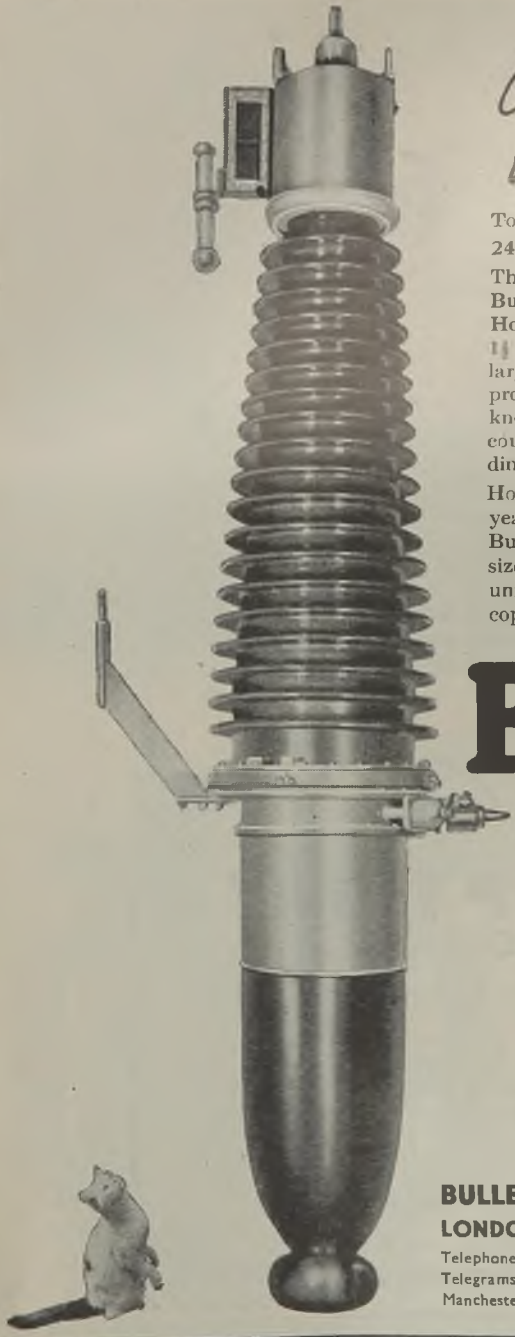
ELECTRICAL REVIEW

FOUNDED 1872

Vol. CXXXVII. No. 3545 NOVEMBER 2, 1945 9d. WEEKLY



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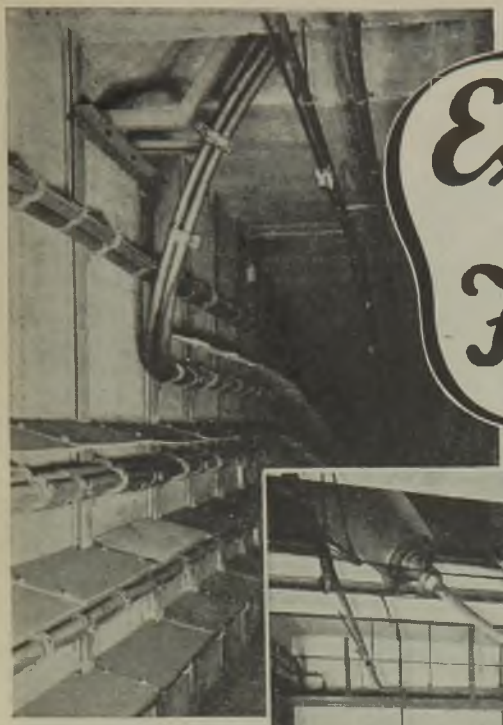
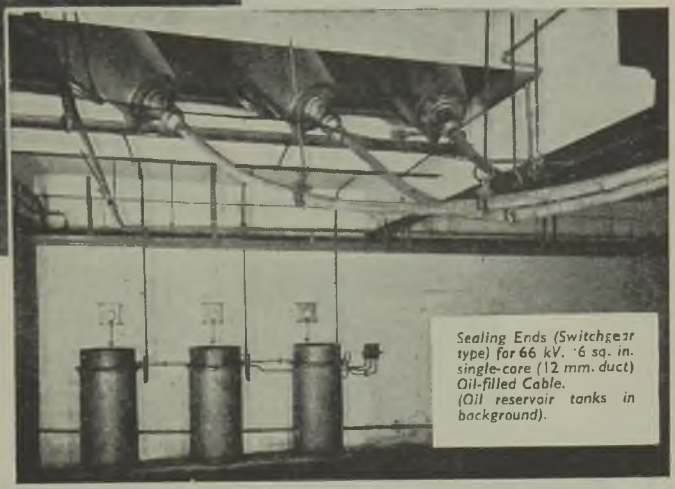
**Book November 9th for the E.I.B.A. Victory Ball**



# Extensions at Fulham

Cable tunnel showing 66 kV. single-core Oil-filled Cables one set rising to transformer.

Fire shields are fitted over the Cable runs.



Sealing Ends (Switchgear type) for 66 kV. 6 sq. in. single-core (12 mm. duct) Oil-filled Cable. (Oil reservoir tanks in background).

Fulham Power Station has come through the ordeal of war, scarred but more powerful than before. Henley Contract Engineers and Henley Cables have played an important part in bringing new plant into operation as well as in restoring raid damage. The accompanying illustrations are typical of HENLEY Oil-filled Cables supplied and installed at Fulham.

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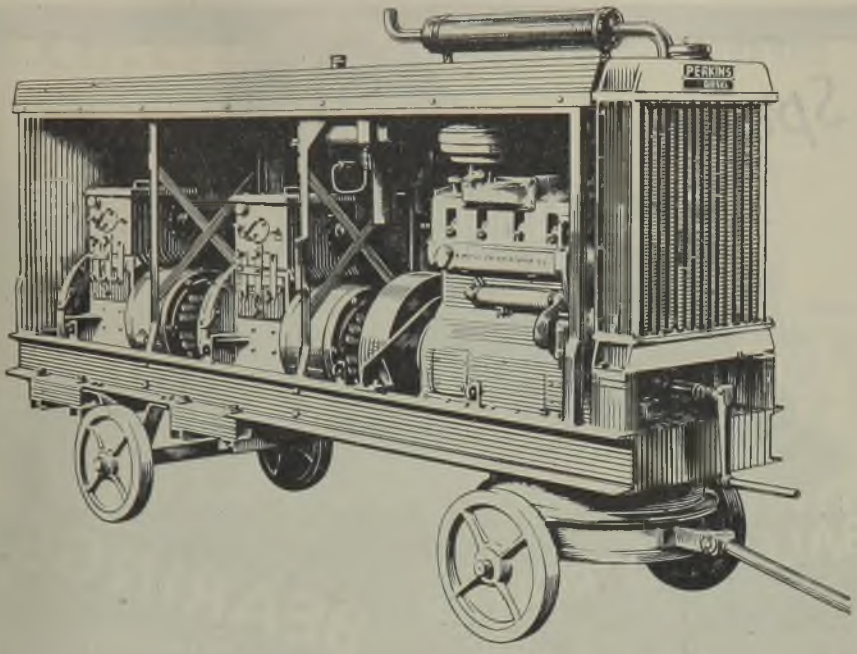


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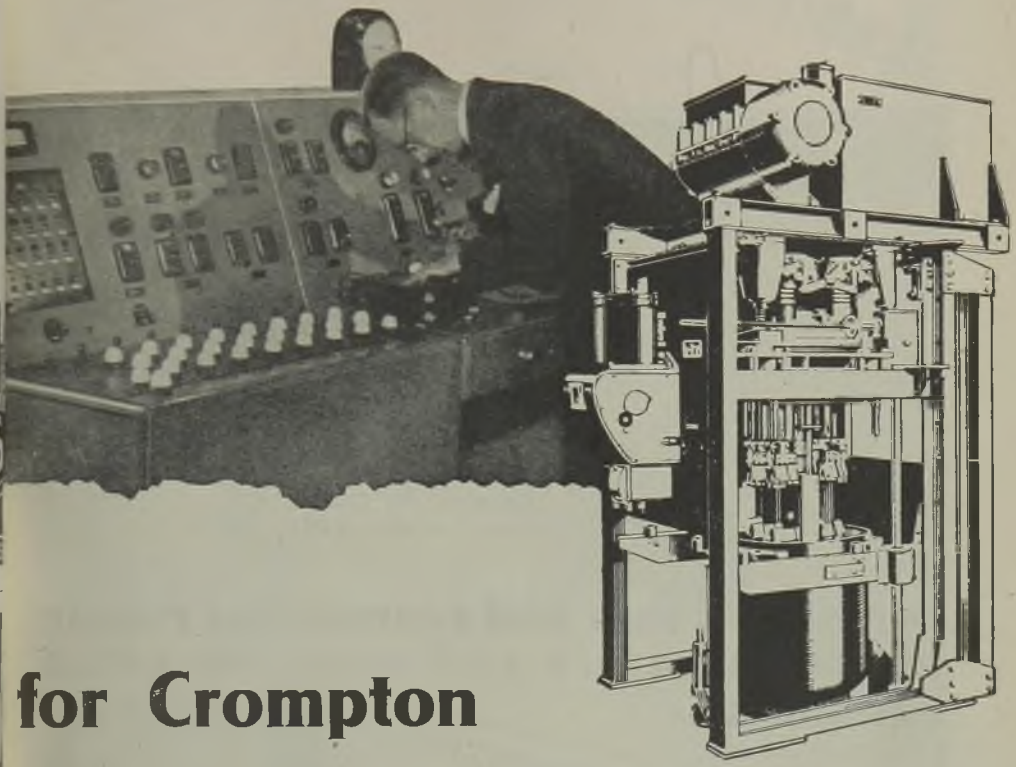

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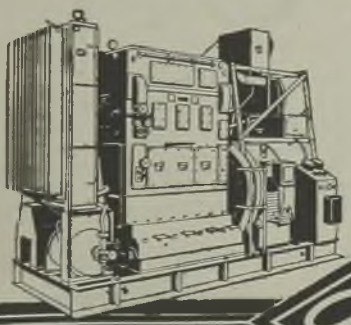

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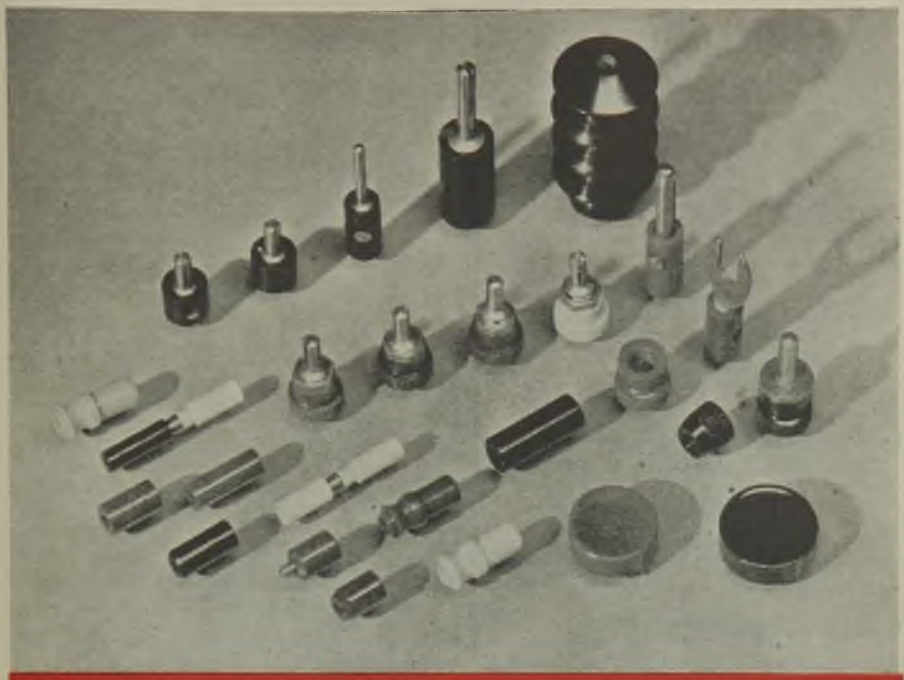

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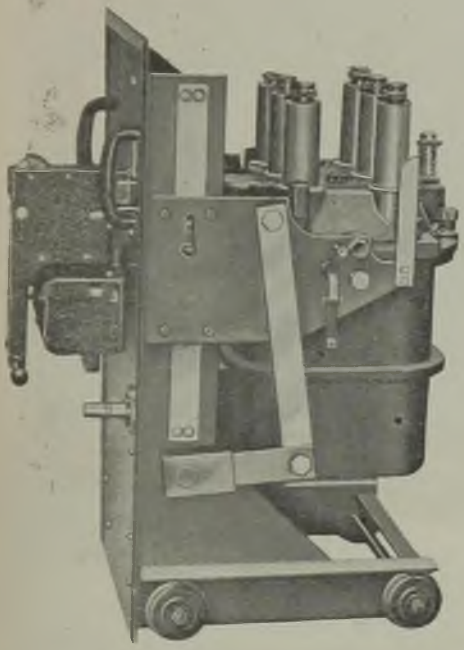

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● *The illustration shows an S & C circuit breaker, truck-mounted for use in S & C air-insulated and compound-filled switchgear. This unit is rated at 150 MVA at 11 kV and is available for hand, spring or electrical closing, as desired.*

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# ELECTRICAL REVIEW

November 2, 1945

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## Contents :—



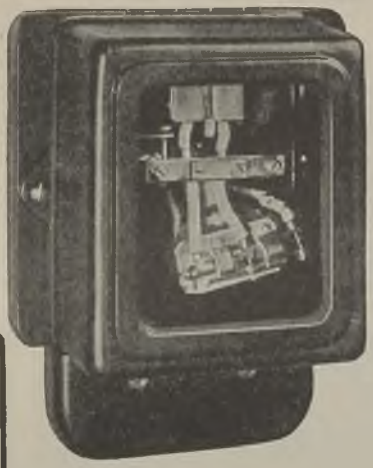

**EDITORIAL, ADVERTISING & PUBLISHING OFFICES : Dorset House, Stamford St., London, S.E.1**

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."



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# ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872




Vol. CXXXVII. No. 3545. NOVEMBER 2, 1945 9d. WEEKLY

# Taxation and Industry

## Wartime Burden Slightly Eased

WITH national expenditure still running at about the wartime level and colossal domestic and foreign debts, there would seem to be little justification for reduction of taxation at present. But this is to adopt a purely financial view; other considerations make some measure of relief imperative. Consequently even the most orthodox economists have welcomed the small concessions announced last week by the Chancellor of the Exchequer.

It is true that with regard to income tax allowances the relief is illusory, except in so far as a definite early decrease in the burden is substituted for undated post-war credits—jam to-day instead of jam to-morrow. The reduction of a shilling in the standard rate is likely to have a more stimulating effect. It is worth recalling that after the last war income tax went up but it was still only 6s. in the £ in 1921-23, as compared with the proposed 9s.

### Substitute for E.P.T. Sought

More substantial benefit may be expected from the reduction of the excess profits tax to 60 per cent. as from January 1st, coupled with the promise of an early start on the repayment of the 20 per cent. refund provided for in the 1941 Finance Act. The Treasury realises that E.P.T. is not an ideal way of levying tribute from industry. It is apt to encourage extravagant, wasteful expenditure and, the Chancellor added, "even downright dishonesty." Exploration of possible alternatives is under way. The substitution of a flat rate of tax and profits has been considered but apparently abandoned; suggestions have been made that some form of dividend limitation is possible. An interesting condition of the reduction is that the amounts refunded shall be "ploughed back" into business and Mr. Dalton promised that the Finance Bill would contain provisions to ensure this.

Industry is to secure further relief as from April 6th next. This has been fixed as the "appointed day" for the coming into operation of the income tax allowances in respect of capital expenditure on industrial buildings and plant erected on and after April 6th, 1944. An article on the effects of these provisions appeared in the *Electrical Review* of June 22nd, 1945.

### Incomplete Relief

All those in the electrical industry who have been pressing for the reduction or removal of purchase tax on domestic appliances were pleased to learn of the Chancellor's decision to free cookers, space heaters, water heaters and refrigerators from the impost. Their satisfaction cannot be complete, however, until the tax upon a wider range of appliances is remitted. Certainly a number of these other appliances may be considered to be "luxury" articles in these days of continuing austerity, or at least non-essential, but such things as electric kettles and irons are certainly not in this class and should have been included in the exempted equipment.

Further concessions next April are foreshadowed but the extent of these must depend largely upon the reduction

of expenditure in the meantime. Terminal payments in respect of war contracts and the costs of demobilisation of the Forces must inflate this expenditure for some months yet. The securing of economies must engage the serious attention of the Chancellor and the spending Departments.

**Equipping the Home**

AT no previous time has so much interest been shown in the provision of appliances for household use. This is mainly because the building programme presents a large-scale opportunity which has never before occurred. The latest manifestations of this interest, to which reference is made in other pages, are an exhaustive study of the subject prepared by P.E.P.; a survey by the Board of Trade of appliance production before and during the war; an explanation from B.E.A.M.A. of the reasons for the present shortage; and the remission of purchase tax on a range of heating, cooking and refrigerating equipment. It would seem that in spite of the appearance of many newcomers there will be work for all those engaged in the industry for many years ahead.

**Heavy Arrears**

EVEN without the new business the scope would be tremendous. The decline in production, much of which will have to be made up, is well illustrated by the Board of Trade figures referred to above. Cookers, for instance, were produced at the rate of 250,000 a year before the war. In the first half of this year, although production had been very much speeded up as compared with the intervening years, the annual rate was still only 39,800. The corresponding figures for space-heating apparatus were 1,250,000 and 219,000 respectively; for kettles 350,000 and 109,000; for irons 1,250,000 and 315,000; and for vacuum cleaners 400,000 and 28,000.

**Scientific Approach**

To claim that scientists and engineers should play their part in shaping national policy is not to say that, solely by virtue of their training (however well this may qualify them to make objective assessments), they ought to exercise a predominant position of control. Mr. F. J. Elliott, in his chairman's address to the I.E.E. South Midland Centre, in urging them not to stand aloof from the social and economic affairs of the community, observed that their active contribution to solving social problems should be commensurate with their knowledge. There are many other facets to civilisation, but it may be stated that all who aspire to lead, although devoid of detailed expert knowledge, should develop a similar logical attitude towards social problems as is obviously necessary in science and engineering.

**Boiler Availability**

IN his I.E.E. presidential address in 1939, Sir Johnstone Wright referred to the locking-up of capital in power stations due to loss of steaming capacity represented by the gap between boiler and turbine availability. His subsequent suggestion that boiler plant should be specified to be capable of running continuously up to m.c.r. for six months with on-load cleaning only, without the gross overall efficiency falling by more than $2\frac{1}{2}$ to $3\frac{1}{2}$ per cent. (depending on the type of firing), led to the setting up of the Boiler Availability Committee. The latest publication of this body, noted elsewhere in this issue, provides incontestable evidence that falling off in availability is mainly due to cleaning methods that modern conditions have made obsolete. Its proposals are constructive and practicable.

**5,000-MVA Circuit-Breakers**

WITH transmission pressures of 264 kV a possibility in this country, higher rupturing capacities than the 2,500 MVA hitherto associated as a maximum with 132 kV will come up for consideration. Fortunately the design of arc-rupturing devices has more than kept pace with increases in circuit-breaker MVA, so that stresses imposed by the heavier duties are actually less than they were with earlier types having lower ratings. For this achievement credit must be given to researches carried out at the high-voltage testing stations of the manufacturers, since opportunities to use supply systems for the purpose are obviously restricted. In a contribution to *Electrical Engineering* (the journal of the American I.E.E.) for June, Messrs. A. W. Hill and W. M. Leeds present evidence that seems to show the feasibility of interrupting capacities as high as 5,000 MVA.

# Foundry Firing

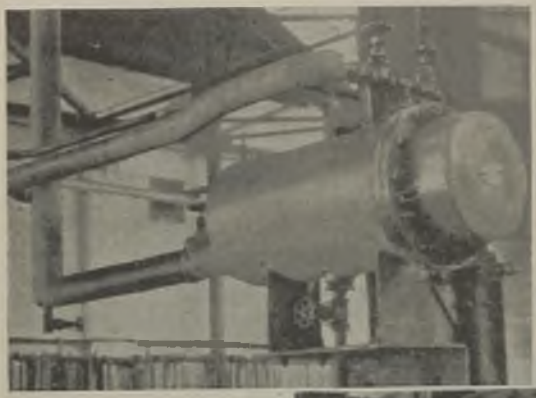
## Electrical Heating of High-Viscosity Fuel

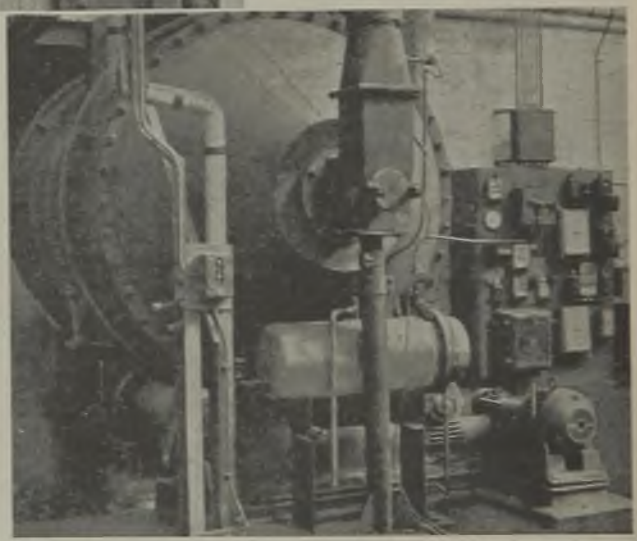
DURING the war in view of the importance of conserving oil tanker space, the Government decided that petroleum should not be employed for furnace heating, so that users of this class of fuel had to resort to some alternative firing medium. One of the permissible fuels suitable for certain types of industrial furnaces is a high-viscosity fuel consisting of a mixture of pitch and creosote, the latter being a solvent of the former. But a serious disadvantage of this mixture is that at normal temperatures its viscosity is too high for storage, pumping and atomisation, so that it is necessary to maintain it at a high enough temperature to keep it sufficiently fluid at all times of delivery and servicing.

Three 400-lb. Morgan tilting furnaces and three of a line of seven pit fires (right) are connected to the pipe-line of the non-ferrous foundry installation; note pre-heaters

Recently at the works at Kilmarnock of Glenfield & Kennedy, Ltd., we saw some interesting installations for serving different types of industrial furnaces with this type of fuel, and how fluidity is maintained by means of electrical heating. An extremely important feature is that although the firing systems were originally designed and laid out for the use of a very high grade of fuel, as now modified and described they are suitable for dealing with the heaviest grades of fuel, and it is reasonable to speculate that, having now made the necessary capital outlay to permit the change in the firing medium, when things become normal again the company will be in a position to use one of the heavier types of oils which will be available for furnace firing. The creosote-pitch is delivered to the storage tanks of the installations heated to about 90 deg. F., and it is maintained at this temperature both in the storage tanks and during its flow through the pipe systems feeding the furnaces. Further, the fuel is preheated, also electrically, to about 200 deg. F., at each furnace immediately before it is delivered to the burner to ensure proper atomisation. Fuel delivered to the factory by road is first heated at the gas works, so that on arrival it can be delivered straight to the storage tanks, while that delivered by rail is heated up on the factory site while

it is still in the transport tanks which are suitably equipped with steam coils before it can be pumped or will flow into the storage tanks. Means are available for supplying the transport tank heaters with steam from the factory boiler installation for this initial heating.





The fuel is heated electrically to about 200 deg. F. at each furnace ; pre-heater secured to building stanchion. (Right) The ring main of the heavy foundry serves one 5-ton ferrous rotary furnace ; the 10-kW pre-heater has a throughput of 55 gallons per hour

There are three main installations in the Glenfield factory, one serving melting furnaces and pit fires in the non-ferrous foundry, another for a rotary ferrous melting furnace in the heavy foundry, and a third which provides for a number of furnaces in the smithy. In each installation there are one or more storage tanks equipped with immersion heaters under thermostatic control.

