharf cranes, mechanical transport, etc. Applications, which must be in writing, stating date of birth, full details of qualifications and experience, including present employment; also Identity and National Service or other registration particulars, and quoting reference No. F.A. 52, should be addressed to the Ministry of Labour and National Service, Appointments Department, 1-6 Tavistock Square, London, W.C.1. 3124

PRODUCTION Controller required by progressive London Company manufacturing scientific and electrical measuring instruments. To be responsible for purchasing, production planning, progress, stores and stock control. Commencing salary £500-£600, according to qualifications.—Box 3188, c/o The Electrical Review.

REQUIRED for Paper Mill in India, Chief Superintending Engineer. Should have sound theoretical knowledge and good practical experience of mechanical engineering, preferably boiler and power plants; capable of planning extension. Member of Institution of Mechanical or Electrical Engineers. Salary according to qualifications up to £2,500 per annum, with free quarters. (Ref. No. C.2840XA). Mechanical Engineer. Good experience of erecting machinery. Capable of taking charge of maintenance work. Salary according to qualifications up to £1,200 per annum, with free quarters. (Ref. No. C.2842XA). Write quoting the appropriate Order No. to—Ministry of Labour and National Service, Appointments Department, Technical and Scientific Register, Room 670, York House, Kingsway, London, W.C.2, for application form which must be returned completed by 16th November, 1945. 3129

SALES Representative required for Atlas Lamps in Leicestershire. Remunerative position with excellent prospects for keen energetic man. Connection in electrical and hardware trade and large users an advantage. Salary, commission and expenses. Write in confidence details of past experience to—Box H.X.9., T.E.I., 105, Judd Street, London, W.C.1. 3175

SENIOR Draughtsman required. Must have had extensive experience in the design of electric motors for mass production. Fullest particulars should be submitted in confidence. Applications can only be entertained from men who are outside the age limits still in force. Salary £550 p.a.—Box 3187, c/o The Electrical Review.

REQUIRED, Two Junior Electrical Draughtsmen, transformer experience essential, permanent position, good post-war prospects. Applications from Class A ex-Servicemen only.—Box 3087, c/o The Electrical Review.

SKILLED Draughtsmen required by transformer manufacturers in London. Preference will be given to an applicant who has had experience of transformer design, but applications from draughtsmen skilled in other branches of electrical industry will receive full consideration. Five-day week. Association rates offered. Class A ex-Servicemen and others exempt from M.O.L. control only.—Box 3069, c/o The Electrical Review.

STOREKEEPER and Stores Assistant with knowledge of general electrical supplies. Vacancy (permanent) occurs owing to death. Applications from Class A ex-Servicemen or those over 51 only. Details of experience and salary required to—W. E. Co. Ltd., 37, Vauxhall Bridge Road, S.W.1. 3158

TECHNICAL area Sales Managers required by old-established electrical manufacturers. Must be under thirty. B.Sc. preferred but at least National Certificate. Full details of technical qualifications, sales experience and salary expected to—Box 3185, c/o The Electrical Review.

TECHNICAL Writer required, good knowledge of instrument manufacture and modern electronic apparatus; experience in preparation of catalogues and servicing manuals essential; permanent post. Apply stating age, qualifications, salary, etc., to—Muirhead & Co. Ltd., Elmers End, Beckenham, Kent. 3139

TEST Room Assistants. Two juniors required for testing electrical transformers and mercury arc rectifiers. Progressive position. Applications only from Class A ex-Servicemen or under 18. Apply Box 3174, c/o The Electrical Review.

VACANCIES are available for men released in Class A who have had experience on Instrument Work. Preference will be given to those who possess some theoretical knowledge. Apply, stating experience, training, age and wages required, to—Cambridge Instrument Company Ltd., Sydney Road, Muswell Hill, N.10. 46

WANTED an experienced Toolmaker-Designer for Bakelite Moulds. Applications from those over 51 or Class A ex-Servicemen only. Write in first instance to —Box 3057, c/o The Electrical Review.

WANTED for India, Electrical Sales Engineer, preferably with knowledge of overhead high tension transmission, electric railway, tramway and trolley bus overhead construction. Age 28/34. Apply by letter, stating age, full particulars of education, engineering qualifications and experience, to—Box 3141, c/o The Electrical Review.

