

ELECTRICAL REVIEW

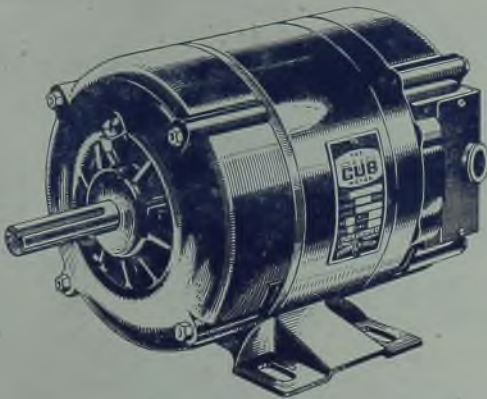
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Vol. CXXXIX. No. 3592

SEPTEMBER 27, 1946

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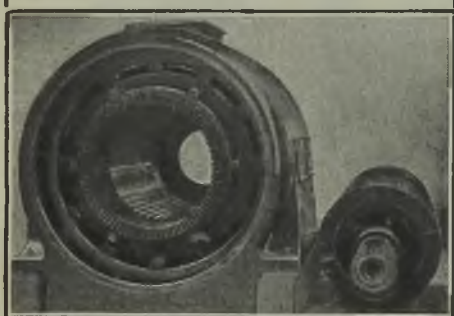
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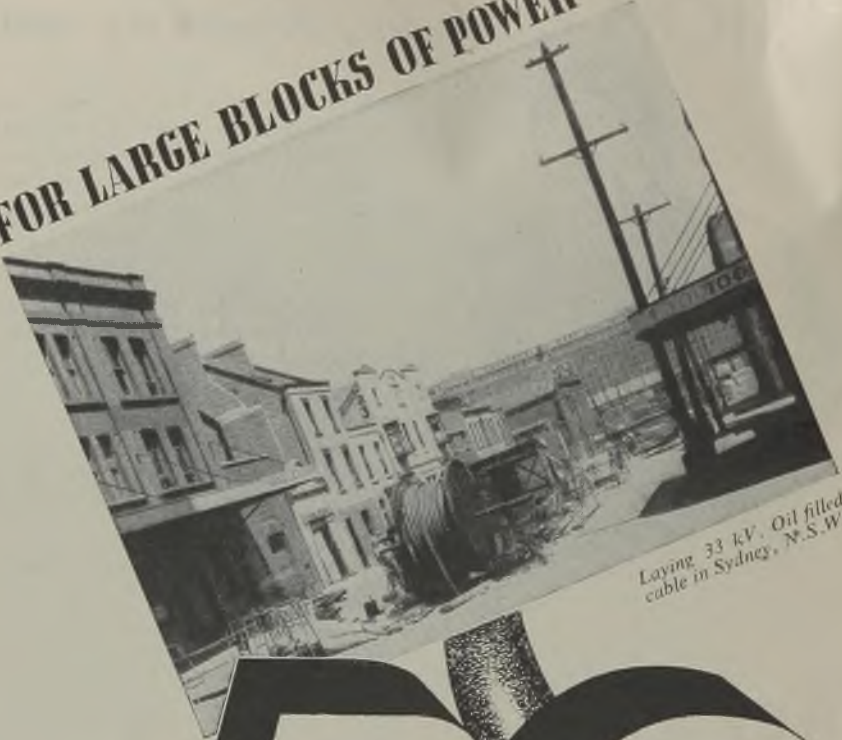