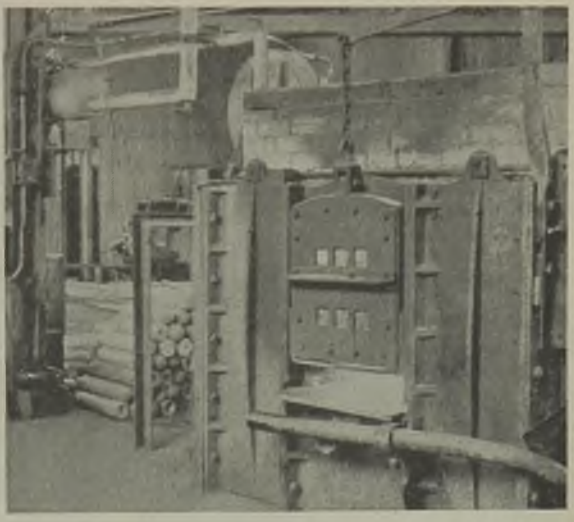
The hot fuel is pumped from these tanks by motor-driven units integral with the system, and through a ring main pipe-line from which the various furnaces in the particular installation are fed. The ring main has a gradual fall back to the pumps and storage tanks of about one foot per 100 ft. of pipe run. The ring main and the service pipes are equipped with " line heaters " consisting of " Rockbestos " asbestos-insulated, flat twin lead-covered heating cable supplied by British Insulated Cables, Ltd. The cables are bound firmly to and in direct contact with the pipes, under the lagging, and in every case a duplicate line heater is installed for stand-by purposes. The line heaters are also thermostatically controlled. In view of the electrical heating of the pipe-lines the lagging has a special significance. The one-inch thickness of heat insulation has an " insulating efficiency " of about 80 per cent. of the bare surface losses at temperatures varying from 80 deg. F. to 200 deg. F. The lagging is fire-resisting and weatherproof, and is reinforced and finished with hard-setting compound and painted.

In all instances the storage tanks were in existence before the change-over to the present fuel, serving for petroleum storage. For the non-ferrous foundry there are two underground storage tanks, each with a capacity of 1,270 gallons. They are unlagged and are now each equipped with two 4-kW immersion heaters of the tubular sheathed type, each measuring 7 ft. 6 in. long. With their thermostat, the heaters are situated below the level of the tank oil draw-off, so that they are always covered by the oil. The thermostat is installed above the immersers and at the same end of the tank as the draw-off.

In the short delivery 4-in. pipe between

the transport vehicles and the storage tanks is a coarse single filter, while in the 2-in. suction line between the duplicate positive displacement pumps which serve the ring main pipe-line and the storage tanks is a coarse duplex filter. The pumps each have an output of 150 gallons per hour against adjustable pressure of 50 lb. per sq. in. maximum, and the 1-HP pump motors are squirrel-cage machines with direct-on starting equipment fitted with no-volt and overload releases.

The ring main is about 265 ft. long, and connected to it in the sequence of the oil flow are a two-ton Stein & Atkinson rotary furnace, three of a line of seven Morgan pit fires, and three 400-lb. Morgan tilting furnaces. The tee-off to the pit fires is roughly half-way along the ring main, and the pipe from the main suction to this point is of 2-in. bore. Beyond this point back to the suction point it is of 2·5-in. bore. The line heater for the 2-in. pipe is loaded at 12 W per foot run, while that for the 2·5-in. pipe is loaded at 15 W per foot run. In the tee-off to the rotary furnace is an oil pre-heater with a maximum throughput of 35 gallons per hour which is loaded at 6 kW. One pre-heater only with a maximum throughput of 7 gallons per hour and a loading of 1·5 kW serves all three of the pit fires. Each tilting furnace has its own pre-heater with a maximum throughput of 6 gallons per hour and a loading of 1·25 kW.



**Four furnaces are fed from the ring main of the smithy installation; one furnace shown**

The pre-heaters are products of Archibald Low Electrics, Ltd., who also supplied the storage-tank immersion heaters, and all the heaters are of similar construction irrespective of their size. The bodies are made from steel tubes welded into heavy steel flanges, and all the protuberances are welded to the body. The element tubes, which are welded into the removable tube plate, operate at a low temperature, and the loadings represent only about 8 W per sq. in. of tube surface. The

**The smithy storage tank is lagged and elevated to about 10 ft. above floor level**

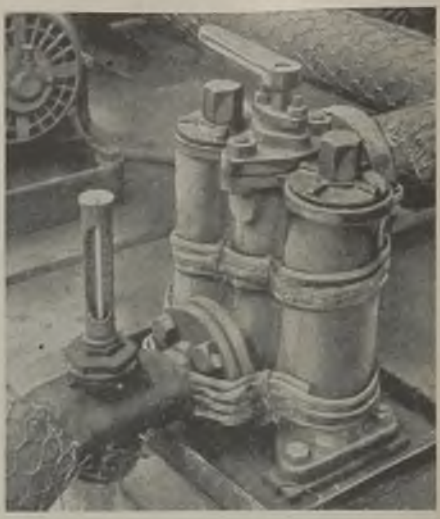
elements are of the removable-core type. Each heater is fitted with both automatic control and hand-reset safety thermostats, provision for a warning lamp, a pressure relief valve, a thermometer connection, inlet, outlet and drain connections, and a dust-tight terminal cover. The largest size, that for the rotary furnace (6 kW), measures about 4 ft. in overall length and the main cylindrical body is about 10 in. in diameter. In the branch connections immediately in front of the furnace burners in the case of the pit fires, *i.e.*, between the burners and pre-heater, are fitted fine duplex oil filters—one to each burner.

In the case of the heavy foundry installation the storage tank is also underground, outside the building, and is unlagged. It is cylindrical and disposed horizontally. With a capacity of 2,500 gallons, it measures 12 ft. 8 in. long and 6 ft. 6 in. in diameter. It is fitted with two immersion heaters and a thermostat, similarly situated to those in the tanks already referred to, and the tubular heaters are each 10 ft. long and loaded at 6 kW. The duplicate motor-driven oil circulation pumps are also installed in the open, almost immediately above the storage tank, and these also have a capacity of 150 gallons per hour against a maximum head of 50 lb. per sq. in. The return pipe-line is equipped

**The hot fuel is pumped from the storage tanks by motor-driven units integral with the system**

with a pressure regulating valve complete with by-pass and isolating valves, as is the case in all installations. Between the pumps suction and the storage tank is a coarse duplex filter.

The ring main pipe-line in this case is only about 80 ft. long, because it serves



**Line heaters are in direct contact with the pipes, etc. (lagging removed from filters)**

one furnace only. The bore is 1·5 in. and the line heater cable, which is similar constructionally in all the installations, is loaded at about 10 W per foot run. The 2-in. short suction branch line is also equipped with a 10-W per foot run line heater. The furnace in this case is a S. & A. 5-ton rotary equipment. The pre-heater in front of the burner has a throughput of 55 gallons per hour and is loaded at 10 kW, and in all other respects it is similar to those of the other furnaces.

The storage tank in the smithy building is mounted on a steel structure about 10 ft. above the floor level. Because of its exposed and accessible position the tank is lagged with a 2-in. thickness of heat insulation. The tank is 5 ft. 6 in. in diameter and 24 ft. 3 in. long and has a capacity of 3,600 gallons. An indication of the effect of the lagging, by comparison with the other storage tanks, is that in this case there are two

immersion heaters, each 7 ft. 6 in. long and loaded at only 2·5 kW. For emergency use the tank is also equipped with steam coils having a total heating surface of 5 sq. ft.

Again there is a coarse duplex filter between the pumps suction and the storage tank and the duplicate motor-driven circulating pumps are similar to the others, except that the capacity of each pump in this case is only 100 gallons per hour. There is also in this case, however, a 3½-HP motor-driven transfer pump with a capacity of 1,000 gallons per hour, for pumping the creosote-pitch fuel from the rail tank into the storage tank.

The ring main pipe-line for the smithy installation is about 270 ft. long. It has a 2-in. bore, and the loading of the line-heater cable is 12 W per foot run. Four smithy furnaces are fed from this ring main, two *via* 1-kW pre-heaters, each with a throughput of 2·5 gallons per hour; one *via* a 1-kW pre-heater with a throughput of 3 gallons per hour; and one *via* a 3-kW pre-heater with a throughput of 14 gallons per hour. In three cases fine duplex filters are fitted in the pipe-line between the heater and the burner.

Each installation is centrally controlled from a distribution and control board made by the company's electrical department from materials supplied by Clyde Fuel Systems, Ltd. The equipment on each board includes push-button stations for the remote control of the motors and heaters which are normally automatically controlled. A feature of the installations is the use of Pyrotenax wiring in view of the high ambient temperature in the region of some of the furnaces. The total heating load of the three installations is about 60 kW.

We are indebted to Mr. Henry Gardner, managing director, Glenfield & Kennedy, Ltd., for permission to view the installations and publish this description, and to Mr. N. M. Arthur, works engineer, for his co-operation in the collection of information.

## Projected Birkenhead Station

BY the courtesy of Mr. F. W. Brecknell, M.I.E.E., the borough electrical engineer of Birkenhead, we reproduce a photograph of a model prepared by Sir Alexander Gibb & Partners, consulting engineers, of the new power station which is being erected for the Corporation. The model was made for submission to the Fine Art Commission and it will be seen that the buildings will be a good example of modern functional design. Work is expected to begin upon the erection of the station within the next few months.

**Model of the new Birkenhead power station on which work will be commenced shortly**

Messrs. Merz & McLellan, the consultants, inform us that the site of the station is on the west bank of the Mersey at Bromborough about a mile north of the Eastham Locks entrance to the Manchester Ship Canal. In its initial stage the station will contain two 50,000-kW turbo-alternator sets and condensing plant and four boiler units each having an evaporative capacity of 300,000 lb. per hour, but the layout is designed for an ultimate capacity of 200,000 kW.

The 11,000 V turbo-alternators will run at 3,000 RPM, the steam conditions at the turbine stop valve being 900 lb. per sq. in. at a temperature of 900 deg. F. The main switching of the outgoing transmission system will be at 132 kV. The furnaces will be fired with pulverised coal and electrostatic precipitation plant will be installed. The chimneys will be 325 ft. high above ground level and will be of brick construction as will also the buildings of the power station. Condensing water will be provided from the Mersey.

# Chemical Factories

## Power Supply Requirements

SPECIAL safeguards needed for the distribution of electric power on a large scale within the chemical industry were the subject of the inaugural address of MR. J. B. LANCASTER, I.C.I. (Billingham Division), Ltd., as chairman of the Tees-side Sub-Centre of the Institution of Electrical Engineers, delivered at Middlesbrough.

It was emphasised that continuity of supply of power was an over-riding requirement, for a number of distinct chemical processes were often so interlocked that failure of any one would throw a whole sequence out of production for a long time. Thus a general disturbance due to a heavy electrical surge of only one-quarter of a second duration might interrupt the entire production of a huge plant for twelve hours.

Another special characteristic of chemical factories was their unusually high load factors, but the very steadiness of load in turn introduced problems of overheating of electrical equipment. It would appear, perhaps without intent on the part of designers, particularly of switchgear and distribution fusegear, that current carrying contacts did need a thermal cycle in order to maintain their efficiency, possibly due to microscopic relative movement of parts by expansion and contraction.

### Interruptions Minimised

In an endeavour to illustrate how interruptions could be minimised, circuit lay-out diagrams were exhibited of two distribution systems. One of them represented a 6·6-kV radial feeder system fed directly from the factory power station with interconnectors. The other showed an almost equally loaded 11·5-kV ring main system operated in units, each energised by two transformers, one of the latter forming an additional source through frequency changers from the public supply mains. Thus the short-circuit duty had been kept below 150 MVA with consequent reduction of the price of switchgear by comparison with the 500 and 350 MVA ratings necessary on the radial system. The ring main system had been very much more flexible in service and the lower cost of switchgear permitted 11·5-kV extensions to be more readily undertaken.

To gain security it was insufficient merely to provide alternative feeders, since faults and interruptions seemed never to obey the ordinary laws of probability. To ensure that duplication of supplies was maintained in all circumstances, the system operation must be delegated to one person competent to safeguard supplies, usually the power station or system control engineer, who would direct all switching operations with the aid of adequate means of communication.

With a view to classifying the occurrence of system faults Mr. Lancaster had analysed records of all incidents (since 1928) leading to interruptions of supply on a large high-voltage industrial network. He examined each incident and ascribed a basic cause to each fault, classified under eight headings and presented in tabular form. That survey formed the subject of a general commentary, illustrated with lantern slides.

### Thermal Over-Rating.

For instance, on only two occasions had protective gear failed to operate, but simplification was desirable. Most switchgear and distribution fusegear was thermally over-rated for service in chemical factories. Overheating was a fruitful cause of failure on fault and Mr. Lancaster recommended that at least double the normal current rating should be specified.

The design of transformers left little to be desired, but their end-boxes did not provide any margin for error on the part of cable jointers and definitely cramped their work. The extreme reliability of factory distribution cables was beyond dispute, even under seemingly adverse circumstances. Tests had shown that very good protection against damage by external fire was afforded by eight coats of sodium silicate solution (1·4 sp.gr.) painted on to the cables. Cable terminations and joints required to be improved fundamentally; one might reasonably expect solid plastic substances to replace the present compounds, which might form the actual insulation moulded over the cable-end and removable in one piece by gland-plate unbolting.

It seemed fundamentally wrong to strip equipment at stated intervals merely to make sure that nothing was wrong with it. The only effective substitute for routine

maintenance was a complete testing routine, which had yet to be devised and tried out in practice. Routine insulation resistance tests at high voltage had been in operation for the last two years with encouraging results. Some circuit-breakers, difficult to release from service, had been kept in use well beyond their normal maintenance periods by regular observation of temperature. Relays were subjected to routine current-injection tests and maintenance was based entirely on the results.

# Weather Statistics

## Importance in Power System Operation

THE recent discussion of weather effects on power system operation at a joint meeting in London of the Institution of Electrical Engineers with the Royal Meteorological Society was preceded by four short introductory papers to which reference was made last week.

In the subsequent debate Mr. R. A. S. THWAITES (Manchester Corporation) said there was a common experience for which he had never yet heard a satisfactory explanation, that an overhead line would stand up satisfactorily to rain or snow but would frequently flash over in wet sleet. During a storm in 1937 the wind reached a velocity of 100 miles an hour at Holyhead, there was 4½ in. of snow and ice on the overhead lines and it had been calculated that a factor of safety of 16 would have been necessary to guard against those conditions. In the 1940 severe storms, which ranged from North Wales to Southampton, 4½ in. of hard ice built up, but the fact was that such conditions of glazed frost had not occurred for 50 years.

### Average Rainfall Maps

Mr. D. J. GLASSPOOLE (Meteorological Office) outlined the progress that had been made in recent years in the Climatological Branch of the Meteorological Office in summarising the records and rendering them useful to electrical engineers. He mentioned maps of average rainfall on a scale of 2 in. to the mile over parts of Scotland for the North of Scotland Hydro-Electric Board, information about the frequency of occurrence of heavy falls of rain, of intense falls in short periods, and runs of consecutive days without rain. Emphasising the importance of this information for hydro-electric power stations he asked that full use should be made of the Meteorological Office in this connection. Other records included the mapping of the mean wind force, the maximum gusts and the frequency of wind of various directions and forces. Some of those data had been summarised, in conjunction with B.E.A.M.A., in a form that electrical engineers could use to devise the most economic wind power units for various localities. The Meteorological Office was also preparing a climatological map of the British Isles which aimed to include maps of the means of the main meteorological elements, the extremes, and also the frequency of occurrences of as many phenomena as possible.

Mr. E. A. POWELL (London Power Co.) said that when his company first started a control centre in 1928 the Air Ministry's daily forecasts were only valuable for forecasting two or three days ahead. They therefore developed their own technique which enabled them to forecast the load required practically for each day. If hour to hour information could be obtained it would be of the greatest value in meeting extreme conditions. Although temperature had a big effect on the load, it was not very serious so long as there was sufficient plant available and the forecast covered a period of, say, 10 hours.

Mr. E. G. DYMOND (Kew Observatory) demonstrated the radio-sonde described by Wing Commander Poulter.

Mr. GORDON MANLEY (President, Royal Meteorological Society) showed curves illustrating weather effects at higher levels and particularly towards the north of England. At the higher levels the tendency was towards dry snow whereas at the intermediate levels there was nothing but rain, especially on the coast. At a distance of 20 miles inland, however, there was considerable snow at the intermediate levels and the possibility of rime icing on the conductors, especially with a strong wind. He also showed a map illustrating the number of days on which snow might be expected in various parts of the country.

Mr. R. G. CARROTHERS (Kennedy & Donkin) said the papers made it clear that accurate short term weather forecasts were very necessary. At the present moment

information was available which enabled reliable predictions to be made for the future, but there did not seem to be any means for making reliable intermediate predictions. Not much had been said of the effect of variations in rainfall on the design of hydro-electric plant. Calculations of the necessary storage were involved and with the present scarcity of information it seemed that hydro-electric plant could only produce dependable supplies of power by continuing to use expensive civil engineering works and the storage of large quantities of water. Reliability was very costly and the question was whether a lower order of reliability could not be accepted in some cases. Some industries, for example, might be able to tide over a period of shortage of electricity just as in some other public utility services the vagaries of the weather were allowed to interfere with reliability as a matter of course.

### Altitude and Plant Rating

Mr. J. F. SHIPLEY (one of the secretaries of the Royal Meteorological Society) remarked that reliability was not so important overseas as in a closely populated country like Great Britain. Honest British firms trying to sell internal combustion engines in Africa or India took altitude rating conditions into account which increased their costs whereas competitors from other countries did not, so that British firms suffered. The banks of streams on which hydro-electric plants were situated at extreme altitudes might be destroyed by flooding so that prediction was desirable of the time when snow and ice were likely to melt. In Bermuda the average velocity of the wind was never below 11 miles an hour and seldom exceeded 14 miles an hour. With such constant conditions he wondered why nobody had put up a wind power station in Bermuda. The maximum wind velocity was between 40 and 50 miles an hour.

Mr. E. E. HUTCHINGS (E.R.A.) said that one aspect of the operation of overhead lines under varying weather conditions which had received little attention was the conductor temperature. Although it required experimental confirmation, there was evidence that for a certain increase in wind pressure an increased rating of 30 or 40 per cent. was necessary for a given conductor. The transition from natural to forced convection at low wind speed had not yet been fully investigated, but it had been computed that the combined effect of that radiation together with a minimum wind speed of one mile per hour would be to raise the temperature of an ideal overhead line by something of the order of 10 deg. C. The weather also affected the operating temperatures of underground cables and the relation between the moisture content of the soil and its thermal resistivity required further consideration.

Mr. W. HILL (West Gloucestershire Power Co.) speaking of the formation of ice on conductors, said power system engineers would benefit considerably if they could have reasonably accurate short period forecasts of cold snaps because with a few hours warning the necessary precautions could be taken.

Mr. C. T. MELLING showed some curves illustrating the variation of load with temperature in the year 1942–43 when the Ministry of Fuel and Power urged the use of less electricity. It seemed that the variation of output with temperature depended on individual reaction to temperature and from that point of view the fuel economy campaign did not bring about much improvement. In the winter of 1944–45 there was a sharp increase of load with reduction of temperature.

Mr. W. N. C. CLINCH (Northmet Co.) said that there might be more collaboration between the meteorological services and the control centres for electricity supply. The electricity supply engineer needed to know what the weather conditions would be in the next few hours in the area for which he was responsible and there was a big field for co-operation with the meteorological service.

## 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:—

**India.**—An inquirer in England wishes to pass on to Indian friends the names of suppliers of transformers, motors, alternators, wires and cables, conduits, lamps, ceiling and table fans, switchgear, etc., who desire representation in India. (X.124.)

**Switzerland.**—Agencies for makers of electric motors, drills and hammers, carbon brushes, etc. (X.125.)

# Poultry House Heating

## Satisfactory Use of Floor-Warming Installation

THE usual hatching season for chickens is from November to about June, so that during the early part it is essential for warmth to be provided for the operation of an incubator and for the newly hatched chicks whilst they await dispatch. At Bedwell Lane, Stevenage, Herts, Mr. G. G. Ivory, a poultry farmer with an extensive mail-order business in day-old chicks, has an incubator room containing a 12,000-egg incubator (Stephens Cabinet Incubator, Ltd.) with provision for the installation of a second equipment of the same capacity at a later date.

**The 12,000-egg incubator with transformer and control gear on the left, and (right) a 2 in. layer of cement and sand being placed over the iron wires**

Specifying a room temperature of 65 deg. F, Mr. Ivory approached the Northmet Power Company for the provision of an electric heating system. Although one of the various forms of low-temperature heating would no doubt have met the requirements the company decided, with the object of obtaining experience of the new method, to install a floor-warming system which would have the advantage of keeping the heating load off the supply system peak and hence qualify for a lower rate of charge. Mr. R. Grierson, the company's heating engineer, and Mr. J. C. Horrell, Northmet district superintendent for Stevenage, supervised the installation.

The incubator room is a wooden building approximately 30 ft. by 18 ft. by 6 ft. 9 in. to the eaves and 10 ft. 6 in. to the ridge. It is constructed of tongued-and-grooved boarding, lined with asbestos sheeting for heat insulation. The heating installation is energised from a 6-kVA transformer (London Transformer Products, Ltd.), giving approximately 66 V on the secondary side, the mid-point tapping being provided and earthed. The secondary is connected to copper busbars from which No. 8 SWG galvanised iron wires are taken to form the floor warming circuits. These iron wires are laid in the floor at a spacing of 3½ in. with a 1 ft. margin on all four sides of the room. Three circuits are provided, each having a length of 484 ft., the total loading being of the order of 6 kW. The wires were laid on top of the original 4-in. concrete floor, a 2-in. deep mixture o cement and sand then being floated over the wires. Thermograph records have confirmed that the specified room temperature of 65 deg. F is maintained uniformly by means of the thermostat. The floor installation is cut off by time switch during the system peak hours, at present 7 a.m. to 10 a.m. during the months of December, January and February, without materially affecting the performance. As the incubator stands against the north wall, two 250-W heaters are mounted behind in order to prevent a current of cold air being drawn into the inlet ports. Supply to these and to the incubator (3 kW) is without restriction.

After two seasons the farmer is most satisfied with the results, the past season from February 1st to May 30th resulting in an 81 per cent. hatch of fertile eggs. Live chicks numbered 21,225, and the electricity consumption for all purposes, including the floor warming, was 9,317 kWh.

# Industrial Measurement

## New Marconi Instruments

A DISPLAY of electrical measuring apparatus, originally arranged by Marconi Instruments, Ltd., for a convention of chemists in London and prolonged for general inspection last week, included some recent robust designs for industrial requirements. Incidentally the company is now making its own galvanometers and indicating instruments.

The selection included a signal generator, a beat frequency oscillator, an AC wave analyser, a circuit magnification Q-meter, an indicating electrometer, an electromagnetic impulse counter and the prototype of a tester designed for rapidly checking the output of dry battery cells in factory production. The change-over from voltage to current checking and all switching operations are performed automatically by a one-revolution motor driving cams, which drop chopper bars for contact making. The time cycle is four seconds, all the operator has to do is to insert a cell in the test jig and watch coloured pilot lamps.

A moisture-in-wood meter speedily determines the electrical conductivity of timber between two needle electrodes in a convenient holder designed to penetrate 5 mm. for testing to a depth of 2 in.; a screw-down clamp applicator is used for thin wood. A direct reading is obtained when the instrument pointer is returned to zero by rotation of a knob on a dial calibrated in actual percentage of moisture content. The instrument is portable and is energised by dry batteries; it weighs 21 lb. complete.