WAREHOUSEMAN, essential good knowledge of the trade, Class A ex-Serviceman. State experience, age, salary, etc., to—General Manager, Sloan Electrical Co. Ltd., 41, Kingsway, W.C.2. 3157

WORKING Manager required to take complete charge of small electric supply company. Generation by water and oil. Commencing salary £400 per annum. Applications, accompanied by two recent testimonials, to reach Secretary, Machynlleth Electric Supply Company Limited, Machynlleth, by the 10th November, 1945. 3149

YOUTH with some knowledge of electrical goods required as Warehouse Assistant, good prospects. Apply—Mr. Fisher, Farmer, Stedall & Co., 145, St. John Street, Clerkenwell, E.C.1. 3038

APPOINTMENTS FILLED

Dissatisfaction having been so often expressed that unsuccessful applicants are left in ignorance of the fact that the position applied for has been filled, may we suggest that Advertisers notify us to that effect when they have arrived at a decision? We will then insert a notice free of charge under this heading.

WEST Hampshire Electricity Co.—Junior Mains Assistant and Sales Representative.

SITUATIONS WANTED

ADVERTISER (40), seeks situation as Mains Assistant or Foreman, 19 years' experience of corporation and contracting work; past 3 years full control supervising complete installation of L.V. and H.V. distribution, up to 11 kV on R.A.F. stations. Further details supplied.—Box 7822, c/o The Electrical Review.

ADVERTISER (44), Associate I.E.E., desires position as Sales Engineer in Chester area to represent Manufacturer, 24 years' sales experience, domestic and commercial apparatus, wide connection, excellent creden tials, available shortly.—Box 7861, c/o The Electrical Review.

ADERTISER seeks post as Supervisor, Representative, or Head Foreman. years' experience on installations elect. & mechanical survey, planning, and maintenance.—Box 7865, c/o The Electrical Review.

ADVERTISER (53), offers very wide experience all branches, Sales Office Administration, Home and Export. Efficient and economical controller. Details, salary, etc.—Box 7820, c/o The Electrical Review.

A.M.I.E.E. (34), E.H.V. Switchgear and Motor Control, specialist complete distribution schemes, 17 years sales, contracts, publicity with leading manufacturers, inside or outside position. £650 minimum.—Box 7862, c/o The Electrical Review.

A.M.I.E.E. (35), experienced Sales Engineer (home and export, desires technical administrative position in London or Kent.—Box 7867 c/o The Electrical Review.

B.Sc., age 38, designer of transformers, motors, relays, rheostats, free.—Box 7830, c/o The Electrical Review.

CONTRACTING Engineer seeks progressive position, London exp., age 41. Would take charge of small business.—Box 7848, c/o The Electrical Review.

DISTRIBUTION Engineer (37), A.M.I.E.E., B.Sc.(Eng.), seeks post with company developing rural area. Experienced 33-kV, 11-kV and 400-volt overhead and underground systems. Reasonable salary. Own car.—Box 7807, c/o The Electrical Review.

DRAUGHTSMAN, with 10 years' experience in design and production of domestic and industrial cooking and heating equipment, seeks position with firm interested in the development of above apparatus.—Box 7792, c/o The Electrical Review.

ELECT. Eng., Class A release, med. cat. A1, age 40, 22 yrs.' experience all branches, estimating, three-phase overhead and underground distribution, etc., requires suitable position.—Box 7797, c/o The Electrical Review.

ELECTRICAL. B.Sc.(Eng.) and H.N.C. (24), good presence, seeks appointment (W. London) leading to executive position; 5 yrs.' administrative exp.—Box 7856, c/o The Electrical Review.

ELECTRICAL Engineer, 5 years' apprenticeship plant maintenance, experienced in A.C. and D.C., seeks a position overseas.—Box 7868, c/o The Electrical Review.

ELECTRICAL Engineer (35), B.Sc.(Hon.), A.M.I.E.E., release October, desires permanent progressive post with consultants or contractors dealing with power installations and electrical equipment buildings. Wide practical and commercial experience.—Box 7788, c/o The Electrical Review.

ENGINEER, A.M.I.E.E., skilled in installation and maintenance transmitting receiving gear, good general knowledge office routine, desires change.—Box 7790, c/o The Electrical Review.

ENGINEER, Electrical, Mechanical, Maintenance, or Assistant to Contractor, long experience erectors and upkeep various installations and plant, work planning, supervision, records, estimating, knowldge steam, H.W. and cooking plants, over 51.—Box 7850, c/o The Electrical Review.