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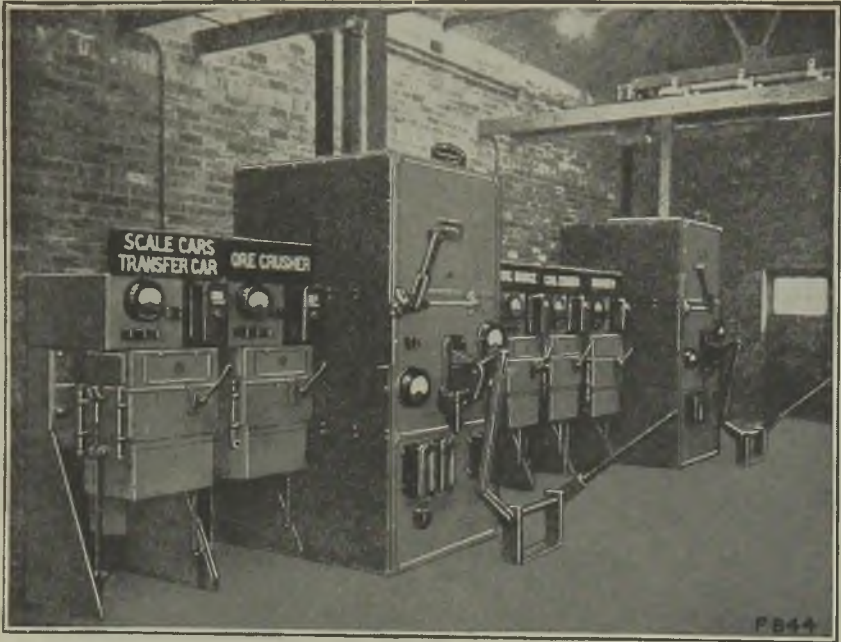
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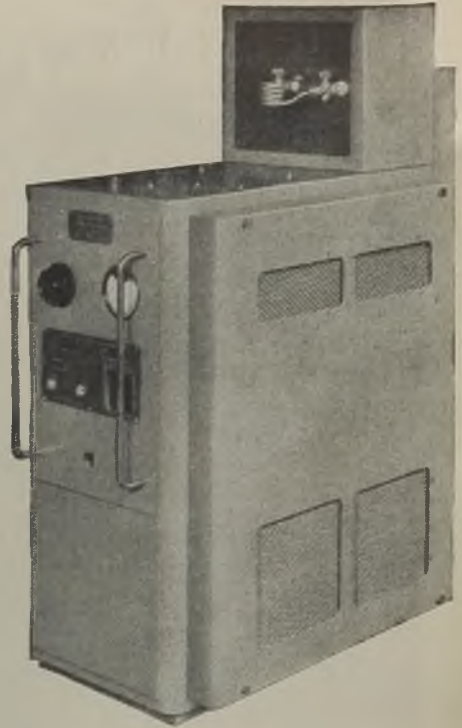
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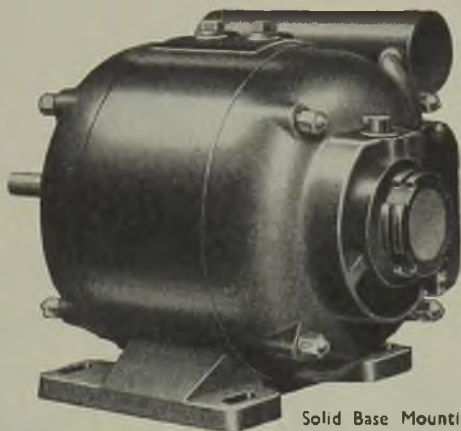