### Moisture in Grain

For the cereal and milling industries there are moisture-in-grain meters, operated in a similar way. These electronic meters reveal how the presence of moisture varies the dielectric properties of the grain sample, which is placed in a test cell at the top and recovered by pressing a button from a sliding tray at the bottom of the instrument. There is a battery-operated model and mains-energised types have been made to provide continuous ink-graph records by means of sampling electrodes placed within the grain chutes of storage granaries and mills.

The scope of electrometric determination of the hydrogen-ion content of fluids by means of pH-meters for gauging their neutrality (acidity or alkalinity) is growing in an increasing number of industries. The temperature compensator, which balances the standardised potentiometric e.m.f. with that generated electrochemically in the glass-electrode system, is adjusted manually in the case of a portable battery-operated pH-meter, but functions automatically in mains-energised models. They are accurate in "spot" determinations to 0·02 pH, the control dial being calibrated directly in pH units as well as in millivolts to enable the meter to be switched over for corrosion-potential measurements.

A series of electrode assemblies of the dip, immersion and through-flow types has been designed for varying industrial requirements, including the monitoring of boiler feed water in power stations. The "at-a-glance" indicator portion of the outfit comprises a mains-energised three-stage DC amplifier with a large degree of inverse feed back (developed by the neon-stabilised cathode circuit of the final valve of the chain) which is applied to the bias system of the electrometer to promote potentiometric self-balancing. The alternative ink-graph recorder, driven by a synchronous motor, utilises a special electrometer valve (as a null indicator) which presents a very high impedance to the electrodes so that polarisation is minimised.

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# X-Ray Jubilee

## Celebration of Röntgen's Discovery

TO commemorate the fiftieth anniversary of the discovery of X-rays by Wilhelm Conrad Röntgen on November 8th, 1895, a series of meetings will be held between November 8th and 10th. The programme has been planned jointly by a number of societies interested in the medical, scientific, and industrial aspects of X-rays, including the Royal Society, the British Institute of Radiology, the Faraday Society, the Physical Society, the Institute of Physics and the Institution of Electrical Engineers. The inaugural meetings will be held on November 8th at the Royal Society, Burlington House, Piccadilly, W.1.

There will be a joint meeting of all participating societies at the Phœnix Theatre, Charing Cross Road, W.C.2, on November 9th, when Sir Lawrence Bragg, O.B.E., F.R.S., will deliver an address on "The Scientific Consequences of Röntgen's Discovery of X-Rays."

Scientific meetings dealing with the applications of X-rays to physics and chemistry are to be held at The Royal Institution on November 9th and 10th.

At a meeting on November 10th at the Institution of Electrical Engineers the following papers will be presented:—"The Development of Electrical X-ray Equipment," by Dr. C. C. Paterson; "The Evolution of X-ray Photographic Materials," by Dr. H. Baines; "Industrial X-ray Analysis, Past and Present," by H. P. Rooksby; and "The Growth of Industrial Radiology," by W. J. Wiltshire. Dr. P. Dunsheath, President of the I.E.E. will preside.

There will be a small exhibition of historical items of interest in the Reid Knox Hall of the British Institute of Radiology, 32, Welbeck Street, W.1, on November 8th, 9th and 10th. The exhibits will include early X-ray tubes and radiographs, books, apparatus, and one of the earliest cine films.

# Technical Education

## A Review of Some Present Problems

By H. J. Booth, Graduate I.E.E.

THREE problems connected with technical education have been the subject of much argument in the correspondence columns of this journal and elsewhere of late. They are: The inclusion of pure physics in the syllabus of engineering examinations and the revised syllabus of the I.E.E.; the ability of the technical colleges to make provisions for this; and the falling status of the Higher National Certificate.

To be an efficient engineer requires not only a sound technological education but also a thorough training in the fundamentals on which that technical knowledge is based. Otherwise, it is like building a house on a slab of rock set in quicksand; the rock is sound enough in itself but has no adequate foundation.

***The author considers that the status of the Higher National Certificate is falling. He suggests reasons for this and makes proposals for arresting the decline. A change in the employers' attitude towards the Certificate is considered necessary***

A large number of the problems which arise in electrical engineering, especially in the new fields of electronics, radio and television, can only be solved by reference to the fundamental laws of physics. In many cases, the pure physicist has a clearer insight into the nature of a problem than an engineer with a host of technical qualifications.

Many young men to-day, with an extensive knowledge of alternators, transformers, voltage regulation, etc., have little idea what an ampere or volt is in terms of fundamental units or what they are actually a measure of. It may be argued that it is not necessary for an engineer employed in, say, the electricity supply industry to know how many c.g.s. units of current are equivalent to one ampere, but it is a short-sighted view. A soldier is taught not only how to use his rifle but also how it works. Moreover, once a grasp of fundamentals has been achieved, higher technology loses much of its awe.

Technical colleges are designed to provide their students with the knowledge they require. If the leading educational authorities lay down that a knowledge of certain subjects is advantageous to the engineer in the efficient prosecution of his duties, then the colleges should do all in their power to provide such instruction, and not object because it happens to mar a traditional syllabus nicely moulded into a prospectus, college routine and staff hours. These difficulties should be faced and overcome.

The only point on which I sympathise with the colleges is the plea that the H.N.C. syllabus is already overloaded and to extend it beyond a period of five years is undesirable. To alleviate this disadvantage I would suggest three solutions: First, that any subject which is not required to gain exemption from the I.E.E. examinations should be excluded from the course, *e.g.*, machine drawing; secondly, under the new Education Bill, day release will be made compulsory up to the age of eighteen and therefore more time will be made available; thirdly, a teaching of fundamental physics in the lower stages of the course will make the teaching of the higher technology a good deal easier for the lecturer in the final years. Taking these points in order, a knowledge of machine drawing can be gathered from the pre-N.C. courses or during the student's practical training. Separate courses in this subject could be run for those who intend to become designers or designer-draughtsmen, so arranged that they may be taken before, after or concurrently with the N.C. courses.

Secondly, most colleges find that they can arrange in a two-year course of one whole day per week what they allow a student to do in three years of evening classes of three nights per week. Thus when the new Education Bill becomes operative, the H.N.C. courses will not take up five years unless additional subjects are introduced. Here, at least, is a definite answer to the time problem.

Thirdly, the teaching of fundamental physics in the lower stages of the course has a relation to my argument in the previous section. In enabling the higher technology to be more readily understandable it will ease the lecturer's burden and the progress of the course will be quicker. In quite a number of electrical formulæ, the use of basic concepts can reduce the length of the proofs considerably.

That the status of the Higher National Certificate is falling is evident from the remarks of young men holding this hard-acquired qualification. I think the reasons for this decline are three-fold. In the first place the war-time intensive courses have had the effect of mass-producing H.N.C. holders; although the standard of the certificate itself has not suffered owing to these intensive courses (on the contrary, it has generally increased), employers take the view that quantity is not quality and hand out the technical posts exclusively to degree holders.

In the next place, the H.N.C. does not provide such a thorough training in fundamentals as is required of a degree student taking his intermediate examination. Finally, the H.N.C. does not carry any weight as an indication of the student's general education, while a degree does to a limited extent. It may also be added, as a correspondent pointed out recently, that the H.N.C. lacks a national standard and it was suggested that the I.E.E. should set the H.N.C. examinations for all colleges. But it already does the next best thing, namely, assesses all examination papers and answers.

There is an obvious danger in this lowering of the status of part-time-acquired qualifications. The young graduate rightly feels he should be given a chance to prove his abilities; failing this he becomes discontented and discontent breeds apathy. The younger aspirants will note this apathy and become indifferent to technical education, and the supply of qualified engineers and technicians will fall.

The qualification of Grad. I.E.E. whether by B.Sc. or H.N.C. should be respected, and, indeed, the graduate by the H.N.C. usually has more practical training to his credit. Further, a matriculated student with two H.N.C.'s (not a rare occurrence), one in electrical and one in mechanical engineering, is much more highly qualified than the B.Sc. with a general engineering degree.

### University's Attitude

Another cause of discontent arises when a H.N.C. holder, finding it avails him nothing, attempts to qualify for his B.Sc. He finds that no matter how learned he is, he has to start at the bottom again and is subject to all the rules and regulations of a youth from school. London University does not recognise professional qualifications as meriting any exemptions from its degree examinations. It fails to realise that its degrees are recognised by the professional institutions. According to the I.E.E. *Students' Journal* this matter is receiving consideration. Let us hope it bears fruit.

The recent suggestions by the I.E.E. Post-War Planning Sub-Committee on Education are good, theoretically, and together with the new regulations for Associate Membership they should help to arrest the falling status of the H.N.C. But what is also needed is a change of view on the part of employers.

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## Education and Training

### Opportunities to be Seized Now

SOME views on technical education and training were expressed by Mr. S. H. RICHARDS (chief meter examiner, Electricity Commission) in his inaugural address as chairman of the Measurements Section of the Institution of Electrical engineers. His object was to emphasise that the two I.E.E. reports on this subject could not be ignored. They summed up and extended the experience of the past in a set of proposals which would make opportunity more equal for all. Those documents marked an epoch in the history of the I.E.E., but it was not suggested that strenuous endeavour would not be necessary to reach the goal set up.

The reports were a collective responsibility as well as a challenge. If the future were grasped the world could be made a better place to live in, but only by tackling the training problem so that budding electrical engineers could be fitted for the tasks that lay ahead of them.

Speaking of the older member and his responsibility, Mr. Richards cited instances that were illustrative of what could be done in small ways to implement the I.E.E. proposals for the education of future generations of engineers. Turning to the younger generation and its opportunity, Mr. Richards said that the implementation of the I.E.E. reports would depend upon several factors; the co-operation of the older generation and the avidity with which the younger seized the chance that was being offered.

Members of the Measurements Section had a unique opportunity of reaching out to the unknown, seeking for what might be a pearl of great price. The lead had been given by the I.E.E. It was worth while to belong to such a body, to be one of a company of adventurers, joining with a band of seekers for hidden truth.

# PERSONAL and SOCIAL

## News of Men and Women of the Industry

THE Council of the Incorporated Municipal Electrical Association has elected **Mr. A. J. Newman,** formerly city electrical engineer of Bristol, an associated member. It is proposed to elect **Mr. B. Handley,** formerly electrical engineer and manager, Portsmouth, and a past-president of the Association, an honorary member.

**Mr. F. S. Naylor,** B.Sc., A.C.G.I., M.I.E.E., borough electrical engineer and manager at Gravesend, has been appointed borough electrical engineer of Islington to succeed Mr. A. P. MacAlister, who is retiring. Mr. Naylor served his apprenticeship with the British Thomson-Houston Co., Ltd., Rugby, receiving his engineering training at the City and Guilds (Engineering) College, South Kensington. After a period of power station testing work, he was appointed technical assistant to the chief electrical engineer of Imperial Chemical Industries during the erection of the 93,000-kW Billingham station. From 1928-35 he served as technical assistant to the West Midlands J.E.A., and was engaged on the specification, design and construction of the Ironbridge generating station and the development of the Shropshire distribution scheme.

Mr. F. S. Naylor

Between 1935 and 37 he held the post of technical assistant to the general manager of the Sheffield Electricity Department, and he then became chief electrical engineer to Firth-Browns, Sheffield. In 1940 he was appointed electrical engineer and manager at Southwark, a position he held until going to Gravesend last year to succeed Mr. N. A. Elliott. Mr. Naylor was chairman of the I.E.E. Sheffield Sub-Centre in 1939-40 and has served on the E.R.A. Sub-Committee on Electricity Supply Costs and the E.D.A. Welding Tariff Sub-Committee.

**Lt.-Col. J. Taylor,** R.E.M.E., has been released from the Army to return to the staff of Ferranti, Ltd., and has been appointed northern area manager, operating from the works at Hollinwood. **Mr. J. Mendelson,** manager for Scotland and Northern Ireland, has moved to 98 Greenbank Crescent, Edinburgh, 10 (telephone: 56345). **Mr. L. A. Walker** has been promoted manager, Midlands Area; his address is 5, Holifast Road, Sutton Coldfield, Birmingham (telephone: Erdington 1505). **Mr. H. H. Weeks,** manager of the Western Area, operates from Chelwood, Bloomfield Grove, Bath (telephone: 2723). **Mr. R. M. Hobill,** who during the war years has been the transformer works manager, will shortly take over the duties of London area manager. **Mr. R. J. Hebbert,** while retaining the position of staff manager, has lately been appointed manager, Eastern Counties, with an address at Grove House, Sutton-on-Trent, Newark (telephone: Sutton-on-Trent 269).

**Mr. R. H. Pilcher,** who has been serving with the R.A.F., has now resumed duties as manager of the Ipswich branch of Johnson & Phillips, Ltd., at 5, Arcade Street (telephone: Ipswich 3417).

**Mr. H. B. Style,** general manager of the Wessex Electricity Company is retiring to take up an appointment abroad. **Mr. Robert B. Brown,** deputy general manager prior to his military service, has now returned and will succeed Mr. Style as general manager.

**Lt.-Col. K. G. Maxwell** has resumed his duties as manager of the publicity department, of the Metropolitan-Vickers Electrical Co., Ltd. **Mr. E. E. Walker,** who has been acting manager, has been appointed assistant manager. **Mr. M. Hird** is being retained as adviser on technical editorial publicity.

**Mr. Griffith Jenkins** has been appointed general manager to John Bennie, Ltd., Glasgow. Before the war he was in charge of the provincial sales of the associated company, Marryat & Scott, Ltd. He has spent the war years in a Government Department.

On October 19th a cheque was presented to **Mr. Jonah Newark** upon his retirement after completing 55 years service with the Automatic Telephone & Electric Co., Ltd. Mr. Newark, who is a wireman, helped to design cables for use with the earliest telegraph relays, notably the Gullstad type and he took part in a number of special outside installation jobs undertaken by the company. The presentation was made by Mr. W. S. Vick, works manager, and Mrs. Newark received a handbag.

The engineer and manager of the Brighton Corporation electricity undertaking draws our attention to an outstanding example of long service. **Mr. G. J. Casselden,** the chief clerk of the undertaking retired in 1938 but returned in 1939 and finally left in September. Mr. Casselden joined the Brighton Lighting Co. in 1884 and remained with the undertaking when the Corporation acquired it in 1894.

**Mr. G. Flett** recently retired from the position of power station superintendent in the Bradford Electricity Department after thirty-two years' service with the undertaking. On October 19th a presentation, which took the form of a cheque, was made to him on behalf of the staff and

workpeople, this being followed by a dinner given in his honour by the senior members of the staff. Councillor D. Hellewell, chairman of the Electricity Committee, presided at the presentation, which was made by Mr. T. H. Carr, the electrical engineer and manager. Other speakers included Mr. N. Wright and Mr. W. Leggott, superannuated employees of the Department who had served under Mr. Flett for long periods.

Tynemouth Corporation Electricity Committee is to extend for twelve months the services of **Mr. J. B. Glen,** the borough electrical engineer and manager, who is due to retire at the end of the year.

**Mr. E. Oldale,** mains superintendent, Oldham Electricity Department has resigned to become mains engineer at Stockport. He had been at Oldham for about ten years.

**Mr. Taylor Croft,** a director of Contractors (Pudsey), Ltd., electrical engineers, has been presented with a silver cigarette case by members of the Council and magistrates, as a memento of his year of office as Mayor of Pudsey.

Liverpool Electric Light and Power Committee has recommended that **Mr. H. Blackburne,** temporary assistant inspector (now in H.M. Forces) be appointed on his return to duty as apprentice instructor; **Mr. J. L. Low,** B.Sc., electrician (now in H.M. Forces) be appointed assistant maintenance engineer; **Mr. S. Lowey,** consumers' engineer be designated meter and test superintendent; and **Mr. W. H. Murray,** chief inspector, electricity meters, be designated meter and test engineer.

On October 20th a party of about 75 members of the Leeds Branch of the Association of Supervising Electrical Engineers paid a visit to the works of Brook Motors, Ltd., at Huddersfield. The party was met at the general offices and provided with guides who conducted the members through the various departments and explained the stages of AC motor manufacture. After the tour the party was entertained to tea in the canteen.

Southport Corporation Electricity Committee is opposing the release of **Mr. W. E. Masters,** its consumers' engineer, who has tendered his resignation upon obtaining another appointment.

On relinquishing his appointment as Controller of Light Metals in the Ministry of Aircraft Production in order to rejoin the British Aluminium Co., Ltd., **Mr. G. W. Lacey,** B.Sc., has been appointed general sales manager. **Mr. G. A. Anderson,** B.A., who recently relinquished his appointment as Deputy Controller of Light Metals to rejoin the company, has been appointed deputy general sales manager.

**Mr. L. E. Laidlaw,** A.M.I.Mech.E., has joined Machine Units, Ltd. (after six years in the R.A.F.) as technical representative in Bristol and the West Country in connection with the company's electrical accessories and cutting tools.

The First Lord of the Admiralty, the Rt. Hon. A. V. Alexander, accompanied by Mr. H. D. MacLaren, Director of Electrical Engineering to the Admiralty, and Mr. R. W. Adams, Admiralty Regional Electrical Engineer, Midland and South Wales District, recently visited the Witton Engineering Works of the General Electric Co., Ltd. The visitors were received by Sir Harry Railing, chairman of the company and Dr. C. C. Garrard and Mr. J. J. Gracie, joint general managers of the works. During a walk round the works, submarine motors and switchboards, large motors and generators for the Admiralty and many types of marine control were inspected, and the visitors witnessed million-volt discharges in the high-tension test department. They also saw a comprehensive exhibition of G.E.C. war products.

**Mr. A. V. Alexander with Sir Harry Railing at the G.E.C. Witton works**

**Mr. T. B. Boothman** is the winner of the Sir Henry Fildes Medal essay competition. His subject was "Training of Factory Managers, Practical Administration; which should be First and Why." The medal will be presented

at the annual general meeting of the Institution of Factory Managers on January 26th.

**Mr. W. Arthur Jones**, who is retiring from the position of general secretary of the Electrical Power Engineers' Association at the end of the year, is to receive a gift of £1,500 as a token os the members' regard. The Divisional Councilf were recently asked to send in any nominations for the position by October 31st. A commencing salary of £800 is to be paid. The National Executive Council has put forward as its nominee **Mr. J. F. Wallace**, assistant general secretary.

**Mr. J. B. Lancaster**, the chairman of the Tees-side Sub-Centre of the I.E.E., whose address is summarised in this issue, is a native of Birmingham. He was educated at Bedford School and later, concurrently with a five-year engineering apprenticeship course with the B.T.H. Co., took a degree course at the Rugby College of Technology. He secured the London B.Sc. degree with second-class honours in mathematics. From 1933 to 1934 he underwent a special student apprenticeship course with the B.T.H. Co. and then served with the Yorkshire Power Co. in various capacities from 1934 to 1940. He was then appointed to his present position of electrical distribution engineer with I.C.I. (Billingham Division), Ltd.

**Mr. A. Haddock**, the chairman of the I.E.E. Sheffield Sub-Centre (see p. 641), is distribution engineer in the Sheffield Electricity Department. He was born at Leeds in 1901 and was educated at the Central High School in that city and at the Leeds University where he took the B.Sc. degree with first-class honours in electrical engineering. From 1927 to 1936 he was with the Yorkshire Electric Power Co. as district engineer and then went to Sheffield as assistant mains engineer. In 1937 he was promoted to deputy distribution engineer and two years later to his present position.

**Electrical Commander J. D. Markland**, R.N.V.R., has been appointed chief engineer of the Maidenhead Corporation Electricity Department to succeed Mr. C. A. Britton, who, as already reported, is taking up an appointment with the Sudan Light & Power Co., Ltd.

**Lieutenant-Commander A. C. Hazel**, R.N.V.R., who is at present serving in the Pacific, hopes to rejoin Low Temperature Carbonisation, Ltd., in January. Mr. Hazel was at one time area organiser with the Coal Utilisation Council and before that sales superintendent to the South Somerset & District Electricity Co., Ltd. He won the E.D.A. National Public Speaking Contest in 1934.

**Mr. T. Muirhead**, who has been chief electrical engineer at the Glapwell Colliery of the Sheepbridge Coal & Iron Co., Ltd., for the past eight years, has been appointed chief electrical and mechanical engineer to the Dalton Main Collieries and John Brown & Co.'s Collieries, Rotherham. This year Mr. Muirhead is president of the Midland Branch of the Association of Mining Electrical and Mechanical Engineers. On leaving Glapwell he was presented with a gold wristlet watch from the electrical staff.

The Manchester Electricity Committee has expressed appreciation of the services of **Mr. F. P. Seager**, substations engineer, and **Mr. W. Baxter**, superintendent of electrical repairs, on the occasion of their retirement.

**Mr. W. A. H. Parker**, M.I.E.E., M.Am.I.E.E., has been appointed electricity consultant to the National Farmers' Union. He will help members with the negotiation of terms and conditions of electricity supply and advise them on the application of electricity to their farms, both with regard to lay-out and machinery. Mr. Parker is well known as an electricity consultant and has had considerable experience of electrical designing. He was chairman of the E.D.A. Farm Sub-Committee which provided the first electrical exhibit at the Royal Show at Bristol. After serving an apprenticeship on electrical machinery design with Electromotors, Ltd., Manchester, he held positions in the electricity departments of the Farnworth U.D.C. and Heywood Corporation before being appointed meter and testing engineer with the Lancashire Electric Power Company. In 1922 he became sales engineer to the West Gloucestershire Power Company but left in 1943 and has since been engaged as technical adviser to several industrial concerns.

Mr. W. A. H. Parker

**Mr. H. Outram**, assistant engineer at the Fulham power station, is resigning to take up the position of power station superintendent to the Hong Kong Electric Co.

**Mr. J. Kenyon**, of Blackpool, has been appointed electrical maintenance engineer at Preston Corporation power station and **Mr. J. Blackburn**, assistant control engineer.

A victory dinner to the staff and employees was given recently by the Biddle group of companies. Mr. J. Platt-Mills, M.P. for Finsbury, referred to the companies' extensive output of "Vectair" heating, ventilating, cooling and other equipment for the Service departments.

## Obituary

**Mr. F. Bradford.**—We regret to report the death, at Wavertree, Liverpool, on October 21st, of Mr. Frank Bradford, the Liverpool representative of Pirelli-General Cable Works, Ltd.

**Will.**—**Mr. J. E. Betts**, chairman, Associated Electrical Industries Group Purchasing Committee, left £23,645.

# CORRESPONDENCE

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

## Registration of Contractors

THE article in the N.R.E.I.C. by its vice-chairman Mr. A. H. Dykes (*Electrical Review*, October 19th) is timely for war reactions favour the unscrupulous and while skilled labour is mis-directed and standards lowered, the quality of installations suffers.

For varied reasons the industry and public are disinclined to weigh the implications of the schemes suggested to check increase of bad work. But we have in being a widespread, workable, economical, voluntary organisation for better wiring—sponsored by the I.E.E. and supported for twenty-one years by over a thousand of the best contractors and their employees. They do disservice to the industry who discredit the improvement efforts of the National Register which is an independent technical foundation to guide the installer and guard the consumer.

Fierce competition in places where wiring regulations are derided caused a few withdrawals from the Register and some expected more direct support from their supply and local authorities. But, after all, those who would maintain their principles must exert their own powers and not depend on outsiders' favour. Firms on the Register should be its chief unpaid publicity agents, although the central body could assist by giving more information about its good work and purpose.

It is to be hoped that Mr. Dykes's statements evoke criticism for, as he suggests, free discussion is the healthy way to get results.

*Edinburgh.* D. S. MUNRO.

## Motor Protection

WE read with interest the article by Mr. D. T. Evans dealing with electric motor maintenance published in your issue of October 19th.

We are in agreement regarding the necessity for discrimination between short-circuit and overload protection, but we feel that there is one point which has not always been appreciated regarding the setting of overload relays, and this is that, according to B.S. Specifications, an overload relay has a margin of operation of 10 per cent. above or below its setting.