EXECUTIVE, 20 years' experience in telephone industry, office and shops control, seeks post as Manager, technical or non-technical, or similar executive position in London area. Age 40. Salary approx. £450.—Box 7831, c/o The Electrical Review.

EX-R.A.F., Class A release, seeks situation as Traveller. Ten years in electrical trade, own car. Offers to—Box 7849, c/o The Electrical Review.

FOREMAN Electrician, 20 years' exper. all systems contracting and maintenance. London or Lancs.—Box 7854, c/o The Electrical Review.

GRADUATE I.E.E., wide technical and representative experience, desires progressive post, preferably on export work. Knowledge of French and Spanish.—Box 7813, c/o The Electrical Review.

HIGHLY-trained Secretary seeks permanent post-war position. Experienced minuting of meetings, Trade Association work, full statistical knowledge and general confidential secretarial work.—Box 7794, c/o The Electrical Review.

LIGHT-current Engineer, 12 years' experience in telephony, carrier current equipment, research, design and administration, high academic qualifications, seeks responsible and progressive position in England.—Box 7844, c/o The Electrical Review.

M.Sc. Honours degree electrical engineering, 16 years' experience, generators, motors, electrical instruments and electronics, own patents, wants to change position.—Box 7791, c/o The Electrical Review.

MAINTENANCE Engineer (Elect.) seeks progressive position in West London. Wide exp. and keen, age 41.—Box 7847, c/o The Electrical Review.

MAN with specialised knowledge of Stores Systems, urging of bought out material and progress control of manufactured parts, seeks position with company engaged in the manufacture of domestic heating and cooking appliances. Box 7860, c/o The Electrical Review.

MANAGER, methods and design, A.M.I.P.E., age 36, wide experience high grade electro-mechanical apparatus, telephone, radar, etc., tactful administrator and disciplinarian, good organiser, proven production engineer, mass production, tools, presswork, etc., seeks progressive senior post. Available November.—Box 7761, c/o The Electrical Review.

PROGRESSIVE young man with 14 years' experience in the vacuum industry requires position as Manager or Assistant Manager in large neon sign company on salary, plus 1,000-ft. run bonus, basis. Expert knowledge of glass working, pumping and neon installations. Able to install and equip complete neon sign factory and control all processes to make neon tubes. Alternatively would consider working partnership with small electrical concern, very limited capital.—Box 7768, c/o The Electrical Review.

RADIO and Electrical Sales Engineer seeks position as Representative to firm of radio and electric appliance manufacturers or wholesalers, N. of England preferred; 16 years' experience. Plenty of initiative and progressive man.—Box 7850, c/o The Electrical Review.

REPRESENTATIVE (Wholesalers'), solid connection S.W. London, East Surrey, seeks change. Could treble present turnover with right backing. Commission basis, would open branch if necessary and drive light van. Exceptional opportunity to wholesalers desiring new accounts.—Box 7800, c/o The Electrical Review.

WILLING to travel. Particularly interested in South America. Electrical Maintenance and Installation Engineer, age 27, secondary education, London apprenticeship. 11 years' experience Diesel alternators, distribution, etc. Due for "A" release, February, 1946.—Box 7789, c/o The Electrical Review.

YOUNG Electrical Engineer (24), student apprenticeship, 7 years' experience installations and switchgear manufacture. Matriculation, Ordinary and Higher National Certs., desires interesting post, London area.—Box 7787, c/o The Electrical Review.

YOUNG Man (27), at present serving H.M. Forces, seeks progressive post; 6 years as electrician R.A.F., studying electrical engineering. Due release approx. Jan. 1946.—Box 7845, 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.