This means that a relay which is set to trip at 125 per cent. may not operate until the current has reached a value of 137·5 per cent. These figures are in accordance with B.S. 587, while B.S. 142 gives a figure of 130 per cent. as the tripping value. We would suggest that over-current relays should be matched to the thermal characteristics of the motor, so that they will operate when a limiting safe temperature is reached by the motor. No further restarts are then safely possible until a cooling period has elapsed.

With reference to single-phasing and delta-wound motors, the difficulty of obtaining protection with normal over-current relays can be easily overcome where star-delta starting is employed, by connecting the relay coils in series with the motor windings so that they deal with the current which passes through the motor windings and not only with the line current, which is the case when they are fitted in the accepted standard star-delta starter connections. There is no doubt that in open-phase fault conditions it is desirable for the motor stator winding to be star-connected, because this is intrinsically safer than the delta method.

*Chester.* P. J. SHIPTON and A. G. SHREEVE,
Cantie Switches & Brookhirst Switchgear, Ltd.

## Turkish Requirements

IN a "Review of Commercial Conditions in Turkey" produced by the Department of Overseas Trade (Stationery Office, 1s.) it is stated that opportunities should occur for the supply of capital goods in connection with various public utility schemes which have already been commenced or are planned. Among these are paper, cellulose, chlorine and cement factories. Contracts for these works were all awarded in the first instance to German firms but progress has been held up owing to the inability of the contractors to supply the necessary electrical equipment, cables, etc., and the question whether Germany will now be able to supply is, as yet, uncertain. Work on the construction of the Catalagzi power station, the contract for which was awarded to a United Kingdom company (Metropolitan-Vickers) in 1940, is due to be resumed as soon as possible, and extensive electric and hydro-electric undertakings are under consideration.

# Newport's Fiftieth Anniversary

## Rapid Expansion in Recent Years

ON October 13th Newport (Mon.) celebrated the fiftieth anniversary of the commencement of public electricity supply by a luncheon given by the Electricity Committee to members of the Council and staff, and a few other friends associated with the undertaking. Afterwards a visit was paid to the power station where there is in progress a 30-MW extension. Alderman Raikes, chairman of the Electricity Committee for a number of years, proposed the toast of the undertaking, Mr. T. H. Wood, the chief engineer, replying. Mr. J. T. H. Legge of the Central Electricity Board complimented the undertaking on its excellent performance, and congratulated the chairman and the Electricity Committee on its success.

The provision of electric lighting in Newport was first discussed by the Town Council in 1889. A Special Committee appointed investigated the matter and eventually recommended that a Provisional Order should be sought to supply electricity to the borough. An Electric Lighting Order was granted in 1891 and contracts were placed at the end of 1893 for the erection of the Llanarth Street works, which were officially opened on October 14th, 1895, by the Mayoress switching on the public arc lamps.

Demands for electricity for heating and power soon surpassed that for lighting and upon the conversion of the tramway system from horses to electricity, the Llanarth Street works, which generated on the single-phase, 87·5 cycle AC system, proved unsuitable for electric traction and for accommodating the larger and more efficient plant then available. In 1902 therefore the Corporation built its East power station in Corporation Road to generate DC at 500 V for traction and at 460 and 230 V for lighting and power. The generating plant consisted of three 500-kW Markham engines, with Babcock & Wilcox boilers working at 160 lb. per sq. in. The 50-cycle AC system, with a generating pressure of 6,200 V, was adopted when the plant was extended in 1911 by the installation of a 1,500-kW Parsons turbo-alternator.

To supply demands for electricity outside the borough an Extension Special Order was obtained in 1922. Numerous extensions have been carried out at the East station, which is now one of the selected stations and will by 1947 have a capacity of 90,000 kW. In 1928 the Llanarth Street works ceased to operate as a generating station and was converted to serve as the undertaking's central substation. Up-to-date electricity showrooms were opened in the High Street in 1936. To-day the undertaking has over 27,000 consumers and generates 232,436,000 kWh a year, the average price per kWh sold being 0·977d. as compared with 3·955d. fifty years ago, despite an increase from 6s. to 42s. a ton in the cost of coal. The total capital expenditure on the undertaking amounts to £2,324,196.

**At the Newport jubilee lunch**

Top row (left to right) :—Councillor M. Selby, Councillor F. W. W. Morrice, Mr. R. L. Axford, Alderman F. J. Humphries, Councillor L. F. A. Driscoll, Councillor T. F. Mooney. Bottom row :—Mr. T. H. Wood, Councillor J. Parry-Brown, the Mayor (Councillor G. W. Armstead), Alderman F. W. Raikes, Mr. J. T. H. Legge and Mr. E. H. Fox

To commemorate the jubilee an illustrated brochure has been prepared by Mr. T. H. Wood, the borough electrical engineer and manager, successor to the late Mr. Nichols Moore, whose name will be long associated with the undertaking as being in a great measure responsible for its excellent progress.

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**Brisbane Council's Five-Year Plan.** — A programme of works covering the next five years which has been prepared by the Brisbane City Council involves an estimated expenditure of £10,000,000, including approximately £2,100,000 for transport, power house, and electricity supply.

# Views on the News

## Reflections on Current Topics

WAR'S stimulating effect upon electricity consumption is clearly demonstrated by a statement prepared by the Electricity Commissioners giving the month-by-month output during the whole of the war period. The annual totals show fairly steady progress from 24·4 million kWh in 1938 to 38·4 million last year. The monthly peak was reached in January last (4·2 million kWh) but since then there has been a decline as compared with 1944. No doubt this very slight relief will be welcome to the supply authorities in present circumstances but the respite can only be temporary, and all the plant now under construction will be loaded up almost as soon as it is installed.

* * *

A Sunday paper has informed its readers that during next winter "electricity cuts are officially regarded as essential" but cuts in gas supplies are unlikely, reliance being placed upon reduced pressure. I do not know who the "official" was who imparted this pessimistic view, but I do know that the officials best acquainted with the matter hope that "load-shedding" (to adopt the official euphemism) may not be necessary although precautions should be taken by supply authorities to explain the necessity should it be forced on them. I am aware of the continuing difficulties of the coal situation but, in common with the rest of the public, I am getting a little tired of being promised something worse all the time.

* * *

Two major considerations seem to be involved in the lifting of the purchase tax from cooking, heating and other domestic apparatus. In the first place the cost of equipping new houses will be appreciably lower (although Government-sponsored schemes already escaped the tax); secondly it will put a different aspect upon hire-purchase schemes. E.D.A. found by means of a questionnaire addressed to its members that while purchase tax was not likely to cause a general holding-up of hire and hire-purchase schemes, many authorities hesitated to go all out because of it. The disappearance of the tax will have a stimulating effect upon these schemes—when sufficient appliances become available.

* * *

Several domestic electrical appliance manufacturers I have met recently seem to be rather hazy as to the question of price control in relation to their products. Briefly the position is this. With the approval of the Central Price Regulation Committee, members of B.E.A.M.A. have made an advance of 50 per cent. in their pre-war prices of goods listed in 1939. Non-B.E.A.M.A. members have generally followed suit, the Central Price Regulation Committee having been frequently consulted in cases of doubt. For entirely new apparatus, for which no previous or comparable prices are available, manufacturers are also taking advantage of the facilities offered by the Committee for approving fair prices. There is no compulsion to refer matters of price to the Committee but it is a safeguard worth taking. Should complaints of overcharging be made, prices approved by the Committee would be automatically upheld; prices not so approved would call for an investigation into the manufacturers' method of pricing and perhaps legal action. In any case complaints regarding overcharging for electrical apparatus are almost non-existent and are likely to become rarer still as larger supplies become available and competition gets going again.

* * *

According to a note in last week's *Electrical Review*, tenants of council houses at Silsden may install electricity at their own expense for all purposes except clothes washing, cookers or grillers and fires. The Gas and Water Committee 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." This is unbelievable kindness of heart on the part of the Committee, but is it sure of its ground?

* * *

Sentiments with which I am in entire agreement were expressed by Mr. G. P. Dixon, the Colchester borough electrical engineer at a ratepayers' meeting last week. He said that he hoped reorganisation would not be the end of municipal supply. There were many rumours of nationalisation or regionalisation, but he felt that the vital necessity for electricity in the post-war world could not wait while a perfect solution to the ownership problem was sought: they had to get on with the job. All the same it is difficult to get on with any job with the spectre of possible extinction in the background.

* * *

In announcing that electric lighting is to be installed in Biggleswade Council houses, the tenants repaying the cost at the rate of 6d. per week, the *Star* headed its note "Time Marches On" and ever since I read it I have been wondering why.—**REFLECTOR.**

# Willow Holme Power Station

## Extensions to Generating Plant at Carlisle

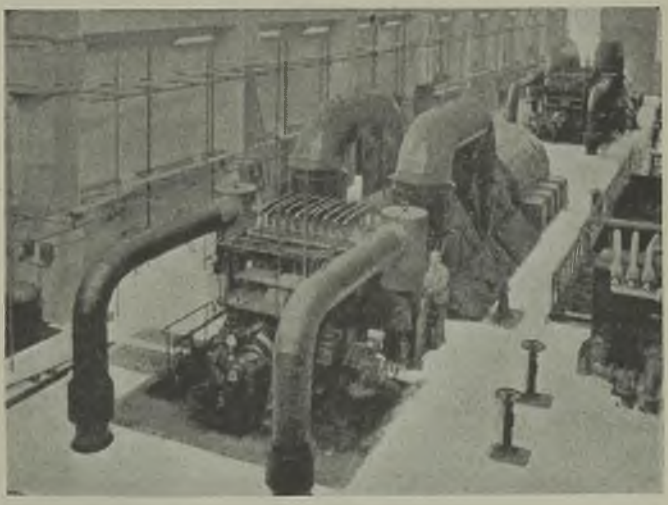
As part of the war programme for providing generating plant in the west of Great Britain, the capacity of Willow Holme power station of the City of Carlisle was increased from 26,150 kW to 86,150 kW. Directions were issued in May, 1940, by the Central Electricity Board for the installation of the first 30,000-kW unit of the extension, which was running by January, 1943, and two years later for a second unit, the whole 60,000 kW being in service in January of this year.

All buildings are of reinforced concrete and are erected on concrete foundations, without piling, on ground consisting of deposited sand and earth, the general surface level being +33 o.d. In the boiler house are five tri-drum stoker-fired boilers with a normal duty individually of 120,000 lb. per hr. (maximum 150,000 lb.) and steam conditions of 625 lb. per sq. in. and 840 deg. F. Furnace walls are water-cooled at sides and front and are refractory with arches at the back. Arrangements have been made for refiring the grit from the economiser hoppers. Each boiler has one multi-loop superheater with primary and secondary sections; steam temperature is controlled between 90,000 and 150,000 lb. per hr. by an automatic air-operated attemperator. Two induced-draught fans in conjunction with secondary grit cyclones and two forced-draught fans are installed per boiler, the former driven by 112-HP squirrel-cage motors and the latter by 37-HP motors of the same type; fan regulation in both cases is by means of hydraulic couplings fitted with scoop control remote-operated automatically or manually. Secondary air is provided by two constant-speed damper-controlled fans driven by 17-HP motors. Flue gases pass to a 250-ft. brick chimney. Soot blowers on the first two boilers are manually operated, and the others automatic.

Principal temperatures in deg. F. for normal and maximum boiler ratings are as follows:— Feed, 320,336. Gases, leaving boiler, 722, 762; leaving economiser, 418,456; leaving air heater, 250, 275. Air, entering air heater, 80, 80; leaving air heater, 282, 299. The amount of coal of 11,000 BThU per lb. designed to be burned per sq. ft. of grate area is 36·4 lb. at economic rating and 45·5 lb. at m.c.r. with $CO^2$ at boiler exit of 13·75 per cent.

Coal is received from railway sidings capable of dealing with the requirements of a 120,000-kW station by means of 30-ton tipplers of the side-emptying type supplying a main hopper which allows coal to gravitate on to a rotary feed table for the first section of plant and on to belt feeders for the second.

Three belt conveyors of 100 tons per hr. capacity and three of 200 tons take the coal to five 350-ton bunkers in the boiler house or to the coal store (40,000 tons at 15-ft. depth) whence it is spread by a drag scraper. Ash and grit are discharged from the stokers and secondary cyclones *via* three water



**The new 30,000 kW sets in the Willow Holme station of the Carlisle Corporation**

troughs into a 100-ton pump, whence it is grabbed into lorries. The ash plant is rated at 100 tons per hr.

The 3,000-RPM turbines of both 30,000 kW generating sets (24,000 kW economic rating) are of the two-cylinder reaction type and receive steam at 600 lb. per sq. in. and 825 deg. F. Low-pressure steam is bled from four stages, two connections being to low-pressure feed-water heaters and two to high-pressure heaters on the discharge side of the feed pumps. There are five of the latter—three 450-HP electric and two steam—rated at 30,000 gal. per hr.

The l.p. cylinder of each turbine is of the double flow construction receiving steam at the centre and exhausting to two condensers with a combined duty of 216,864 lb. per hr. giving a vacuum of 28·9 in. (bar. 30 in. hg.) with 26,300 gal. per min. of cooling water at 55 deg. F. Circulating water is taken from the River Eden by means of four two-stage axial flow pumps with individual capacities of 13,750 gal. per min. against a static head of 24 ft. and friction load of 22·5 ft. with syphonic assistance of 75 per cent. efficiency; these are driven by 195-HP vertical squirrel-cage motors.

### Generator Arrangements

Generation is at 11-kV, stepped up to 33 kV, at which switching takes place. The m.c.r. of the alternators is 37,500 kVA at 0·8 power factor and the inherent reactance 24·3 per cent. Pilot and main exciters are mounted on extensions to the rotor shaft. Both alternators are controlled by metal-clad 800-A 750-MVA circuit-breakers, one of which is a duplicate-busbar type and the second a single-busbar design with single break on each of the completely separated phases and containing 78 gal. of oil as against the 250 gal. of the other.

Bus-bar protection has been provided for all the new high-voltage switchgear. Station auxiliaries are normally operated from 2,000-kVA 11,000/400-V transformers supplied from old and new 11-kV switchboards. In view of different rupturing capacities of the old and new 11-kV circuit-breakers, interconnection is through 20,000-kVA cast-in-concrete reactors with a reactance of 8 per cent. on 20 MVA. The 400-V, 3,000- and 800-A auxiliary switchgear is of the air-break metal-clad type. Most of the motors are direct-on started with DC latched-in contactors and automatic reclosure. As a stand-by a 750-kW 400-V turbo-alternator has been installed. Considerable use has been made of Pyrotenax cable for the wiring of the station auxiliaries and lighting.

### Rural Work Commended

At a luncheon held on October 25th Mr. J. Nimmo (Electricity Commissioner) commending the Carlisle undertaking on its electrical development in rural areas, which had previously been referred to by Mr. G. C. Milne (borough electrical engineer, Lancaster), regretted that there was no labour available at present to carry the scheme to conclusion. He deprecated the loose talk about rural electrification in Great Britain, which could bear comparison with that of any other country. But for the war there would by now have been very little left outstanding.

Mr. J. R. Potts (chairman, electricity committee) said that Carlisle station was the only selected station between Lancaster and Kilmarnock. Even if local interests suffered, changes in electrical organisation that would be in the national interest would be welcomed. Mr. A. C. Thirtle (city electrical engineer) stated that the extended station had a capacity for generating 360 million kWh per annum and was one of the fifty-six stations in the country which generated more than 200 million kWh a year and together supplied 85 per cent. of the total requirements. Of the 289 million kWh output for the year ending September 30th, 1945, Mr. Arnott (C.E.B.) said that only 18·5 per cent. had been used in Carlisle, the remainder having been exported to the grid.

The extension has involved a capital outlay of approximately £2,250,000. It was designed and supervised by Mr. C. W. Salt (city electrical engineer until October, 1944, when on his retirement he was succeeded by Mr. A. C. Thirtle) and his staff in collaboration with the consulting engineers, Kennedy and Donkin.

### Suppliers of Plant

The principal contractors were: Stirling Boiler Co., Ltd., boiler plant; British Thomson-Houston Co., Ltd., turbine plant, main switchgear, transformers, reactors, motors, soot-blower (automatic control); English Electric Co., main double-busbar switchgear; British Insulated Cables, Ltd., main cable work; David Thomson & Sons, Ltd., circulating-water piping, power wiring (Pyrotenax), heating and lighting; Atlas Sprinkler Co., fire-fighting plant; Sturtevant Engineering Co., Ltd., vacuum-cleaning plant; John Laing & Son, Ltd., civil engineering.

Among the sub-contractors were the following: International Combustion, Ltd.,

stokers, ash-handling and scraper plant; Babcock & Wilcox, Ltd., coal-handling plant and soot-blowers; Mavor & Coulson, Ltd., conveyor belt idlers; Goodyear Rubber Co., Ltd., conveyor belts; E. Green & Son, Ltd., gilled-tube economisers; James Howden & Co., Ltd., air heaters; Davidson & Co., Ltd., fans and dust-extraction plant; Brookhirst Switchgear, Ltd., motor starters; Aiton & Co., Ltd., high-pressure pipework; Hopkinsons, Ltd., valves and mountings; G. & J. Weir, Ltd., feed pumps; Copes Regulators, Ltd., feed regulators; Cambridge Instrument Co., Ltd., Bailey Meters & Control, Ltd., James Gordon & Co., Ltd., Geo. Kent & Co., Ltd., and W. Crockett & Co., Ltd., instruments; Electroflo Meters Co., Ltd., automatic boiler control and instruments; W. & T. Avery, Ltd., weighbridges; Hydraulic Coupling & Engineering Co., Ltd., fan couplings; Hewittic Electric Co., Ltd., rectifiers for stoker drive; Liptak Furnace Arches, Ltd., refractory rear arches; Mirrlees Watson Co., Ltd., condensing plant, feed heaters, evaporators, service and screen-washing and c.w. pumps and pipework; J. Blakeborough & Sons, Ltd., screens and valves; Alfa-Laval Co., Ltd., turbine-oil purifiers; Drayton Regulator & Instrument Co., Ltd., desuperheaters; Candy Filter Co., Ltd., water conditioning; Tudor Accumulator Co., accumulators; Clifford & Snell, Ltd., "Loudaphone," "Ordasign" and "Synchrodial" equipments.

## Future of Fuel Industry

### Sir John Dalton's Views

ON his election as president of the Fuel Luncheon Club last week Sir John Dalton spoke of the far-reaching Government proposals affecting the fuel industries. He stated that the capital involved in the mining, gas and electricity industries was over £1,000 millions and the number of people directly employed was over 1,000,000. Any change of ownership or operation would, therefore, be an enterprise on an enormous scale which could not be done in a hurry unless the risk was taken of doing injustice to a large section of the public or, alternatively, doing injustice to the future stability of the industries.

Sir John stated that the average holding of stock by shareholders in gas and electricity companies was of the order of £200 so that the bulk of holdings were in the hands of the small man. Holdings over £2,000 represented only about 2 per cent. of the whole issued capital of the companies.

He thought that nobody could challenge the principle that where any industry was nation-wide and was completely independent, there must then be possibilities of the public interest being endangered and any Government would be bound to control that industry in some way or other. The difficulty was to apply this principle to the fuel industries. There were no other industries in the country so exactingly controlled as the gas and electricity industries, and he had difficulty in finding any justification for nationalisation. Dividends and prices were already regulated, or the power had already been obtained to regulate them. Every single operation of both industries required prior sanction or approval by some Department or other.

He foresaw a complication immediately the mining industry was nationalised. The Government would then be the owners of the house coal market of the coal trade and the State would therefore become competitors straight away with the gas and electricity industries for domestic heating. At the same time, the State would be the dictators of the price which gas and electricity undertakings would have to pay for their coal.

## Boiler Cleaning

### Availability Committee's Bulletin

WITH more onerous operating conditions, deposits on external heating surfaces of boilers have increased in quantity and changed in nature so as to render inadequate most former cleaning practice. A new publication by the Boiler Availability Committee (Bulletin MC/131, 43 pages, 17 fig.) is based on experience gained with new methods of cleaning modern stoker-fired plant as well as with the systematic and thorough application of existing cleaning methods.

The great increase in steaming hours gained by the thorough cleaning of surfaces down to the metal and the reduction of time obtained by cleaning before the gas passages are choked are both clearly demonstrated. A considerable amount of cleaning can be carried out by soot-blowing and water-lancing while boilers are on load and the technique of applying these processes to the various sections of the plant is described. Water-lancing was originally introduced by the Committee during the war for cleaning superheaters, but its use has recently been extended to tubes. For occasional or emergency use water sluicing may be employed. The most satisfactory ways of cleaning economisers and air heaters are also by wet processes, which are described.

Ten appendices give detailed illustrated descriptions of equipment and individual applications of these cleaning methods at power stations, together with the steaming hours thereby obtained. It is emphasised that the cleaning of boilers should be systematically controlled and regularly inspected by competent staff.

The Boiler Availability Committee is composed of representatives of supply undertakings owning power stations, the Central Electricity Board, boiler makers and research organisations. Applications for copies of the Bulletin, other than those required for stations operated under the Central Electricity Board, should be made to the chief engineers of the boiler makers concerned.

# COMMERCE and INDUSTRY

## B.E.T.R.O. Begins Services. Queen at Women's Exhibition.

### Export Research

SPEAKING at a meeting of the British Export Trade Research Organisation on October 24th, Mr. A. Ethell, director of administration, said that membership had reached 205. Now that they could offer a concrete service it was intended to make a drive for increased membership. An intelligence service was now available and at the beginning of 1946 B.E.T.R.O. would be able to carry out specific research on instructions from members. The purposes of the meeting were, first, to ask members to promote the value of the organisation among their friends in industry and, secondly, to tell the management what sort of service they required and what problems allied to market research needed ready solution.

Among the points raised in a subsequent general discussion were the investigation of "credit-worthiness" of importing agencies; the use of existing overseas organisations as B.E.T.R.O. agents; the confidential nature of specific research; investigation of transport costs; the position of export groups; the use of British Standards; and the importance of design and packaging.

### I.M.E.A. and Outlets

In the October *I.M.E.A. Journal* reference is made to the statement regarding the standardisation of domestic plugs and sockets issued recently by the British Standards Institution and it is stated that a letter on the matter has been sent to all engineer representatives of the Incorporated Municipal Electrical Association. This briefly reviews the recent history of the subject and states that the Council of the I.M.E.A. is strongly opposed to the proposed up-rating of the present standard design because it would greatly increase contact heating troubles and would expose existing 5-A circuit wiring to dangerous overheating by making it readily possible to load it up to 13A. It is suggested that those members who are subscribers to the B.S.I. should individually protest to that body against its proposals. The Council is seeking an interview with the B.S.I. to put forward the Association's views.

### Norwich Thanksgiving Week

In connection with Norwich Thanksgiving Week, an exhibition of local firms' contributions to the war effort was held in the setting of the Norman Castle. A prominent part was taken by Laurence, Scott & Electromotors, Ltd., included in the company's exhibit being a skiatron radar display set; a radar target indication unit and radar range matching receiver; a Mark VII plotting table; an E.M. elevation receiver; a special quick-action change-over switch for controlling an alternative source of supply to essential electrical apparatus on warships; and various other types of control gear. A Mark VI rangefinder director was shown in operation. The heavier exhibits were illustrated by photographs, the latter including a submarine main motor (in the manufacture of which the company were pioneers) and submarine warfare equipment. Help as sub-contractors was given by many local firms, including the engineering department of the company's oldest customer (now Reckitt & Colman, Ltd.), whose works were electrified by Mr. W. H. Scott in about 1883.

### Export of Surplus Machine Tools

It has been a condition of the Government's machine tool disposal scheme that Government surplus machine tools are not exported. The object of this has been to give British industry a first chance to re-equip with the best surplus tools. The Machine Tool Control now announces that, as from November 1st, Government surplus used and unused machine tools which have been on offer to British industry through the disposal scheme for four months are available for export. The restriction on the export of American machine tools acquired under Lend-Lease arrangements remains in force.

### Queen Visits Electrical Exhibition

On Thursday last week Her Majesty the Queen paid a visit to the Women's Electrical Exhibition at Dorland Hall, Regent Street, London. She was accompanied in her inspection of the exhibits by the Dowager Lady Swaythling (president of the Electrical Association for Women), Miss Caroline Haslett (director, E.A.W.), Mr. V. W. Dale (general manager, E.D.A.), Capt. J. M. Donaldson (chairman, E.D.A. Exhibition Committee), Mr. H. J. Randall (vice-chairman, E.D.A. Council), Mrs. M. B. Jackson (chairman, E.A.W.), Alderman Mrs. Gregory (E.A.W.) and Miss F. E. Jackson (treasurer, E.A.W.).

**Mr. V. W. Dale explaining one of the displays to Her Majesty the Queen at the Women's Electrical Exhibition**

Her Majesty was particularly interested in the planned kitchen and its attractive colour scheme. She said that the royal kitchens

seemed out of date by comparison and she hoped that such equipment might be used when new houses were built on the royal estates. She also hoped that electric washing machines would soon be available for every housewife, for whom washing day was the most tiring day of the week. Looking at the educational and training sections of the exhibition, the Queen expressed the opinion that there was a great career open to women in electricity not only in the home but in such spheres as nursing and medical electricity.

On the previous day H.R.H. Princess Royal also visited the exhibition, spending a considerable time inspecting the domestic side of the display and the A.T.S. exhibits.

## Contract Correction

In the "Contracts in Prospect" section of our issue of October 12th, it was reported that new offices were being erected at Wallsend for the Parsons Marine Steam Turbine Co. Messrs. R. T. James & Partners, whose name was mentioned, inform us that the body concerned is the Parsons & Marine Engineering Turbine Research & Development Association and not the company named. They are concerned as consulting engineers with the design of the civil engineering side only of works for research and testing of marine machinery.

## District Heating Suggested for London

A proposal that the City of London Corporation should investigate the possibilities of district heating was to be made by a member at a meeting of the Court of Common Council yesterday.

## Proposed New Factories

It is reported that the Electro Dynamic Construction Co., Ltd., proposes to erect a new factory at Bridgwater, and that a factory is also to be built in the same district by Crypton Equipment, Ltd. The latter works will employ about 400 people and it is hoped to have it in operation by next summer.

## Travellers' Benevolent Institution

The annual court of governors of the Commercial Travellers' Benevolent Institution will be held at the London offices of the Institution 4b, Frederick's Place, E.C.2, on December 28th at noon.

## Bulpitt Display Aids War Charities

War charities have benefited by over £3,000 by a mobile display which Mr. T. N. Dunn, service manager of Bulpitt & Sons, Ltd., has arranged to draw attention to the company's manufacturing activities in both war and peace. Mounted on a lorry the exhibit has as its central feature a 21-in. torpedo, which has been made up with a standard warhead and afterbody, with a dummy centre portion forming a money-box. Since its introduction in 1941 at Birmingham's Warships Week, it has been shown at Wolverhampton, Worcester, Dudley, Tipton, Solihull, Halesowen, Leicester and Coventry.

Surrounding the torpedo are other war products such as sea markers, smoke floats, identification flares, photographic flashes, 25-lb. and 7 -lb. practice bombs, bulkhead lamps, Admiralty stockpots, etc., together with a few


**Bulpitt mobile display**

of the company's peacetime products, "Swan Brand" electric kettles, coffee percolators, cooking utensils, tea sets, etc. The difficulties of resuming production of the latter are increased by the fact that the electrical department was completely destroyed by enemy action in 1940, so that it will be some time yet before production can reach its former level.

## Arc Welding Competition

A competition in arc welding is being organised by the Arcweld Research Construction & Supply Co., 68, Bridle Road, Eastcote, Pinner, Middlesex, from whom full particulars can be obtained.

## Lamp Showcards

In view of the emergency situation and the shortage of materials, John Ismay & Sons, Ltd., made no effort during the war to produce lamp publicity matter. Now, however, they are making available two attractive showcards relating to Ismay and Briton lamps. These have been made from window transfers in stock before the war mounted on "unrationed" cards.

## Diesel-Electric Locomotives for Egypt

The Egyptian State Railways have ordered from the English Electric Co., Ltd., twenty-seven Diesel-electric locomotives, twelve for general service, including express passenger duties, and fifteen for shunting. Weighing 48 tons, the shunting locomotives are powered by 350-BHP Diesel engines, and a trailing load of 1,040 tons can be shunted on the level. The general service locomotives, weighing 116 tons and with Diesel engines developing 1,600 BHP attain a maximum speed of 75 MPH with an express passenger train. They have six

traction motors driving two three-axle bogies, and the control scheme provides for multiple unit working. There is a driving position at each end of the cab. Further orders are in hand for the Great Western Railway and for the Federated Malay States.

## New Supply Department

The Prime Minister announced on Monday that it was proposed to amalgamate the already combined Ministries of Supply and Aircraft Production into a new Supply Department which would furnish supplies and carry out research, design and development for both military and civilian purposes. The Board of Trade would remain responsible for general questions of industrial and commercial policy and so far as these questions were related to engineering the Ministries of Supply and Aircraft Production would work in close co-operation with the Board.

The Ministry of Production had already been merged in the Board of Trade although for formal reasons it was at present necessary to retain two separate Votes. The Raw Materials Department and the Raw Materials Controls of the Ministry of Supply were transferred to the Board of Trade as from that day (Monday) but the Iron and Steel, Non-Ferrous Metals and Light Metal Controls would remain with the Ministries of Supply and Aircraft Production.

## Atomic Energy Research

It was announced by Mr. Attlee on Monday that a research and experimental establishment covering all aspects of the use of atomic energy was to be set up at Harwell airfield, near Didcot. Responsibility for research in this subject was to be transferred from the Department of Scientific and Industrial Research to the Ministry of Supply but the D.S.I.R. would have representation on the committees dealing with atomic energy.

## Chinese Engineers in Britain

Sixty Chinese engineering post-graduates who are to be trained in British engineering works, under the scheme arranged by the Federation of British Industries in conjunction with the Chinese Government, were welcomed in London last week by Sir Frank Gill, chairman of the F.B.I. China Committee. These apprentices have been allotted to thirty engineering works in various parts of Great Britain, including London, Bristol and Glasgow. Ninety engineering students have already been trained under the F.B.I. scheme and more than half are back in China helping the reconstruction and development of their country. The scheme has been in operation for the past fifteen years.

## G.E.C. Refresher Courses

To prepare service men for their return to civil life the General Electric Co., Ltd., some time ago devised a series of refresher courses to help men and women from the Forces to adapt themselves to their new environment. The scheme was officially inaugurated on October 1st when seventy-five men and women of the Magnet House staff, who recently returned from the Services, were welcomed back by Mr. Leslie Gamage (vice-chairman) and Mr. T. W. Heather (director and sales manager). Technical specialists of the company have combined to give the courses which will cover a period of about three months. In addition there are five courses covering simple and more advanced courses in electricity and magnetism, book-keeping and accountancy, shorthand and typewriting and arrangements also will be made for special training at technical colleges and institutes.

## Welsh Girls Learn Lamp-making

On Monday last twenty-six girls arrived from Merthyr Tydfil, South Wales, to spend the next few weeks learning electric lamp making in the Edmonton and Tottenham factories of Thorn Electrical Industries, Ltd. They are the forerunners of other parties of girls from South Wales who will ultimately form the nucleus of the staff of the new factory being built for the company at Merthyr Tydfil—the first electric lamp factory in South Wales.

## Trade Announcements

On October 27th, Sidney G. Jones, Ltd., returned to London to offices at 8, Balham Hill, S.W.12 (telephone: Battersea 0266).

Craig & Derricott, Ltd., have moved to Royal Works, Sutton Coldfield, near Birmingham (Telephone: Sutton 2547).

# TRADE MARKS

THE following applications have been made for trade marks. Objections may be entered within a month from October 24th :—

PAM. No. 635,357, Class 9. Radio and television apparatus; sound recording, reproducing and amplifying apparatus; public address apparatus; batteries and accumulators; high-frequency oscillation generators; and parts. —Pamphonic Reproducers, Ltd., Radio Works, St. Andrew's Road, Cambridge.

PARAPLAST. No. 634,806, Class 9. Electric cables and conductors.—Para-Plastics, Ltd., 329, High Holborn, London, W.C.1.

NITROGOL. No. 635,798, Class 9. Electric condensers, resistances, wave filters, transformers, rectifiers, induction coils, relays, cables and flexibles, dry cells, batteries and accumulators, insulation testers, electrically operated thermometers, thermostats, rheostats and indicating and recording instruments.—Dubilier Condenser Co. (1925), Ltd., Ducon Works, Victoria Road, North Acton, London, W.3.

# 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' name and address for E/ZEE welders

# Household Appliances

## Board of Trade Survey

TABLES have been prepared by the Board of Trade showing the volume of consumer goods supplied to the home civilian market during the war period; in some cases the comparative figures for 1937 are given. The term for the Services until towards the end of 1946. It is stressed that the urgent need for electrical appliances is fully understood and appreciated by the manufacturers, who are only too anxious to " deliver the goods " as soon as possible.

ELECTRICAL APPLIANCES SUPPLIED TO THE HOME MARKET
(Annual rate of production in thousands)

| | Cookers | | Boilers, hotplates, grillers, etc. | Fires, radiators, etc. | Water heaters | Immersion heaters | Kettles | Irons | Vacuum cleaners | Bed warmers | Blankets and pads |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Over 3 kW | 3 kW and under | | | | | | | | | |
| 1937 | 250 | | — | 1,250 | — | — | 350 | 1,250 | 400 | — | — |
| 1943 | 10·1 | 6·5 | 0·72 | 58 | 4·3 | 15 | 28 | 92 | 0·24 | 4·0 | 4·8 |
| 1944 | 15·9 | 6·4 | 3·3 | 56 | 5·8 | 26 | 65 | 177 | 0·71 | 2·8 | 6·8 |
| Jan.–June, 1945 | 29·9 | 9·9 | 17·4 | 219 | 10·6 | 53 | 109 | 315 | 28 | 3·9 | 15·5 |

" home civilian market " covers all goods produced which were not made for export or for contracts from the British Government. Household electrical goods form the subject of one table and from this we have extracted the accompanying information. It should be noted that the figures indicate the annual rate of production.

### B.E.A.M.A. Statement

In the course of a statement on the appliance shortage, B.E.A.M.A. says that the public has already been advised that for some time it must be satisfied, in the main, with electric cookers, water heaters, refrigerators, washing machines and other domestic electrical appliances of pre-war design but, even so, after complete stoppage of normal production for so long, some time must elapse before anything like the pre-war rate of output can be resumed, as the special plant installed during the war has now to be dismantled and replaced.

The greatest problem of all is the dire shortage of the right kind of labour in every section of the engineering industry. The electrical industry is not only suffering severely itself from this nation-wide problem, but in other industries, on which electrical manufacturers are largely dependent for supplies of parts, *e.g.*, refractories and castings, the labour problem is equally acute. Until there is a steady flow of suitable workers back to the industries concerned, the supply of electrical apparatus must lag behind the growing demand for Home and export.

Although the war is over, many Government contracts of high priority, particularly for the amenities for the Forces overseas, continue to occupy considerable capacity in the industry; in this category must be included the production capacity of the refrigeration industry which is likely to be engaged on urgent overseas needs

While these difficulties prevail and the prospect in regard to the availability of labour is so uncertain, it is not possible for manufacturers to assess their costs sufficiently accurately to forecast the selling prices of apparatus of new design.

### P.E.P. Survey of Future Market

In our issue of March 9th last we reviewed a broadsheet on " Household Appliances " issued by P.E.P. (Political and Economic Planning, 16, Queen Anne's Gate, S.W.1). This was a summary of a report submitted to the Board of Trade which is now published in full. (" Report on the Market for Household Appliances " (398 pp.). Distributed by the Oxford University Press, Amen House, E.C.4. Price 18s.).

A very thorough survey is made in this report of all aspects of the domestic equipment field with a view to giving some guidance upon design and construction and some idea of the scope for the sale of appliances during the next ten years, particular attention being given to equipment suitable for the lower-income groups of the population.

In the first place a number of factors influencing demand are treated: they include such things as prices, lack of domestic help, the probable tendency of women to remain in industry and the existence or absence of communal facilities for providing food, washing clothes and so forth. Food preparation and cooking equipment of various kinds is compared. Here it is contended that the practice of hiring out electric cookers has slowed up development. A " preferred " design with a 2 cu. ft. oven could, it is said, be produced at £9 (at 1939 prices) with an output of 20,000. Accurate figures are not easily obtainable but it is estimated that there were 1·6 million electric cookers

(including "breakfast" cookers—13 per cent. of the total) in use in 1939; and number of gas cookers is said to have been 8·5 million. The probable post-war sales are put at 320,000–360,000 a year for electric cookers and 850,000 for gas cookers.

The authors of the report found that neither gas nor electricity is considered to be entirely satisfactory for space heating; solid fuel fires are generally preferred but the demand in the first post-war decade for gas and electric fires (bracketed in this instance) is put at about 9½ million. The extra cost of electricity for water heating is given prominence and the requirements for the first post-war decade are put at only 130,000 new and 420,000 replacement heaters as compared with totals of 5·2 million solid fuel and nearly 2 million gas appliances. In the section on clothes washing equipment there is an unjustifiable cost comparison between electric washing *machines* and "simple gas wash boilers." As regards vacuum cleaners it is surprising to learn that the number in use was probably 300 per 1,000 wired homes; a figure of 448 per 1,000 in considered to be attainable, giving an annual sale of 750,000 per annum in the ten-year period.

Refrigerators installed in 1939 are put at 200,000 electric and 90,000 gas and it is thought that there could be sales of 840,000 electric models at a reasonable price during the post-war decade, 210,000 (including replacements).

It is impossible in the space available to give an adequate account of the contents of this admirable result of an enormous amount of research. Many of the conclusions may be contestable but the value of the information thus gathered together is undeniable.

# The Interim Budget

## Purchase Tax Concessions

GENERAL particulars of the interim Budget introduced by the Chancellor of the Exchequer last week have appeared in the public press. The principal features are the restoration of some of the pre-war income tax allowances, the reduction of the standard rate to 9s. in the £, and certain concessions to the lower-income groups all to take effect in April next. The rate of excess profits duty is to be reduced from 100 to 60 per cent. as from January 1st and arrangements are to be made for the refund of 20 per cent. of the tax already paid, as provided for in the Finance Act of 1941. The Chancellor said that the total amount to be refunded was about £450 million but this was subject to income tax which would reduce it to £225 or £230 millions. It was intended to impose conditions upon repayment to ensure that the money was "ploughed back" into business. The Inland Revenue authorities would be given power to make interim repayments pending the final settlement of the amounts due. Possible alternatives to E.P.T. are under consideration.

The Income Tax Act, 1945, provided that from an "appointed day" certain allowances would be made in respect of capital expenditure on certain industrial buildings, plant and machinery. It has been decided that the appointed day shall be April 6th next.

Mr. Dalton also announced the removal of the purchase tax from certain classes of household equipment. A notice issued by the Commissioners of Customs and Excise (No. 78D) gives details of the exemptions, which took effect on October 24th. The classes affected are:—(1) Domestic cooking, space-heating and water-heating appliances of the following descriptions: Stoves, grates, ranges and fireplaces; boiling rings, grillers and hot-plates; radiators and convectors; instantaneous water heaters, immersion water heaters and storage water heaters; wash boilers and wash coppers. (2) Parts of such stoves, grates, etc. (3) Domestic refrigerators.

It is noted that the exempt appliances include independent central heating and hot water supply boilers heated by gas, solid fuel or liquid fuel; single and multi-point geysers; circulator water heaters; calorifiers; heated towel rails; gas and electric fires; and panel and tubular room heaters. Articles which are *not* exempt include "articles not themselves falling within the terms of the exemption which incorporate components that would be exempt as separate articles, *e.g.*, hollow-ware cooking utensils incorporating boiling rings; drying cabinets and air-conditioning appliances incorporating convector heaters; washing machines incorporating wash boilers; ice cream machines." Other non-exempted articles are electric kettles and other culinary hollow-ware, whether fitted with heating elements or not; toasters; waffle plates; coffee roasters; irons and ironing machines; dish washers; bed warming appliances; curling tongs and heaters; hair dryers; radiant heat lamps, "sun" lamps, ultra-violet lamps, infra-red generators and similar apparatus.

It is proposed to include a provision in the Finance Bill enabling buyers under purchases made before October 24th to obtain the benefit of this exemption if such benefit has accrued to their suppliers. No rebate of tax will be allowed on goods which were delivered before October 24th by a registered person under a taxable sale. or on goods which have been appropriated by a registered person before that date to retail trade or other taxable purpose, *e.g.*, office use or hire purchase. It is not open to registered persons to take back goods from retailers or from their own retail branches and claim a rebate of tax in respect of them with a view to their re-delivery free of tax.

# Electricity Output

### Monthly Figures for War Period

ON the outbreak of the war the Electricity Commissioners suspended the publication of their monthly statements showing the amount of electricity generated by authorised undertakers in Great Britain. The monthly figures for the war years are shown in the following table which also includes the figures for the last pre-war year. The figures for the period October, 1944, to September, 1945, are subject to revision :—

| Month | Electricity Generated by Authorised Undertakers in Great Britain (in millions of kWh) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 |
| January | 2,382 | 2,704 | 3,018 | 3,145 | 3,616 | 3,437 | 3,712 | 4,174 |
| February | 2,145 | 2,334 | 2,658 | 2,725 | 3,323 | 3,075 | 3,594 | 3,295 |
| March | 2,111 | 2,508 | 2,451 | 2,867 | 3,370 | 3,306 | 3,691 | 3,383 |
| April | 1,849 | 2,046 | 2,347 | 2,632 | 2,860 | 2,854 | 2,886 | 2,926 |
| May | 1,854 | 2,068 | 2,194 | 2,593 | 2,741 | 2,894 | 2,924 | 2,812 |
| June | 1,612 | 1,912 | 2,036 | 2,230 | 2,577 | 2,641 | 2,745 | 2,652 |
| July | 1,656 | 1,918 | 2,152 | 2,287 | 2,566 | 2,648 | 2,605 | 2,537 |
| August | 1,679 | 1,885 | 2,076 | 2,320 | 2,461 | 2,645 | 2,606 | 2,474 |
| September | 1,868 | 1,897 | 2,056 | 2,480 | 2,675 | 2,932 | 2,919 | 2,707 |
| October | 2,195 | 2,225 | 2,450 | 2,858 | 2,976 | 3,248 | 3,332 | |
| November | 2,346 | 2,350 | 2,559 | 2,993 | 3,186 | 3,522 | 3,597 | |
| December | 2,675 | 2,563 | 2,778 | 3,236 | 3,300 | 3,747 | 3,744 | |
| Cumulative for Year | 24,373 | 26,409 | 28,776 | 32,369 | 35,654 | 36,951 | 38,354 | |

# Training Cable Jointers

### Five Year Apprenticeship Plan

THE organisation and varied activities of the Distribution Department of the Sheffield Corporation were described in the inaugural address of MR. A. HADDOCK as chairman of the Sheffield Sub-Centre of the Institution of Electrical Engineers.

Dealing with the recruitment and training of cable jointers Mr. Haddock expressed the opinion that, in order to secure sufficient numbers in future, electricity authorities would have to formulate an apprenticeship scheme which would enable youths to commence trade training immediately they left school. He suggested two years with installation inspectors and meter fixers, one year on sub-station work, one year on various kinds of jointing and a final year actually working as a jointer's mate. During the apprenticeship trade-school instruction should be obtained on conductor jointing and soldering, application of insulation and plumbing. All this should be given in a school forming part of the electricity undertaking's organisation. Keen apprentices would be free to secure evening school instruction on the technical principles governing their work.

High-voltage jointers in Sheffield returned to the school for periodical short refresher courses. They were encouraged to try out their own ideas by making joints which, upon completion, could be dissected and examined. The relative abilities of men thus became evident and opportunities to improve their skill kept them interested in their work.

Preparation of extension plans and the keeping of service records by the mains drawing office were described, as well as system operation for load regulation to best advantage, together with the compilation of adequate fault reports for monthly averaging and annual analysis.

Mr. Haddock's concluding observation was a reminder that most sections of the industry were agreed that some reorganisation was desirable. It was time the industry learned to settle its differences internally and to speak to its customers with a single voice.

## Joint Sciences Committee

At a meeting of the Association of Scientific Workers held recently it was resolved to set up a Joint Sciences Committee, consisting of scientists from various fields, with the object of considering the best ways in which natural and social scientists can be brought together to deal with social problems, and to consider certain fields in which such work is of particular importance.

# Employees' Tenancies

## Position Under the Rent Restriction Act

By F. E. Sugden, A.C.I.S., Barrister-at-Law

A CASE of far-reaching importance recently occupied the attention of the Courts; it raised the matter of an employee living in his employer's business premises who left his employment and was asked to give up possession of the premises to make room for his successor. He declined to do this and the employers took legal action. The final decision should considerably clarify the position under the Rent and Mortgage Interest Restrictions (Amendment) Act, 1933.

Briefly, the facts of the case were these:—The defendant had been employed by the plaintiffs at their factory and as an employee occupied, as a weekly tenant, a house belonging to the firm. In November, 1944, the defendant's employment with the plaintiffs came to an end and a successor was engaged. The new employee was not able to take up work with the plaintiffs until April 16th, 1945. The defendant remained in occupation of the house after November, 1944, paying rent weekly as before, and in February, 1945, the plaintiffs served upon him a notice to quit. He refused to leave and proceedings were taken by the plaintiffs for recovery of possession on the grounds that they required the house for occupation as a residence for a person engaged in their whole-time employment within the meaning of paragraph (*g*) of the First Schedule of the Act of 1933.

### County Court Judge's Decision

The County Court Judge held that the plaintiffs were entitled to recover possession. The tenant appealed against this decision under section 3 (1) of the above-mentioned Act which provides that "no order or judgment for the recovery of possession of any dwelling-house to which the principal Acts apply or for the ejectment of a tenant therefrom shall be made or given unless the Court considers it reasonable to make such an order or give such a judgment."

The Court of Appeal in its judgment stated that the appellant had raised three main contentions:—(1) that he was not in occupation of the house in consequence of his employment by the plaintiffs, as required by paragraph (*g*) (*i*) of the Schedule, but was in occupation by virtue of a new tenancy implied from the acceptance of rent by the respondents after the notice to quit; (2) that the material time to be considered was the date of the issue of the plaint (*i.e.*, particulars of claim in the County Court) on March 20th; and (3) that at that time the new employee had not entered into full-time employment.

### Rent or Mesne Profits?

The Court disagreed on the point that the acceptance of rent after the notice to quit created a new tenancy; the rent so accepted was mesne profits (*i.e.*, not payment of rent but a sum representing the amount of rent which should have been paid during this period). The material date to be considered was not that of the issue of the plaint, but that of the hearing of the action. The words "some person engaged in his whole-time employment" were said to be deplorably ambiguous. In the expression "engaged by" the word "engaged" had an entirely different meaning from its meaning in "engaged in." But whatever its exact meaning here, as the material time was the date of the trial on May 2nd and the new employee had been at work for the respondents since April 16th, the decision of the County Court Judge was right and the appeal of the former tenant was dismissed.

If the defendant had only paid rent for staying on at the premises after he had been dismissed a new tenancy would have been created, but wisely, from the employers' point of view, they did not charge him rent, but after he had received notice only claimed damages (or mesne profits) based on the amount from the date when he last paid the rent until they recovered possession.

This case stresses the need for a man occupying premises belonging to his employers to be sure of his terms of appointment. The employers should make it clear that the tenancy shall last only so long as the employee is with them, at a specific rental; immediately the appointment, for any reason whatsoever, comes to an end, the tenancy is terminated. This is one of the few cases where a "sitting tenant" is not protected by the Rent Restriction Act.