A batch of first-class D.C. Motors, 220 volt, ¼ to 50 h.p., best makes, various speeds. Apply to—G.P.U. Ltd., Wembley, Middx. 3161

A number of D.C. Generators, 100 kW, 500 volt, 250 r.p.m., Crompton, for coupling. First class. Low prices.—The Electroplant Co., Wembley, Middx. 3102

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). 7528

A.C./D.C. Generating Set, input 400/3/50, slip-ring type by Holmes, coupled to dynamo, 150 kW, 230 v., 500 r.p.m.—The Electroplant Co., Wembley, Middx. 3163

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

AERIAL Cables, all sizes quoted for, good deliveries.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 01

ALTERNATOR by Westinghouse, 200 kW 400/3/50, 300 r.p.m., with exciter mounted on common bedplate. Complete with control panel and triple pole oil circuit breaker, voltmeter and 3 ammeters. Can be inspected at—Cox & Danks Ltd., Plant and Machinery Dept., Faggs Road, Feltham, Mddx., Tel. Feltham 3471/3. 3110

BATTERIES, B-class only, all types available; contracts accepted for high tension, grid bias, cycle, 4½-v. flat, bijou, baby batteries and unit cells (wholesalers and retailers supplied). Also large range of other electrical appliances.—Brooks & Bohm Ltd., 90, Victoria Street, S.W.1. Victoria 9550. 61

BEST English Cables, 1/.044 up to 127/.103 deliveries —Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 02

CARBONS, large stocks assorted sizes, solid and cored.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 03

COMPLETE Air Filtration Plant, accommodate 125 personnel. Comprises motors, fans, starters, filters, bye-pass valves, headers, duct work, etc. First-class order. Apply—Box 3176, c/o The Electrical Review.

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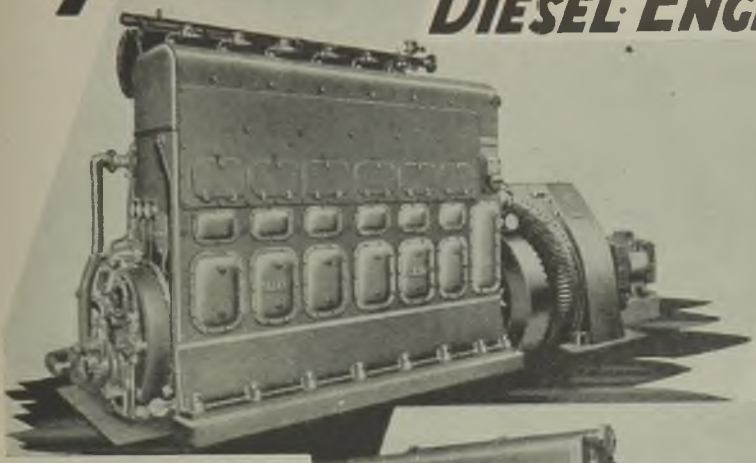
ALLEN DIESEL ENGINES



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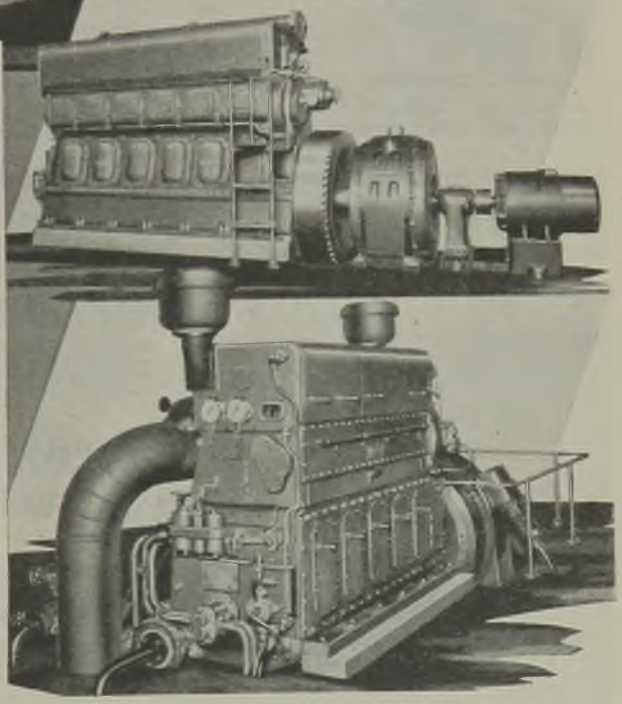

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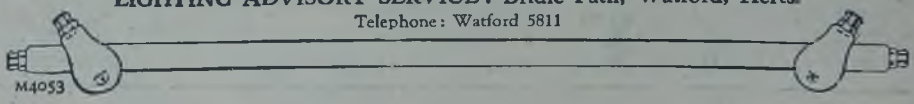

Printed in Great Britain at THE CHAPEL RIVER PRESS, Andover, Hants, and published by ELECTRICAL [illegible] at Dorset House, Stamford Street, Lon