# ELECTRICITY SUPPLY

## Guildford's Tariff Problem. Pinkston Plant Decision.

**Ashton-under-Lyne.** — ELECTRIFICATION OF SEWAGE WORKS.—The Electricity Committee is to invite tenders for the electrification of the sewage works at an estimated cost of £2,136.

**Bexhill.**—FUSE REPLACEMENT.—At a meeting of the Electricity Committee it was reported that owing to shortage of labour, consumers were experiencing some difficulty in having fuses replaced promptly by electrical contractors. The Committee recommended that the Department should undertake the work at a charge of 3s.

**Bradford.**—SUPPLY TO TONG VILLAGE.—The Electricity Committee has approved an amended scheme for supplying Tong Village at an estimated cost of £1,296.

**Croydon.**—NEW POWER STATION. — In connection with the second section of the new power station, the Electricity Committee recommends the engagement of Allott & Sons as civil engineering consultants; the chief engineer as mechanical and electrical engineering consultant; L. G. Mouchel & Partners, Ltd., as consulting engineers for the cooling towers; and Mr. Robert Atkinson as architect for the buildings.

LABORATORY EQUIPMENT. — The Electricity Committee is to modernise the electrical engineering laboratory at the Polytechnic at a cost of £4,400.

**Fulham.**—INCREASED DISCOUNT.—The 1944-45 accounts of the Electricity Department show a surplus of £71,136, but the Electricity and Lighting Committee observes that this is not likely to be maintained to the same extent in the future. The Committee recommends that a further 5 per cent. discount (making 15 per cent. in all) shall be allowed on the total of all accounts except for supplies under special agreements. The concession is to start with the current quarter and continue until the Department's accounts for 1945-46 are available, or such other time as may be determined.

RENTAL WIRING.—Reduced charges for rental wiring are recommended, to operate from and including the current quarter's accounts. In the case of consumers supplied through quarterly meters the charge for six points or more will be 6d. per point per quarter; for less than six points, 7d. per point, with a minimum charge for three points. The charge per kWh to slot meter consumers is to be reduced by ½d. per kWh.

**Gateshead.**—HOUSING SUPPLIES.—The Town Council has reached agreement with the North-Eastern Electric Supply Co., Ltd., regarding the provision of electrical services to houses on the Highfield estate.

**Guildford.**—CONSUMERS AND TARIFFS. — The borough electrical engineer reports that quite a large number of applications have been received during the past few months from consumers wishing to change from the flat rate (either slot or quarterly meter) to the "all in" rate. Unfortunately the very great shortage of labour for the fixing of meters and for the measuring of properties and the extreme difficulty of obtaining supplies of meters have resulted in this side of the undertaking coming practically to a standstill. For many months past endeavours have been made to get labour to help in this direction but the position, despite the ending of the war, does not seem to improve. The work will be undertaken as soon as possible.

REBATE.—The Electricity Committee recommends a rebate of 50 per cent. of the fixed charge to all consumers taking supplies under the "all in" rate for the December quarter.

GENERATING PLANT. — The engineer has informed the Electricity Committee that all the plant at the generating station in Woodbridge Road has now been put into operation and the station is now generating each day to the requirements of the Central Electricity Board.

MODEL KITCHEN.—The Housing Committee has arranged for the electrical engineer to provide a model kitchen at an exhibition at Guildford House.

**Hastings.**—SUPPLY EXTENSION.—The Electricity Committee is to provide supply to the Rock Lane estate at a cost of £19,468. The proposed 11,000-V cable will be of sufficient capacity to meet developments in the extended area.

**Llanidloes.**—FUTURE SUPPLY AGREEMENTS.—The North Wales and South Cheshire Joint Electricity Authority is asking the Town Council to renew its application made thirteen years ago for a Special Order authorising it to take over the supply of electricity now being undertaken by a private company.

**Morecambe.**—NEW FEEDER.—The Electricity Committee has approved a scheme for a second feeder to Overton to link with the existing feeder and extend the area of supply.

**Portland.** — COOKING ARRANGEMENTS. — The Housing Committee has decided that of the 100 permanent houses to be erected at Pound Place 60 shall be provided with electric and 40 with gas cookers.

**Preston.**—EQUIPMENT OF RIBBLETON HOUSES. —An effort to refer back a resolution of the Housing Committee that 750 permanent houses at Ribbleton should be equipped with cookers and wash boilers in the ratio of three houses with electricity to one with gas was unsuccessful at a meeting of the Town Council last week. Ald. Rhodes, chairman of the Electricity Committee, moved the amendment, largely on the ground that his Committee would shortly consider the provision of free wiring for cookers in all new houses and that there was no mention of water-heating facilities. Ald. Herbert and other members said it was not right to go to a private gas company when the town had its own electricity service. The town clerk ruled that the Committee was within its legal rights in giving a choice of service.

**St. Marylebone.**—INTEREST ON DEPOSITS.—The Electricity Committee recommends that the Conference of Local Authorities Owning Electricity Undertakings in Greater London

should be requested to take steps with a view to effecting a reduction from 4 to 3 or 2½ per cent. in the interest on sums deposited as security in respect of payment for supplies, etc.

**Scotland.**—NEED FOR CHEAP POWER.—The Inverness C.C. has decided to ask the North of Scotland Hydro-Electric Board to introduce cheap electric power into Lochaber at the earliest possible moment in order to induce industry to acquire the Admiralty installation at Corpach for the purpose of starting factories there.

TUMMEL-GARRY SCHEME.—The Perth and Kinross County Council has decided to continue opposition to the North of Scotland Hydro-Electric Board's Tummel-Garry project (constructional scheme No. 2) and to ask County M.P.s to table a motion for its annulment.

**York.**—LOANS.—The Electricity Committee is seeking sanction to borrow £17,891 for mains and services, £3,224 for assisted wiring and £11,784 for cables and substations.

## TRANSPORT

**Glasgow.**—THE PINKSTON PLANT.—Replying to the Corporation's application for consent to increase the generating plant at Pinkston power station by 2,500 kW by installing a 25,000 kW turbo-alternator to replace two existing machines of 22,250 kW total capacity, the Electricity Commissioners stated that they had decided to hold a local inquiry into the application and had appointed Mr. H. Nimmo, to conduct it. The Transport Committee agreed, in view of all the circumstances that the Town Clerk be instructed to withdraw the application; that arrangements should be proceeded with for the replacement of the two existing machines of 22,500 kW capacity by one new machine of a similar capacity (in respect of which no consent is necessary from the Electricity Commissioners); and that the manager be instructed to report on the steps to be taken to obtain offers for the new turbo-alternator, boiler plant, etc.

**London.**—STOPPAGE OF WATERLOO SERVICES.—Shortly after 8 p.m. last Thursday the electric services of the Southern Railway between Waterloo and Clapham Junction were put out of action by a fire which occurred among cables just outside the Waterloo substation. The fire was extinguished by the company's staff in a short time and current was restored at about 10.30 p.m.

**Rotherham.**—TROLLEY-BUSES. — The Corporation is seeking in its next Parliamentary Bill to revive lapsed trolley-bus powers, and authority for further trolley-vehicle services.

**Sheffield.**—TRANSPORT FINANCES.—The 1944-45 report of the Transport Department (general manager, Mr. H. Watson) shows that there was a net profit of £70,088 on the tramways and £66,327 on the motor-buses, making £136,415 which has been transferred to renewals and reserve. The total income from the tramways was £1,206,747 (against £1,198,726 in the previous year). Passengers carried (trams) increased from 201·9 million to 204·2 million and the average traffic revenue per car-mile advanced from 19·826d. to 20·066d. A total of 43·1 million kWh was purchased and the average consumption per car-mile was 2·771 kWh (against 2·740 kWh in the previous year).

## RADIO and TELEPHONY

**Great Britain.**—TRUNK LINE EXTENSIONS.—During recent months the Post Office in its efforts to improve the telephone service has provided since January 1st, 1945, an additional 2,000 trunk circuits, each more than 25 miles in length, bringing the total in use to 10,700.

## Municipal Reports

### Liverpool

COMPARATIVE figures for 1938-39 and 1944-45 given in the report of the city electrical engineer of Liverpool (Mr. J. Eccles) show that the output of the generating stations (in million kWh) increased from 1,053·3 to 1,288·3 and the sales within the undertaking from 511·2 to 646·0. For the early war factories 36 miles of 33- and 11-V cables and overhead lines and 42 substations had to be provided. Accelerated development of the Speke and East Lancashire Road areas and arrangements for the provision of a supply to the L.M.S. Railway have necessitated further extensions and work is now in progress on the construction of an additional 30 miles of 33-kV cables and overhead lines. A new 51,500-kW turbo-alternator and a 250,000 lb. per hr. boiler were put into commission at Clarence Dock in 1943 and two further 350,000 lb. per hr. boilers are in process of erection.

Of last year's total sales, 588·1 million kWh was for lighting and power (compared with 563·1 million kWh in 1943-44) and 57·6 (58·9) million kWh for the tramways. The average price received was 1·022d. compared with 0·951d. in the previous year. Total income amounted to £2,875,531 (£2,698,349) with working expenses at £2,339,559 (£2,120,240), and there was a net surplus of £40,109 (£61,934) which has been transferred to the reserve fund. No rate contributions have been made in the past two years.

### Dewsbury

The report of Mr. G. H. Sammons, electrical engineer at Dewsbury, covers the undertaking's fiftieth year (see *Electrical Review*, December 22nd, 1944). Total sales last year amounted to 11·9 million kWh compared with 11·3 million in 1943-44, the average price charged being 0·01d. lower at 1·91d. although working costs rose from 1·450d. to 1·519d. per kWh sold. Gross revenue was £99,762 (£97,440) and working expenses were £75,496 (£68,202), the net result after payment of loan charges, etc., and income tax being a deficit of £795 compared with a profit of £6,224.

# FINANCIAL SECTION

## Company News. Stock Exchange Activities.

## Reports and Dividends

**Strand Electric Holdings, Ltd.**—The accounts for the year ended July 11th last show that the dividend receivable from the Strand Electric & Engineering Co., Ltd., in respect of the year to April 30th, 1945, after taxation, was £8,115 (against £7,827). The directors again recommend the payment of a dividend of 10 per cent. and a bonus of 2½ per cent. and £2,518 (£1,835) is carried forward.

The chairman (Mr. F. L. Blow), in a statement accompanying the accounts, relates some of the company's wartime experiences (extensive damage to its works and the complete destruction of its West End demonstration theatre) and mentions a few of the types of apparatus produced and installed for the Service Departments. Regarding the future, he says that the sales organisation has been strengthened by the addition of an agency in Glasgow and by the establishment, in conjunction with associated companies, of an export department.

**The Jerusalem Electric & Public Service Corporation, Ltd.**, reports a profit for the year ended March 31st last of £90,605 (against £80,263). After providing £39,000 (£30,000) for taxation and making allocations to plant renewal and depreciation account, etc., there is a net balance of £21,128 (£19,786). The ordinary dividend is again 5 per cent., less tax at 6s. 11·924d. (6s. 9·427d.) in the £, and £13,291 (£10,534) is carried forward. The report states that a further 2,000 kW of plant has been ordered to meet the increased demand for electricity. Preference dividends have been paid on the same basis as last year but meetings to deal with the matter will be held immediately after the annual meeting.

**Crabtree Electrical Industries, Ltd.**, announces a final dividend of 5 per cent. and a cash bonus of 7½ per cent., making a total distribution of 17½ per cent. (same) for the year. The trading profit of the operating company, J. A. Crabtree & Co., Ltd., amounted to £224,105 (against £244,292 last year) and the net profit was £77,982 (£72,439).

**The London Electrical & General Trust, Ltd.**—The net profit for the year to June 30th was £32,603 (against £31,714). The ordinary dividend remains at 5 per cent. and after transferring £2,447 (nil) to general reserve £16,355 (£17,099) is carried forward.

**The Brush Electrical Engineering Co., Ltd.**, announces an interim dividend of 4 per cent. this is at the same rate as last year when payment of an interim dividend was resumed.

**The Great Northern Telegraph Co., Ltd.**, states that, including all such receipts and expenditure for the past years as it has only now been possible to ascertain after the liberation of Denmark, the accounts for 1944 show gross receipts amounting to Kr. 31,827,080 (£1,645,661) and a balance of Kr. 4,394,575 (£227,227). Adding the balance brought forward from previous years, the amount available is Kr. 20,225,337 (£1,045,777). The board recommends a dividend of 20 per cent. for 1944, payable in sterling as in previous years, leaving Kr. 12,481,337 (£645,364) to be carried forward. An interim dividend of 2½ per cent. will be payable for the first half of 1945.

**The Anglo-American Telegraph Co., Ltd.**, is maintaining its quarterly dividend at ¾ per cent.

**The Pressed Steel Co., Ltd.**, is to pay an interim dividend of 10 per cent. (same).

**The Ever Ready Co. (Great Britain), Ltd.**, is maintaining its interim ordinary dividend at 15 per cent.

**The British Electric Traction Co., Ltd.**, announces the payment of an interim dividend of 15 per cent. (same) on the deferred ordinary shares.

**Meters, Ltd.**, is again paying an interim dividend of 4 per cent.

**Marconi's Wireless Telegraph Co., Ltd.**, is again paying an interim dividend of 3½ per cent.

**The Marconi International Marine Communication Co., Ltd.**, has declared an interim dividend of 2½ per cent. (same).

## New Companies

**Sheaf Electric Supply Co., Ltd.**—Private company. Registered October 17th. Capital, £20,000. Objects: To carry on the business of wholesalers, retailers, merchants, manufacturers, importers and exporters of, and dealers in, electrical, mechanical, industrial, household or plumbing goods, tools and implements; electricians, radio and television engineers, etc. Subscribers: G. W. Taylor, 41, Laud Avenue, Sheffield and A. Rodgers, 18, Trap Road, Sheffield. Solicitors: Irwin Mitchell, Kershaw & Co., Sheffield, 1.

**C. Price & Co. (Electricians), Ltd.**—Private company. Registered October 22nd. Capital, £1,000. Objects: To carry on the business of manufacturers of, and dealers in, electric and other lamps, radio and public address equipment, reflectors, bells, fires, fans, etc. Directors: R. C. J. Price, 26, Paton Street and P. D. Asten, 3, Gooding Close, both of Leicester. Registered office: 7, St. Augustine Street, Leicester.

**Gordon M. Whittle, Ltd.**—Private company. Registered in Edinburgh October 12th. Capital, £1,000. Objects: To carry on the business of electricians, electrical engineers, etc. Subscribers: H. S. H. Murray, 10, Central Avenue, Glasgow and G. M. Whittle, 45, West Graham Street, Glasgow. Registered office: 33a, Gordon Street, Glasgow.

**Centurion Electric, Ltd.**—Private company. Registered October 10th. Capital, £100. Objects: To carry on business as manufacturers of, and dealers in, transmitting and receiving sets, wireless, television, telegraphic and telephonic apparatus and fittings, etc. Permanent directors: R. S. Quartermaine, 23, Woodside Avenue, Finchley, N.2, and three others. Registered office: 20, Copthall Avenue, E.C.2.

**Electro Analysis, Ltd.**—Private company. Registered October 16th. Capital, £1,000. Objects: To carry on the business of electro, mechanical, automobile, etc. engineers, manufacturers of, and dealers in, electrical, scientific and optical instruments and machines, dealers in articles of rubber or its compounds, plastics, etc. Permanent directors: L. C. Welch, Ormonde Court, Putney, S.W.15 (chairman) and T. W. Welch, 11, Berkeley Place, The Ridgeway, S.W.19 (both directors of Ace Electronics, Ltd.). Secretary: W. C. Norman. Registered office: 10, Adam Street, W.C.2.

**Electrosterilisers, Ltd.** — Private company. Registered October 16th. Capital, £1,000. Objects and other particulars similar to Electro Analysis, Ltd.

**Newson Radio & Electrical Services, Ltd.**—Private company. Registered October 10th. Capital, £1,000. Objects: To carry on the business of manufacturers and distributors of, agents for and wholesale and retail dealers in, wireless and television sets and sound-producing machines, electric and other lamps and plant, etc. Directors: L. S. Phillips, radio and electrical engineer, and Lily Phillips, both of 12, Cronwich Road, Stoke Newington, N.16.

**Bridgham, Graham & Co., Ltd.**—Private company. Registered in Belfast on October 16th. Capital, £1,000. Objects: To carry on the business of manufacturers of, and dealers in, all kinds of electrical supplies, apparatus and plant, etc. Directors: W. C. Bridgham, 151, Sandown Road and W. G. Graham, 7, Castleton Gardens, both of Belfast, electrical engineers. Registered office: 108, Victoria Street, Belfast.

**Harris Oxley, Ltd.**—Private company. Registered October 11th. Capital, £3,000. Objects: To carry on the business of manufacturers and repairers of, dealers in and hirers of electrical and mechanical apparatus, accessories and components, and in particular wireless sets, radio sets and valves, etc. Directors: F. J. W. Lager, Monkseaton, Southcliffe Road, Friars Cliff, Christchurch, Hants, and two others. Registered office, 109, Southbourne Grove, Bournemouth.

**J. Rayner & Sons (Grimsby), Ltd.**—Private company. Registered October 19th. Capital, £2,000. Objects: To carry on the business of electrical, radio, television, mechanical and general engineers, etc. Directors: J. Rayner, electrical engineer (permanent managing director), and Mrs. D. M. Rayner, both of 170, Wilholme Road, Grimsby. Secretary: H. B. W. Parker. Registered office: 181, Wellington Street, Grimsby.

**H. G. Watkins & Co., Ltd.**—Private company. Registered October 19th. Capital, £1,000. Objects: To carry on the business of electrical, radio, mechanical, general and precision engineers, etc. Directors: H. G. Watkins, 1, Corwens Terrace, Corwen, Merioneth, electrical engineer, and A. P. Noble, Mount Kinnerton, near Chester, barrister-at-law. Registered office: Grosvenor House, 104, Watergate Street, Chester.

**Worthton Battery & Electrical Co., Ltd.**—Private company. Registered October 18th. Capital, £2,000. Objects: To acquire the business of the Worthton Battery & Electrical Co., carried on by F. Hadwick and H. Agnew at 23, Chorley Road, Swinton, Lancs, and to carry on the business of dealers in, and manufacturers of, batteries, accumulators, other electrical apparatus, etc. Directors: F. Hadwick, 24, Glen Avenue, Swinton, Lancs, H. Agnew, 419, Chorley Road, Swinton and L. Sidebotham, 4, Bain Street, Swinton. Secretary: F. Hadwick. Registered office: 23, Chorley Road, Swinton, Lancs.

**Consolidated Electric (Elland), Ltd.**—Private company. Registered October 20th. Capital, £2,000. Objects: To carry on the business of electrical engineers and contractors, etc. Subscribers: A. Brooke, 26, Sufton Street, Birkby, Huddersfield, solicitor's clerk and M. Garlick, 35, East Park Street, Morley, near Leeds, solicitor's clerk. Registered office: Kiln End Mills, Elland, Yorks.

**Mc. & B. Heat Control, Ltd.**—Private company. Registered October 20th. Capital, £1,000. Objects: To carry on the business of manufacturers of, and dealers in, heat control apparatus, electrical and agricultural equipment, etc. Directors: R. G. McLelland, Searles, Harlow Common, Essex and H. C. Binstead, The Thatch, Hastingwood, near Harlow, Essex. Registered office: Searles, Harlow Common, Essex.

## Mortgages and Charges

**North Metropolitan Power Station Co., Ltd.**—Satisfaction in full on or before September 1st, 1945, of trust deed dated August 19th, 1930, and registered August 21st, 1930, securing £850,000 5 per cent. second mortgage debenture stock, 1963.

**North-Eastern Electric Supply Co., Ltd.**—Satisfaction to the further extent of £29,723 on September 6th of trust deed dated August 1st and registered August 13th, 1935, originally securing £1,500,000 3½ per cent. consolidated debenture stock.

**Daly (Condensers), Ltd.**—Satisfaction in full on September 14th, 1945, of debenture dated July 15th, 1931, and registered July 28th, 1931, securing £200.

## Receivers Released

**Rentals R.A.P., Ltd.**—Cyril A. Sparks, of 29-31, Euston Road, N.W.1, ceased to act as receiver and/or manager on October 6th, 1945.

**George H. Neal & Co., Ltd.**—William J. Watt of 20, Essex Street, W.C.2, ceased to act as receiver on October 5th, 1945.

# Liquidations

**Amazon Telegraph Co., Ltd.**—Particulars of claims, etc., to be sent to the liquidator, Mr. A. C. Dickinson, Stadium Works, Walton Road, Woking, by December 31st.

**Leominster Electric Supply Co., Ltd.**—Winding up voluntarily. Liquidator, Mr. A. M. Scott, 24-30, Gillingham Street, S.W.1.

**Amesbury Electric Light & General Supply Co., Ltd.** and **Downton Electric Light Co., Ltd.**—Meetings on November 29th at 24-30, Gillingham Street, S.W.1, to hear an account of the winding up by the liquidator, Mr. A. M. Scott.

# STOCKS AND SHARES

THE effect of the interim Budget proposals remains in a considerably advanced value of stocks and shares, more particularly those in companies that will benefit through the promised reduction in excess profits tax. Last week, on the morning after the Budget speech, a rush occurred to buy the ordinary shares of most Home industrial companies. There was a huge turnover of shares, and, accompanying the excitement in commercial issues, further rises occurred in gilt-edged securities. With the prospect of industry being stimulated by the Government's policy, investment is willing to look ahead, and to employ money in the purchase of shares in companies that now have a chance of expanding their energies and their profits. The Government expressly deprecates distribution of increased dividends to shareholders. Investors, however, must use their surplus capital and they are now buying sound industrials yielding 4 per cent. or less.

### Home Electricity

The hardening tendency noticeable in the market for Home electricity supply shares developed further strength under the pressure of a renewal of investment buying. People have recovered from the apprenhensions current at the time of the General Election and the flow of money into the market has been quickened by the reduction of rates on Treasury deposits. In the teeth of elements which, in the ordinary way, might make for hesitation on the part of capital to embark further upon utility investments, prices have improved in the majority of cases. The list is decidedly firmer than it was a week ago. This applies also to the preference shares, prices of which have improved. Rises in price have occurred in all sections, London, provincial and Scottish.

### Transport Stocks

London Passenger Transport "C" stock has risen to 66. The prior charges have not been altered. The rise in Transport "C" was accompanied by an advance of 1s. in Thomas Tilling shares to 55s. 6d. This apparently tempted a little swapping of the latter into British Electric Traction deferred stock, the price of which rose 100 points to 1105. Calcutta Trams keep close to 77s. 6d. Brazilian Tractions eased off to 28¾.

### Manufacturing and Equipment

Upon the opening of the interim Budget there was an immediate search for industrial companies that have suffered from heavy pressure of E.P.T. Most of them did, of course, and the list of equipment and manufacturing ordinary shares makes a good showing this week. General Electrics are higher at 98s., Henley's at 29s. 3d., British Insulated Callender's at 47s. Other rises have occurred in Siemens 39s. 6d., Telegraph Construction, 61s. 6d.—the old and new are both at the same price, Enfield Cable 66s., Ever Ready 45s. and Reyrolle 75s. 6d. Amongst other gains, De la Rue are up to 11⅜, Chloride Electrical 85s., Murex 5 1/16 and Consolidated Signal 6¾. The telephone group found supporters at increased prices for Automatics, 72s., Ericssons, 55s. 6d. and Telephone Rentals, 14s. 6d.

### Miscellaneous Movements

Cable & Wireless ordinary is better by 5 points at 96. Canadian Marconi were run up to 22s. by Montreal buyers. Radio shares showed comparatively little change: Cossors went better to 44s., but reacted to 43s. 6d.; Philco continued dull at 12s. 6d. E.M.I. hardened to 34s. and Pye deferred to 33s. in the Budget "boomlet." Shares of companies engaged in the heavy industry are mainly up since a week ago. Babcock & Wilcox at £3 are 2s. higher. Hopkinsons at 85s., English Electrics at 57s. and Aron Electrics are amongst those that have gains to their credit. J. & F. Stone put on 1s. to 17s.

### Crompton Parkinson

The Crompton Parkinson year ends with September 30th and the ordinary shares are amongst those which are attracting notice from the present day investor in front-rank industrial companies. The issued capital of £1,932,245 includes £150,000 in ordinary stock (5s. units) and £1,111,520 in "A" ordinary shares, also 5s. units. The Stock Exchange market is mainly in the latter; it is comparatively seldom that the ordinary are dealt in. Both classes are alike save for the voting power which belongs to the ordinary. In each of the past two years, the company has declared dividends of 15 per cent. plus a bonus of 7½ per cent., making 22½ per cent. for the year. Anticipation looks for this rate to be maintained in respect of the year just ended. The report and accounts appear early in December. The usual interim dividend of 7½ per cent. on the ordinary and "A" ordinary shares was paid last June. The price has kept steady at 32s. 6d., at which the yield is 3½ per cent. on the money.

### Associated British Engineering

The new issue of shares by Associated British Engineering has now become marketable. They were offered at 40s., and they stand at 7s. premium. Ex rights, the old shares are quoted at 51s. 3d. The company, formerly Petters, Ltd., is now a holding concern, and owns a substantial interest in Brush Electrical Engineering. It sold its aircraft works some ten years ago. In 1943–1944, the company acquired further interests, the money for the purchase of which was provided through the sale of a portion of the Associated British Engineering Co.'s holding in Brush. The year ends with March. For 1945 the dividend was 8 per cent., comparing with 7 per cent. for 1944, and 6 per cent. in 1943.

# Forthcoming Events

**Friday, November 2nd.**—*Glasgow.*—Royal Technical College, 7.15 p.m. I.E.E. Scottish Students' Section. "Automobile Electrical Equipment," by G. Smith.

**Saturday, November 3rd.**—*Manchester.*—At Geographical Society, 16, St. Mary's Parsonage, 2.30 p.m. Junior Institution of Engineers (N.W. Section). "Economics of Industrial Electric Heating," by L. G. King.

**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 Overcurrent 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.* — Oddfellows Hall, Hammersmith, S.W, 7.30 p.m. Association of Supervising Electrical Engineers (North-West London Branch). "Maximum Demand," by B. A. Vuille, M.I.E.E.

*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.

**Wednesday, November 7th.** — *London.* — Institution of Electrical Engineers, 5.30 p.m. Radio Section. "Radio Measurements in the Decimetre and Centimetre Wavebands," by R. J. Clayton, M.A., J. E. Houldin, Ph.D., B.Eng., H. R. L. Lamont, M.A., Ph.D., and W. E. Willshaw, M.Sc.Tech.

*Manchester.*—Engineers' Club, 12.30 for 12.45 p.m. North Western Fuel Luncheon Club. Luncheon meeting with address by Prof. P. M. S. Blackett, F.R.S., on "Atomic Energy."

*Sheffield.*—Central Library, 6.30 p.m. I.E.E. Sheffield Students' Section. Students' Lecture: "Machinery for Electrical Ship Propulsion," by W. J. Belsey.

**Thursday, November 8th.**—*London.*—Institution of Electrical Engineers, 5.30 p.m. Installations Section. "Street Lighting," by E.C. Lennox.

*London.* — London School of Tropical Medicine, Gower Street, 6 p.m. Society of Instrument Technology. Discussion on "Education in Instrument Technology."

*Newcastle-upon-Tyne.*—At Mining Institute, Neville Hall, 6.15 p.m. Institute of Welding (N.E. Tyneside Branch). "Welding as Used in Modern Electric Power Stations," by D. G. Sinfield.

**Friday, November 9th.**—*London.*—Grosvenor House, 8.30 p.m. to 1.30 a.m. Victory Ball in aid of the Electrical Industries Benevolent Association.

*London.*—Royal Society Celebration of jubilee of discovery of X-rays. (Continued on 9th and 10th,)

*London.*—St. Stephen's Tavern, Bridge Street, Westminster, 6.30 p.m. E.P.E.A. Meter Engineers' Group (Southern Division). "Prepayment Meters," by E. Fawssett, M.I.E.E.

*Birmingham.*—Grand Hotel. Birmingham Electric Club. Reunion dance.

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

*Cardiff.*—At South Wales Institute of Engineers, 6.30 p.m. I.E.E. Cardiff Students' Section. Informal talk on "An Engineer Visits America," by T. B. Rolls.

*Edinburgh.*—Heriot Watt College, 7.15 p.m. I.E.E. Scottish Students' Section. "Auto-Electric Cars," by W. Pratt.

**Saturday, November 10th.** — *Leeds.* — Hotel Metropole, 3 p.m. Association of Mining Electrical and Mechanical Engineers (Yorkshire N.W. Branch). "Fluorescent Lighting," by J. H. Mollan.

**Monday, November 12th.** — *Newcastle-upon-Tyne.*—Neville Hall, 6.15 p.m. I.E.E. North-Eastern Centre. "Practical Aspects of Telephone Interference Arising from Power Systems," by P. B. Frost and E. F. M. Gould.

*Wolverhampton.*—Electricity Sports and Social Club, St. Mark's Road, 7 p.m. Electrical Power Engineers' Association (Midland Technical Group). "Aerial Cables," by J. R. Harding, B.Sc., M.I.E.E.

*Bristol.*—I.E.E. Western Centre. "Operational Control of Electricity Supply Systems," by W. Kidd and E. M. S. McWhirter.

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

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## "It Can Now be Revealed . . . ."

THIS is the title of a beautifully illustrated brochure issued by the railway companies (price 1s.) describing the many ways in which they contributed to victory and how they surmounted formidable difficulties, especially those caused by enemy bombing. Some indications of future improvements are given in the concluding chapter. In this it is stated that the return of peace will see the resumption of important electrification projects upon which work was well advanced before the war.

Mention is made of the western extension of the Central tube to Denham and the eastern extension of the same tube to Ongar and Newbury Park, including the Chigwell loop, with a new line from Newbury Park to Leyton; the extension of the Northern tube to Bushey Heath and the electrification of the Alexandra Palace line, which will be connected with the Northern City tube; and the electrification of the L.N.E.R. lines from Liverpool Street and Fenchurch Street to Shenfield. In the Home Counties, work will be begun upon the electrification of the Sanderstead-Horsted Keynes section of the Southern. The electrification of the L.N.E.R. Manchester-Sheffield route will be resumed; this will become the first British main line on which all passenger and freight train haulage and all shunting will be by electric traction.

# 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.*

**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, Chester.

**Dundee.**—November 5th. Town Council. Electric lighting installations at 313 houses, Magdalene's Kirkton housing scheme. Particulars from the city quantity surveuor, 21, City Square.

**Kettering.** — November 28th. Electricity Department. E.h.v. and l.v. paper-insulated, lead-covered armoured cables. (See this issue.)

**Maltby.**—November 10th. Urban District Council. Thirty panel electric fires for houses on the Manor Park estate. Particulars from H. Chadwick, surveyor, Council Offices, Rotherham Road.

**Manchester.**—November 26th. Electricity Department. Capstans and bollards; surge and make-up water cast-iron tanks, etc., for Stuart Street generating station. (See this issue.)

**New Zealand.** — November 29th. Trolley-bus overhead equipment. Wellington City Council.

**North West Midlands.**—November 26th. Joint Electricity Authority. Outdoor type static transformers, electricity supply meters, painting of chimney stacks and spraying of cooling towers. (See this issue.)

**Plymouth.** — November 10th. Electricity Department. Meters and joint boxes. (October 26th.)

**Scotland.**—North of Scotland Hydro-Electric Board. Creosoted wood transmission line poles. (See this issue.)

**Southwark.**—November 14th. Electricity Department. Paper-insulated lead-covered steel-tape-armoured and unarmoured cables. (See this issue.)

**Woolwich.**—November 14th. Electricity Department. H.v. and m.v. cables, electricity meters and transformers. (See this issue.)

## Orders Placed

**Ashton-under-Lyne.** — Electricity Committee. Accepted. 500-kVA transformer.—Ferranti. E.h.v. switchboard.—Ferguson, Pailin. Paper-insulated cables.—British Insulated Callender's Cables.

**Bradford.** — Electricity Committee. Accepted. Transformers:—Hackbridge Electrical Construction Co., English Electric Co., Metropolitan-Vickers Electrical Co. and Yorkshire Electric Transformer Co.

**Fulham.**—Electricity and Lighting Committee. Recommended. Ash disposal plant for power station extension (£33,268).—Babcock & Wilcox.

**Middlesex.**—Health Committee. Accepted. Electrical installation at the Middlesex County Hospital extensions (£1,454).—Read & Partners.

**Oldham.**—Electricity Committee. Accepted. Cables.—Lancashire Cables.

**Southwark.** — Electricity Committee. Accepted. 300-kVA transformer (£298).—Electric Construction Co. 100-A single-phase AC testing set (£318).—Metropolitan-Vickers. Four DC recording voltmeters (£37).—Elliott Bros. (London).

**Westminster.**—Works Committee. Recommended. Four batteries (£772).—Chloride Electrical Storage Co.

## 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.*

**Coventry.**—Factory, Foleshill Road; British Nylon Spinners, Ltd., Foleshill Road.

**Coulsdon and Purley.**—Permanent houses (100), Limpsfield Road, Sanderstead, for U.D.C.; Arthur W. Kenyon, architect, 15, Adeline Place, Bedford Square, London, W.C.1.

**Dartford.**—Works additions, Victoria Road, for J. & E. Hall, Ltd.; Archibald Leith & Partners, architects.

**Featherstone.**—Houses (50), Purston estate, for U.D.C.; R. W. Bainton, clerk, Featherstone, Yorks.

**Gateshead-on-Tyne.**—Completion of administration block, Queen Elizabeth Hospital; borough surveyor.

Factory, Kingsway North, for Fibreboard Boxes, Ltd., Dunston.

**Gosforth.**—Houses (200), for U.D.C.; Tasker & Child, Trinity Buildings, New Bridge Street, Newcastle-on-Tyne.

**Halifax.**—Houses (72), Backhold Lane and Cousin Lane; D. T. Lloyd Jones, borough engineer, Crossley Street.

**Leigh.** — Outpatients' Department, Leigh Infirmary (£60,000); Bradshaw Gass & Hope, architects, 19, Silverwell Street, Bolton.

**Llanrwst.**—Houses (40) and bungalows (12) for U.D.C.; S. C. Foulkes, architect, Central Chambers, Colwyn Bay.

**Longbenton.**—Permanent houses (50); T. McNaught, Longbenton U.D.C. Offices, Forest Hall, near Newcastle.

**Manchester.** — Milk pasteurisation block at Langho Epileptic Colony; city architect, Town Hall.

**Maryport.**—Two factories for the West Cumberland Development Co., Ltd.; J. Laing & Sons, Ltd., builders, Carlisle.

**Middlesex.** — Extensions, Waltham Cross Institution (£26,590), mental colony (£21,546) and Deephams sewage works (£21,000); county engineer.

**Northallerton.** — Factory; Bell & Goldsborough.

**North Shields.**—Factory for De La Rue Plastics, Ltd.; Sir Robert McAlpine & Sons, Ltd., Carliol House, Newcastle-on-Tyne.

**Norton (Staffs).**—Schools (£21,000); Rev. R. B. McKenzie, The Rectory, Parish Church.

**Paisley.**—Reconstruction work for Pollock & Cochrane, Ltd., Thruscraig Works; manager.

**Rotherham.**—Model dairy for the Rotherham Co-operative Society; Jenkinson & Son, architects.

**Rushden.**—School for 360 boys; county architect, Northampton.

**St. Marylebone.**—Rebuilding blocks of flats, Wharncliffe Gardens; T. P. Bennett & Sons.

Dwellings (480), Church Street and Barrow Hill Road; L. de Soissons, and Stanley Hall, Easton & Robertson, architects.

**Scarborough.**—Three blocks of flats, Sandybed Lane; F. W. Plaxton, builder.

**Scunthorpe.** — Factory, Beauchamp's Estate; Kettering Co-operative Clothing Society, King Street, Kettering.

**Stockport.**—Flats, Didsbury Road (£20,539); C. Musker Bros., Ltd., builders, Bingham Street, Swinton.

**Tynemouth.**—Additions, Tynemouth Infirmary (£100,000); General Committee.

**Wallasey.**—Houses (40); Lloyd & Cross, builders, 68, Argyle Street, Birkenhead.

**Warrington.**—Works additions, School Street; Penketh Paint & Varnish Co.

**Weardale.**—Houses (14), Rookhope; R.D.C. surveyor.

**Wednesbury.**—Houses (34), Dale Street; G. W. Yates, Ltd., builders, Chester Road, Stonnall, Brownhills.

**Wenlock.**—Permanent houses (24), Hodgecroft, Bridgnorth Road; J. Brian Cooper, architect, 144, Corporation Street, Birmingham, 4.

**Westminster.**—Flats (177), parish hall, etc., Tachbrook estate; Westminster Housing Trust.

Flats (80), Cumberland Street; city engineer.

**Wolverton.**—British Legion Hall (£10,000); secretary, New Bradwell and District Branch of the British Legion.

# 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* (1*s. each*) *may be obtained from the Patent Office*, 25, *Southampton Buildings, London, W.C.*2.

AKT.-GES. Brown, Boveri & Cie. — "Gas blast circuit-breakers." 958/44. January 18th, 1943. (572489.)

British Thomson-Houston Co., Ltd.— "Control of alternating current electric circuits with the aid of inductive or capacitive reactors." 18828/43. November 14th, 1942. (573450.) "Electric insulators." 8440/44. May 4th, 1943. (572499.)

British Thomson-Houston Co., Ltd., and A. W. Masters. — "Centrifugal electric switches." 7917. April 27th, 1944. (572498.)

British Thomson-Houston Co., Ltd., and C. W. Wood.—"Electric lampholders." 20704. December 10th, 1943. (572479.)

C. S. Bull.—"Electron discharge devices." 7639. April 29th, 1940. (572540.)

Carr Fastener Co., Ltd., and G. Wagstaff.— "Electrical contacts." 21724. December 28th, 1943. (572483.)

Ferranti, Ltd., and H. Easton.—"Moving-coil electrical instruments." 1544. January 27th, 1944. (572492.)

General Electric Co., Ltd., F. H. Brittain and C. E. Ransley.—"Electric rectifiers." 14267. November 5th, 1941. (572511.)

Hewittic Electric Co., Ltd., and R. Wells.— "Vapour electric apparatus." 20579. December 9th, 1943. (572478.)

V. Hope.—"Electrical switchgear." 17779. October 28th, 1943. (572477.)

Marconi's Wireless Telegraph Co., Ltd., and H. J. Round.—"Magneto-strictive oscillatory apparatus." (Cognate applications 34260/38 and 14575/39.) November 24th, 1938. (572500.)

Marconi's Wireless Telegraph Co., Ltd., and F. M. Wright.—"Radio directional aerial systems for very high-frequency operation." 8584. July 7th, 1941. (572470.)

Radio Corporation of America.—"Radio-frequency heating." 11370/43. July 31st, 1942. (572443.) "Noise reduction circuit for sound recording systems." 21332/43. December 31st, 1942. (572481.)

Rediffusion, Ltd., and P. Adorjan. — "Apparatus for radio direction finding and indicating." 3277. February 21st, 1940. (572508.)

Rediffusion, Ltd., P. Adorjan and R. P. Gabriel.—"Radio direction finding and indicating apparatus." 11552. July 11th, 1940. (572570.)

F. Salmon.—"Incandescent electric lamp sockets and adaptors therefor." 12509. August 3rd, 1943. (572517.)

G. R. Shepherd (Westinghouse Electric International Co.).—"Method of treating sheets of ferrous silicon magnetic material to produce an electrically insulating film on the surfaces of the sheet." 1399. January 25th, 1944. (572491.)

S. Smith & Sons (England), Ltd., and V. J. S. Russell.—"Electric alarm clocks." 17002. October 15th, 1943. (572554.)

G. V. Tonner.—"Electrically operated amusement devices." 13605. August 20th, 1943. (572519.)

Wilmot-Breedon, Ltd., and C. H. Stephenson. —"Electric laundry irons." 262. January 6th, 1944. (572486.)

*FAMOUS HYDRO-ELECTRIC STATIONS.*

*Here is the Wilson Dam at Muscle Shoals, U.S.A. It was the first dam to be completed by the Tennessee Valley Authority in their immense scheme for the electrification of the valley and the improvement of conditions for agriculture and industry. It is the largest low-head dam in the world and has an electrical power of 600,000 H.P.*

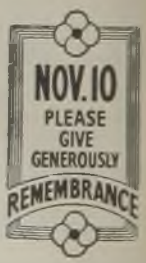
# G.E.C.

## ELECTRIC STORAGE WATER HEATING EQUIPMENT

*Six 150-gallon G.E.C. Water Heaters, forming part of contract ready for shipment to the order of a Government Department*

G.E.C. Water Heating Equipment, like many other well-known G.E.C. products, has proved its value in vital war-time services.

The G.E.C. standard range of non-pressure, pressure and cistern types from 1½ to 30 galls. capacity has been widely used in all kinds of installations for a great number of years, and numerous industrial water heating applications employing G.E.C. large capacity equipment are known to users in various parts of the world.




**WRITE FOR THE G.E.C. CATALOGUE OF WATER HEATING EQUIPMENT**

*Advt. of The General Electric Co. Ltd., Head Office, Magnet House, Kingsway, London, W.C.2*

# 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.

### METROPOLITAN BOROUGH OF SOUTHWARK

**Electricity Department**

**E.H.T. and L.T. Insulated Cables**

TENDERS are invited for the supply and delivery over a period of 12 months ending 31st December, 1946, of Paper Insulated Lead Covered Steel Tape Armoured and Unarmoured Cables of various sizes.

Specification, Conditions and Form of Tender may be obtained from the Borough Electrical Engineer and Manager, Penrose Street, Southwark, S.E.17.

Tenders, together with Fair Wages Clause Declaration duly signed as required by the Council on the forms provided, enclosed in a plain envelope, sealed and endorsed as directed in the tender form, must be delivered to the undersigned not later than Wednesday, 14th November, 1945.

The Council does not bind itself to accept the lowest or any tender.

D. T. GRIFFITHS,
Town Clerk.

Town Hall,
Walworth Road, London, S.E.17.
19th October, 1945. 3214

### BOROUGH OF KETTERING

**Electricity Department**

TENDERS are invited from British Manufacturers for:

SPECIFICATION No. 100. E.H.T. and L.T. Paper Insulated, Lead Covered Armoured Cables, for the period of fifteen months ending 31st March, 1947.

Specification and Form of Tender, in duplicate, may be obtained from Mr. C. Binns, Borough Electrical Engineer, Rockingham Road, Kettering, upon receipt of one guinea, which will be refunded upon receipt of a bona fide tender and the return of the Specification. Extra copies of the Specification may be purchased at a cost of 5s. each.

Tender must be submitted in a plain sealed envelope, supplied by the Corporation, endorsed "Tender for Specification No. 100," and must be received by me not later than first post on WEDNESDAY, 28th NOVEMBER, 1945.

The Corporation do not bind themselves to accept the lowest or any tender.

JOHN CHASTON,
Town Clerk.

Town Clerk's Office,
High Street, Kettering.
22nd October, 1945. 3227

### NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

**Creosoted Wood Poles**

TENDERS are invited for the supply and delivery of Creosoted Wood Transmission Line Poles. Copies of the Form of Tender, Conditions of Contract, Specification and Schedules may be obtained from the undersigned.

T. LAWRIE,
Secretary.

16, Rothesay Terrace,
Edinburgh, 3.
22nd October, 1945. 3213

### METROPOLITAN BOROUGH OF WOOLWICH

**Electricity Department**

**H.V. and M.V. Cables**

TENDERS are invited by the above Council for the supply of H.V. and M.V. Cables required during the year 1st January, 1946, to 31st December, 1946.

Specification and form of tender may be obtained from the undersigned upon receipt of a deposit of £1 1s., which will be refunded within one month of the receipt of a bona fide tender.

Tenders, enclosed in a plain sealed envelope and endorsed "Tender for Cables," must reach me not later than 12 noon on the 14th November, 1945.

The Council do not bind themselves to accept the lowest or any tender.

DAVID JENKINS,
Town Clerk.

Town Hall,
Woolwich, S.E.18.
18th October, 1945. 3215

### METROPOLITAN BOROUGH OF WOOLWICH

**Electricity Department**

**Electricity Meters**

TENDERS are invited by the above Council for the supply of Electricity Meters required during the year 1st January, 1946, to 31st December, 1946.

Specification and form of tender may be obtained from the undersigned upon receipt of a deposit of £1 1s., which will be refunded within one month of the receipt of a bona fide tender.

Tenders, enclosed in a plain sealed envelope and endorsed "Tender for Meters," must reach me not later than 12 noon on the 14th November, 1945.

The Council do not bind themselves to accept the lowest or any tender.

DAVID JENKINS,
Town Clerk.

Town Hall,
Woolwich, S.E.18.
18th October, 1945. 3216

### METROPOLITAN BOROUGH OF WOOLWICH

**Electricity Department**

**Supply of Transformers**

TENDERS are invited by the above Council for the supply of Transformers required during the year 1st January, 1946, to 31st December, 1946.

Specification and form of tender may be obtained from the undersigned upon receipt of a deposit of £1 1s., which will be refunded within one month of the receipt of a bona fide tender.

Tenders, enclosed in a plain sealed envelope and endorsed "Tender for Transformers," must reach me not later than 12 noon on the 14th November, 1945.

The Council do not bind themselves to accept the lowest or any tender.

DAVID JENKINS,
Town Clerk.

Town Hall,
Woolwich, S.E.18.
18th October, 1945. 3217

### CITY OF MANCHESTER

THE Electricity Committee invites tenders for the supply, delivery and erection at STUART STREET GENERATING STATION, Bradford, Manchester, 11, of:—

SIX CAPSTANS AND BOLLARDS (Specification No. 840).
SURGE AND MAKE-UP WATER CAST-IRON TANKS, ETC. (Specification No. 841).

Specifications, etc., may be obtained from Mr. R. A. S. Thwaites, Chief Engineer and Manager, Electricity Department, Town Hall, Manchester, 2, on payment of a fee of one guinea for each specification, which amount will be refunded on receipt of a bona fide tender.

Tenders, addressed to the Chairman of the Electricity Committee, to be delivered not later than 10 o'clock a.m. on Monday, 26th November, 1945.

PHILIP B. DINGLE,
Town Hall, Town Clerk.
Manchester, 2.
26th October, 1945. 3257

### NORTH-WEST MIDLANDS JOINT ELECTRICITY AUTHORITY

TENDERS are invited for the following Contracts:—

Contract No. A.278, Outdoor Type Static Transformers.
Contract No. A.279, Electricity Supply Meters.
Contract No. A.280, Painting of Chimney Stacks.
Contract No. A.281, Spraying of Cooling Towers.

Copies of Specifications and Forms of Tender may be obtained from the undersigned, on payment of £2 (TWO POUNDS) in currency notes.

Tenders must be delivered to the Clerk and Accountant by the first post on MONDAY, 26th NOVEMBER.

The Authority do not bind themselves to accept the lowest or any tender.

F. FAVELL,
York Chambers, Chief Engineer and Manager.
Kingsway, Stoke-on-Trent.
24th October, 1945. 3228

## 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,
The Council House, Clerk of the Council.
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 Hall, Town Clerk.
Tunbridge Wells.
October, 1945. 3146

### CITY OF BRADFORD

#### Electricity Department

#### Appointment of Senior Demonstrator

APPLICATIONS are invited for the position of Female Senior Demonstrator in the above Department. Applicants must hold a Diploma in Domestic Science or other approved qualifications, be competent to conduct lectures and demonstrations, and be able to advise on the use of various forms of electrical apparatus.

The salary offered is that attached to (Female) Grade 1 of the Corporation Salaries and Grading Scheme, commencing at £190 per annum, and rising (subject to satisfactory service) by annual increments of £10 to £240 per annum. At the present time a cost-of-living bonus at the rate of 18s. 6d. per week is also payable.

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

Applications, giving age, qualifications and full details of experience and appointments held, accompanied by copies of recent testimonials, to be enclosed in envelopes endorsed "Senior Demonstrator," and to reach the undersigned not later than 15th November, 1945.

T. H. CARR,
Head Offices. Electrical Engineer and Manager.
27, Bolton Road, Bradford.
October, 1945. 3219

### CENTRAL ELECTRICITY BOARD

#### South-East and East England Areas

#### Assistant Control Engineer

APPLICATIONS are invited for the position of First Assistant Control Engineer at the Board's Control Room in London.

Candidates, age not exceeding 35, should have a knowledge of Power Station work and technical qualifications of Graduate I.E.E. standard.

Apply to Manager, S.E. and E.E. Area, Central Electricity Board, Aldwych House, London, W.C.2.

The Ministry of Labour and National Service have authorised this advertisement. 3229

## 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

## 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

## STRETFORD AND DISTRICT ELECTRICITY BOARD

### Appointment of Junior Shift Engineer

APPLICATIONS are invited for the above appointment from suitably qualified engineers, with modern generating experience.

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

The salary will be in accordance with Class G, Grade 9, of the National Joint Board's Schedule, at present £340 per annum, rising to £354 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 "Junior Shift Engineer," giving details of training, experience and qualifications, together with copies of testimonials, should reach the undersigned not later than Saturday, the 10th November next.

C. TREWAVAS,
Clerk to the Board.

Town Hall, Stretford.
22nd October, 1945. 3212

## 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

## EAST GRINSTEAD URBAN DISTRICT COUNCIL

### Substation Attendant

THE above-named Council invite applications from qualified persons for appointment to the above permanent position at their Electricity Undertaking. Wages in accordance with D.J.I.C. Schedule, No. 11 Area, at present £4 11s. for a 48-hour week.

Applicants must have good experience and knowledge of glass bulb rectifiers and switching operations up to 11,000 volts.

Applications, stating age, present appointment, and experience, with copies of two recent testimonials, to be forwarded to the Deputy Clerk to the Council, Norton House, London Road, East Grinstead, Surrey, not later than the 16th day of November, 1945, and endorsed "Substation Attendant."

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

23rd October, 1945. 3206

## COUNTY BOROUGH OF SOUTHPORT

### Electricity Department

### Junior Shift Engineer

APPLICATIONS are invited for the position of JUNIOR SHIFT ENGINEER at the Department's "Selected" Generating Station. Candidates at present serving with H.M. Forces will receive every consideration.

Candidates must have received a good technical training, have a general knowledge of Central Station practice, and be conversant with the operation and maintenance of Turbo-Alternators, Water Tube Boiler Plant and E.H.T. Switchgear.

Salary will be in accordance with the N.J.B. Schedule, Class F, Grade 8a. 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 "Junior Shift Engineer," should be addressed to the Borough Electrical Engineer, 188, Lord Street, Southport, and must be received by Monday, 12th November, 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.
20th October, 1945. 3236

## BOROUGH OF ROYAL TUNBRIDGE WELLS

### Electricity Department

### Meter Superintendent

APPLICATIONS are invited for the position of Meter Superintendent from qualified Engineers with experience in testing and repairing all types of watt-hour meters, summation equipment and general meter department routine.

The conditions of employment are in accordance with the National Joint Board Schedule, Class F, Grade 8a, commencing salary £371 per annum, including war bonus.

The appointment to be subject to the provisions of the Council's Superannuation Scheme, and the successful candidate will be required to undergo a medical examination.

Applications, with copies of three recent testimonials, should be addressed to the Borough Electrical Engineer, Town Hall, Tunbridge Wells, not later than 17th 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.

JOHN WHITEHEAD,
Town Clerk.

Town Hall,
Tunbridge Wells.
22nd October, 1945. 3222

## BRIERFIELD URBAN DISTRICT COUNCIL

### Electricity Department

### Temporary Cable Jointer (Plumber)

THE above Council invite applications for the position of Temporary Cable Jointer. Wages in accordance with D.J.I.C. Schedule, No. 3 Area, "B" Zone, at present 25.43d. per hour for a 47-hour week.

Applicants must have a thorough practical and technical training in mains jointing, link boxes, feeder pillars and substation L.T. Boards.

Applications, stating age, present appointment and experience, with copies of two recent testimonials, to be forwarded to the undersigned not later than Saturday, 24th November, 1945.

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

NORMAN ASHTON, A.M.I.E.E.,
Engineer and Manager.

Electricity House,
Colne Rd., Brierfield, Lancs.
27th October, 1945. 3254

## COUNTY BOROUGH OF WALLASEY

WANTED: Plumber-Jointers. Rate 26.45d. per hour, £5 3s. 7d. per week of 47 hours. Applications, stating age and experience, to Borough Electrical Engineer, Wallasey Road, Wallasey.

This advertisement does not relate to men between the ages of 18 and 50 inclusive, unless they are excepted from the provisions of the Control of Engagement Order, 1945.

EMRYS EVANS, Town Clerk.
3233

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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.

ARMATURE Winder required, over 51 or Class A ex-Serviceman, South Coast Town. Reply details experience and wages required.—Box 7843, 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 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 Designer with previous experience (over 51 or outside present Engagement Restrictions) required for electric motor manufacturers. State age, permanent progressive position. Applications welcomed from men shortly due for demobilisation. Apply—Higgs Motors Limited, Witton, Birmingham, 6. 3248

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

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.

BUYERS required for exporters of kitchenware (enamel, etc.), electric irons, heaters and kettles. Write—Box 649, Reynells', 44, Chancery Lane, W.C.2. 3238

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

CHIEF Electrical Engineer required for large modern Collieries. Applicants should have had first-class practical experience at collieries covering electric winders, generating plant and various classes of electrical equipment and be familiar with mining regulations. Apply—Pearson and Dorman Long Ltd., Richborough, Sandwich, Kent. 3201

CLASS A release ex-Servicemen who are qualified Electrical Draughtsmen are invited to communicate with the Personnel Officer, Foster Transformers & Switchgear Ltd., South Wimbledon, S.W.19. Apply by writing in first instance. Good prospects for the right men. Salary according to qualifications and experience. 3224

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

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

DRAUGHTSMAN wanted by London lift firm. Experience of electric control gear necessary. Under 18, over 51 or Class A ex-Servicemen only. Write stating age and previous experience to—Box 3267, c/o The Electrical Review.

DEVELOPMENT and Experimental Engineer required by manufacturers in N.W. London specialising in wide range of electrically heated equipment for industrial and commercial applications. Previous experience in this field necessary coupled with imagination, initiative and all-round ability. Progressive position, salary from £600 £800 p.a. Applications in writing, stating age, qualifications, experience and salary required from Class A ex-Servicemen or otherwise exempt from M.O.L. control. —Box 3264. c/o The Electrical Review.

ELECTRIC Cooking. Applications are invited for a qualified Lady Demonstrator by manufacturers of electric cookers. Candidates must possess a recognised diploma in Domestic Science, L.A.W. or equivalent and capable of designing menus, carrying out tests, etc., for the production of a cookery book. The position is a permanent one. A good salary will be paid to the right applicant. Please apply in confidence, stating age, experience, salary required, and when free.—Box 7910. c/o The Electrical Review. 3221

ELECTRICAL. Class A ex-Serviceman required as Counter Hand and Assistant to Buyer, excellent prospects, some knowledge of trade essential. Apply— Mr. T. H. Fisher, Farmer, Stedall & Co., 145, St. John Street, E.C.1. 3221

ELECTRICAL Designers required with experience in design and development of one of the following: transformers, switchgear, control gear, instruments, rotating machinery or power house equipment. Applicants must be Chartered Electrical Engineers or possess an electrical engineering degree or the Higher National Certificate with works training and several years experience in design. Men with drawing office experience only are not required. Various vacancies available at salaries between £600 and £1,000 per annum, according to age, qualifications and experience. Write, quoting D.1515A, to the 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 17th November 1945. 3204

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 3247. c/o The Electrical Review.

ELECTRICIAN wanted immediately. Permanency for good all round man with thorough knowledge 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.

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

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. 1799

ELECTRICIANS. Class A ex-Servicemen or otherwise exempt from M.O.L. control, required for Midlands and South Wales.—John Richards & Co. Ltd., 9, High Street, Burton-on-Trent. 7885

ELECTRICIANS. Class A ex-Servicemen, or over 51, required by electrical contractors, Central London. Permanency to right men. Best conditions.—Box 3266. c/o The Electrical Review.

ELECTRICIANS required by small established contractors for good class installation and maintenance work. Screwed: L.C.: T.R.S. Good conditions. Permanent employment. Class A ex-Servicemen or otherwise free.—Winfield & Co., 82, High Street, Boston, Lincs. 7895

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

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 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.

ESTIMATOR possessing first-class experience of all types of rubber insulated cables required immediately. Permanent and progressive position for suitable applicant possessing initiative. Applicants must be free from restrictions of the Control of Employment Order. Applications, which will be treated in strictest confidence, to— Box 3268. 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 Electrical Engineer, Class A ex-Serviceman, small established repair business; must be worker.—Box 7907. c/o The Electrical Review.

EXPERIENCED man required by radio valve manufacturing company, S.E. London area, to take charge of Rate Fixing and Cost Estimating Departments. Applicants must have specified knowledge and experience, preferably in radio valve or lamp manufacture. Experience in time and motion study an advantage. Write stating age, experience and salary required to—Box 7851, A. K. Advg., 212a, Shaftesbury Avenue, London, W.C.2. 3250

EXPORT Assistant required by firm of electric cable manufacturers. Must possess first-class experience and be fully conversant with all procedure pertaining to export business. Permanent and progressive position for suitable applicant. Applications, which will be treated in strictest confidence, to be forwarded to Scottish Cables Ltd., Deansvale, Renfrew. Applicants must be free from restrictions of the Control of Engagement Order. 3262

INVOICE Clerk required, male (under 18, over 51 or Class A ex-Serviceman only) or female. Knowledge of electrical trade an advantage. Permanent position. Write—Box 7974, Smiths, 100, Fleet Street, E.C.4. 3261

IVESON 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

JUNIOR Draughtsman for decorative lighting fittings manufacturers, S.W. London district. Applications from Class A ex-Servicemen or those under 18 only. Write, stating age, experience and salary required.—Box 3247. c/o The Electrical Review.

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.

MAINTENANCE Electrician required by London contractor. Applications only from those over 51 or Class A ex-Servicemen. Apply giving full particulars to—Box 3265. 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.

METER Mechanic. Applications are invited for the position of Meter Mechanic from craftsmen having suitable experience in repairing and recalibrating all types of watt-hour meters, summation equipment and time switches. Conditions of employment and wages are in accordance with No. 9 Area, J.I.C., the present wage being £5 1s. 10d. per week of 47 hours, including war bonus. The appointment in the first instance will be temporary. Applications, with copies of three recent testimonials, should be addressed to the Borough Electrical Engineer, Town Hall, Tunbridge Wells, by 17th 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. 3223

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.

OVERSEAS Appointment. Government of the Punjab, India, require a Principal for the Punjab College of Engineering and Technology, Lahore. Candidates, preferably British subjects between the ages of 42 and 46, must possess a University Degree in Engineering (preferably Honours), should be at least an A.M.I.Mech.E., A.M.I.E.E. or A.M.I.C.E., with several years' experience in modern methods of teaching engineering subjects, and preferably in college administration, and should be men of broad sympathies, character and personality, with administrative ability and powers of control. Permanent, but appointment will in the first instance be on contract for five years. Salary Rs. 1750 a month, rising by annual increments of Rs. 50 a month to Rs. 2400 a month (Rupee = 1s. 6d.), plus for a selected candidate of non-Asiatic domicile, £30 a month overseas pay. Initial pay according to age, qualifications and experience. Free passage to India and back (and in certain circumstances up to two additional fares for family) for non-Asiatic candidates; free medical attention, rent and bungalow. Write, quoting C.2854A, 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 10th November, 1945. 3203

OVERSEAS Employment. Inspector of Works (Electrical) required by the Government of the Gold Coast for the Public Works Department for one tour of 12 to 24 months, with prospect of permanency. Salary £400 rising to £500 a year, plus local allowance of £60 and allowance for married men between £84 and £204 according to number of children. Outfit allowance £60. Free passages and quarters. Candidates must have served an apprenticeship with a firm of electrical contractors or supply organisation, and have since held a responsible position in cable laying and jointing, overhead distribution systems up to 33,000 volts, and internal wiring of buildings. Written applications (no interviews), giving the following essential details: (1) Full name; (2) Date of birth; (3) Qualifications and experience; (4) Name and address of present employers; (5) Details of present work, should be sent to the Secretary, Overseas Manpower Committee (Ref. 292), Ministry of Labour and National Service, York House, Kingsway, London, W.C.2. Applications cannot be acknowledged. 3231

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.

PROGRESS Clerk required in purchasing dept., with knowledge electrical/radio terms. Class A ex-Serviceman. Good prospects permanency. Write, stating age, experience, salary desired.—RCA Photophone Ltd., Belgrove House, Belgrove Street, King's Cross, W.C.1. 3265

PROGRESSIVE company requires experienced Female Book-keeper, Shorthand-Typist with a view to taking over complete control of office Reply stating age, experience and salary required to—Visolite Limited, 98/98a, Soho Road, Handsworth, Birmingham, 21. 3258

RADIO. An Electrician with experience of installation and maintenance of domestic wireless sets is required by the East Anglian Electric Supply Co. Ltd., Finborough Hall, Stowmarket, Suffolk. Applicants should be Class A releases or exempt from labour control. 7877

REFRIGERATION. Opportunity occurs with old established growing concern for an energetic young man with experience as Traveller. Good prospects. Applicants should give full details of experience and salary required and be exempt from M.O.L. control.—Box 3266, c/o The Electrical Review.

REPRESENTATIVE, experienced, required by firm of wholesale electrical suppliers, for London and Home Counties south of the River. Individual with connection amongst large industrials preferred. Good salary, expense allowance and prospects. Apply in writing first instance.—W. & W., 13, Bloomsbury Square, W.C.1. 3200

SALES Engineer required by prominent London instrument company, to take charge of sales office and to handle all correspondence and contracts (home and export). Must have sound knowledge of industrial and laboratory indicating instruments and electronic test gear. Our staff have been notified of this vacancy.—Box 3237, 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.

SENIOR Mechanical and Electrical Engineer required by large engineering firm to take charge of erection and commissioning of turbo-alternators in western district of Great Britain. Steam turbine experience essential. Tact, personality and ability to control staff required. Salary according to experience. Write, with details, to—Box No. 225, 8, Serle Street, London, W.C.2. 3195

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 director of company in light engineering industry, owning several factories, requires Assistant with following qualifications: Production background, drive and flexibility, experience in organisation and control of scientific and technical staff, academic qualifications preferred. Excellent opportunity for capable and energetic man. Write, giving complete details, stating salary required, to—Box H.N.4, c/o 5, New Bridge St., London, E.C.4. 3240

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.

TURBINE Room Foremen. Applications are invited from men who have had experience as a turbine room foreman or senior driver in power stations employing 30,000 to 60,000 kW. turbo-alternator sets, working with steam conditions of 600 lbs. per square inch and 800°F. temperature. Applicants should have a full knowledge of operation procedure of all auxiliary plant associated with the turbines, and their applications should state in detail their experience and knowledge in this direction. Terms of employment will be in accordance with the National Joint Industrial Council, Area No. 10, Agreement, with a present basic shift rate of 2s. 10.43d. per hour. Applications should be made in writing to the undersigned.—W. C. Parker, Borough Electrical Engineer, 587/591, Fulham Road, S.W.6. 3241

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 an Indian firm in Madras, a qualified Electrical Engineer, with over 10 years' experience in erection, maintenance, contracts, estimating in power stations, with H.T.O.H. lines, pumping and industrial installations. Preference to those who have electrical and mechanical qualifications. Minimum salary £750 per annum, free of Indian income tax. Three years contract. Special terms according to ability. Apply, with full particulars, to—Box 3220, c/o The Electrical Review.

WANTED for Assam, Working Colliery Electrician, five years' agreement, starting on Rs. 550 per month. Terms include bungalow accommodation, medical attendance, membership of provident fund, temporary allowances. Applicants should write, giving full particulars, to—"B. B.," c/o J. W. Vickers & Co. Ltd., 7/8, Great Winchester Street, E.C.2. 3235

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

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

## 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.

CHESHAM Electric Light & Power Co. — Assistant District Distribution Engineer.

## SITUATIONS WANTED

A Young Technician (20). H.N.C. Stud. I.E.E. seeks progressive position in industry. Two years' experience in manufacture of small transformers and light electro-magnetic work.—Box 7900, c/o The Electrical Review.

ACTIVE Sales Engineer (Technical) invites contact with manufacturers seeking representation, London and South. Specially interested in motors (all sizes), rectifiers, gear units and spraying equipment. Wide experience and live contacts. Free from control. Car & phone.—Box 7902, c/o The Electrical Review.

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 seeks post as Supervisor, Representative, or Head Foreman. 25 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.

AN Electrical Engineer requires post. Experience in practical mechanical engineering, design, costing, estimating, manufacturing and sales of all types rubber and paper cables, contracting, M.V. and E.H.T., underground and overhead, installation of transformers, switchgear and generators, testing, fault location. Accustomed to supervision of staff, jointers, linesmen and labour. Welfare, mains records, wages and accounts, etc.—Box 7889, c/o The Electrical Review.

ARMATURE Winder (44), desires change; would seek release for suitable job. Thorough, practical, experienced repair shop man. A.C. and D.C. repairs, rewinds up to 3,000 kW. Able to take charge. 11 years present situation.—Box 7896, c/o The Electrical Review.

ARMY Captain, Public School, age 37, married, just released from overseas, requires appointment with engineering firm. 12 years' experience in electrical contracting in London and the country, including the complete installation of power plant, lighting, heating and cooking. Many pre-war connections with London architects and consulting engineers.—Box 7908, c/o The Electrical Review.

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

CABLES Foreman, keen and progressive, with 20 years' comprehensive experience of power cables and administration, desires change.—Box 7888, c/o The Electrical Review.

CHIEF Engineer instrument firm desires change. Production, design, sales. Fully conversant modern methods. Write—Box 7876, c/o The Electrical Review.

CORNWALL. Electrical Engineer, age 36, requires executive position in Cornwall area. London trained, experienced installation and maintenance, lighting, heating, power, lifts, neon signs and radio. Moderate salary for suitable situation.—Box 7874, c/o The Electrical Review.

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INDEX TO ADVERTISERS

## Index to Advertisers

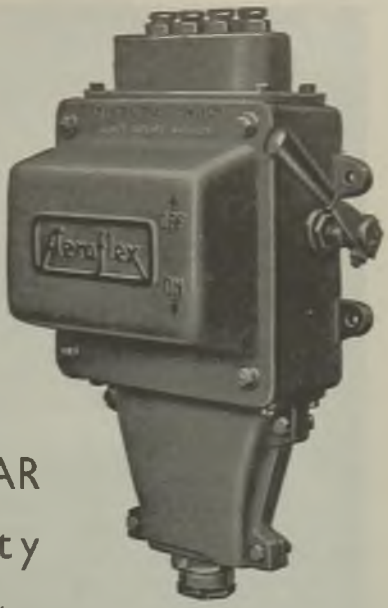


(*Continued on page 72*)

INDEX TO ADVERTISERS

## Index to Advertisers

(*Continued from page 70*)

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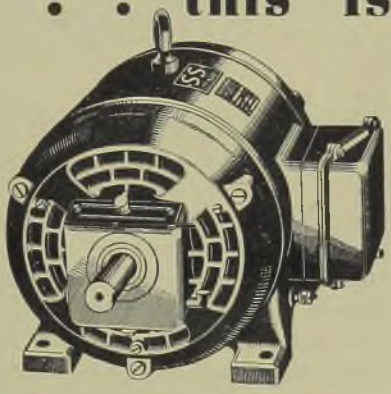

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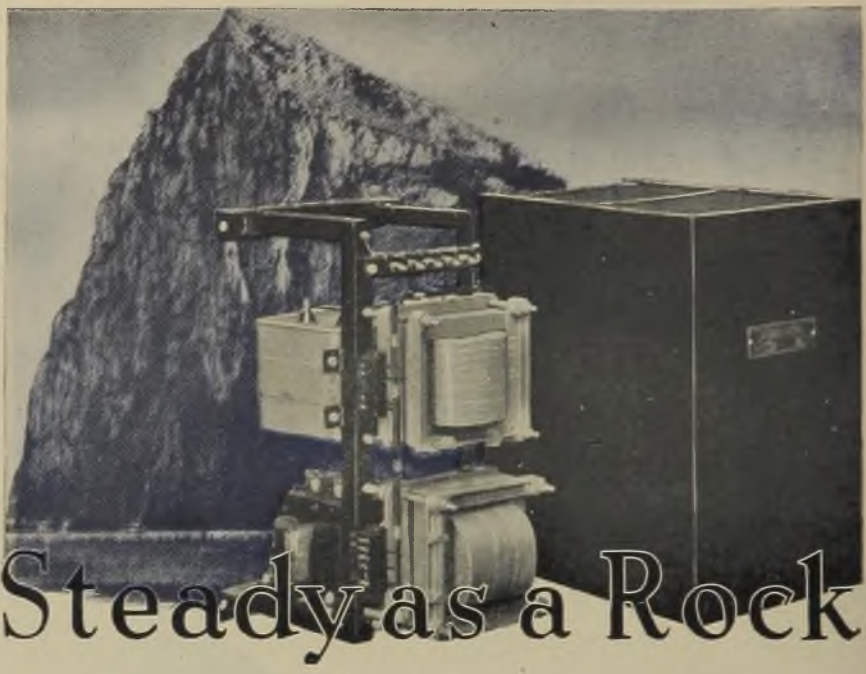

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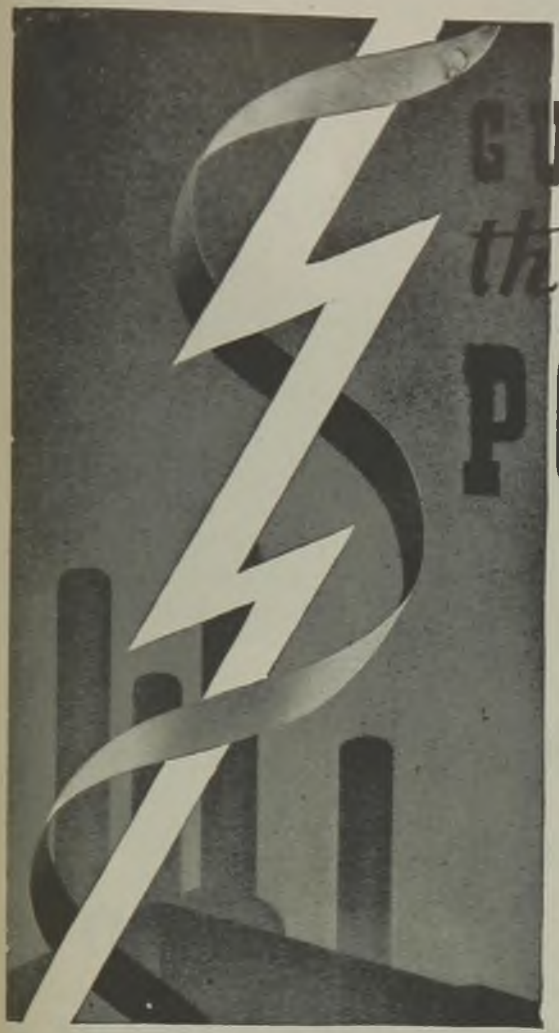

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INDEX TO ADVERTISERS—SEE PAGES 70 AND 72

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