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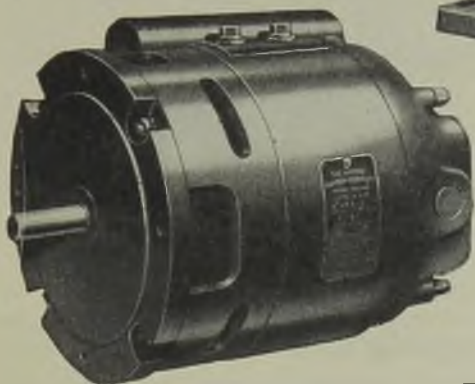
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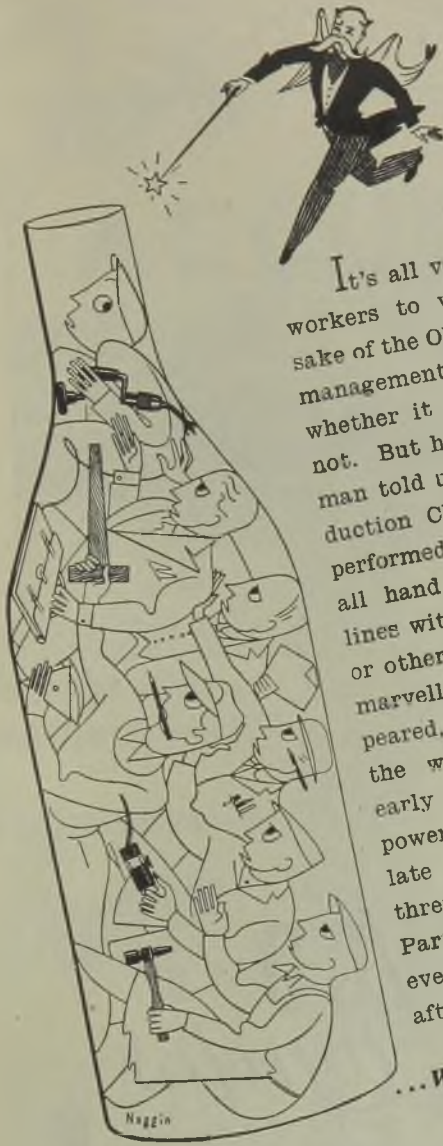
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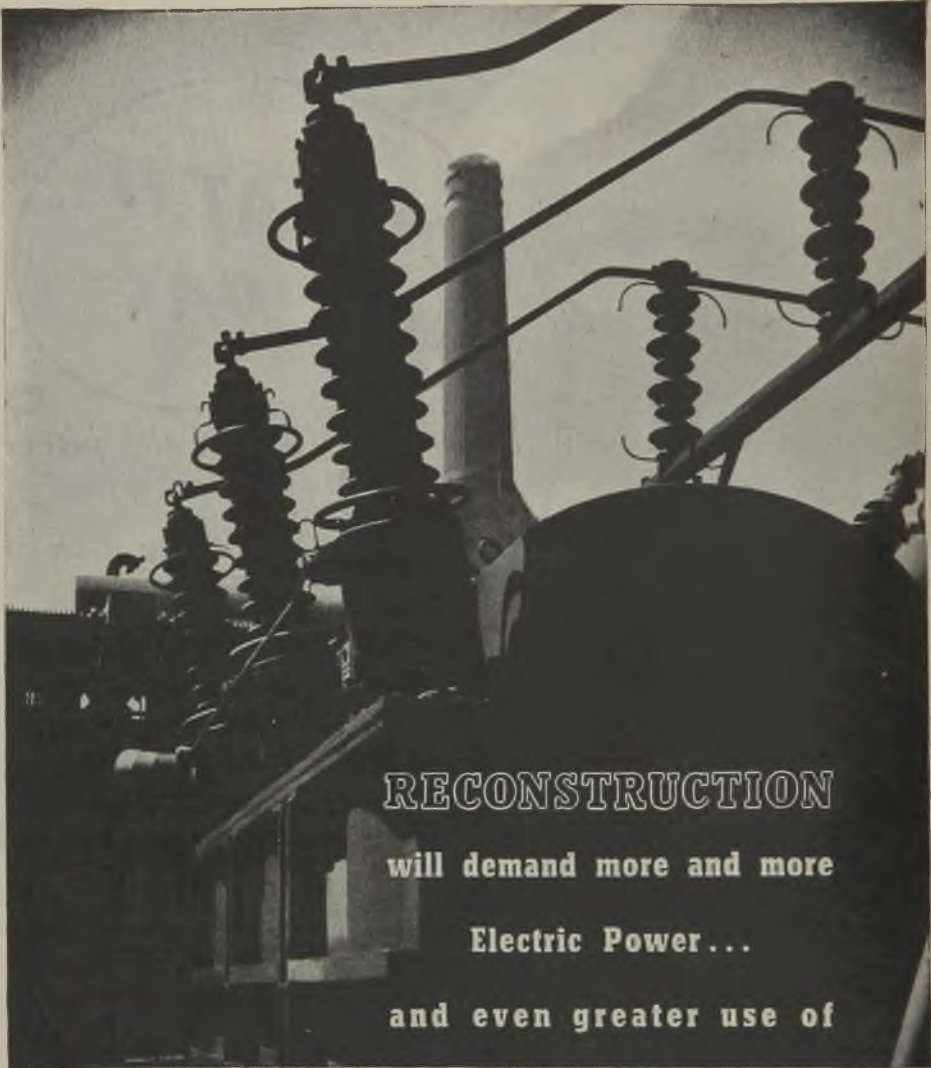


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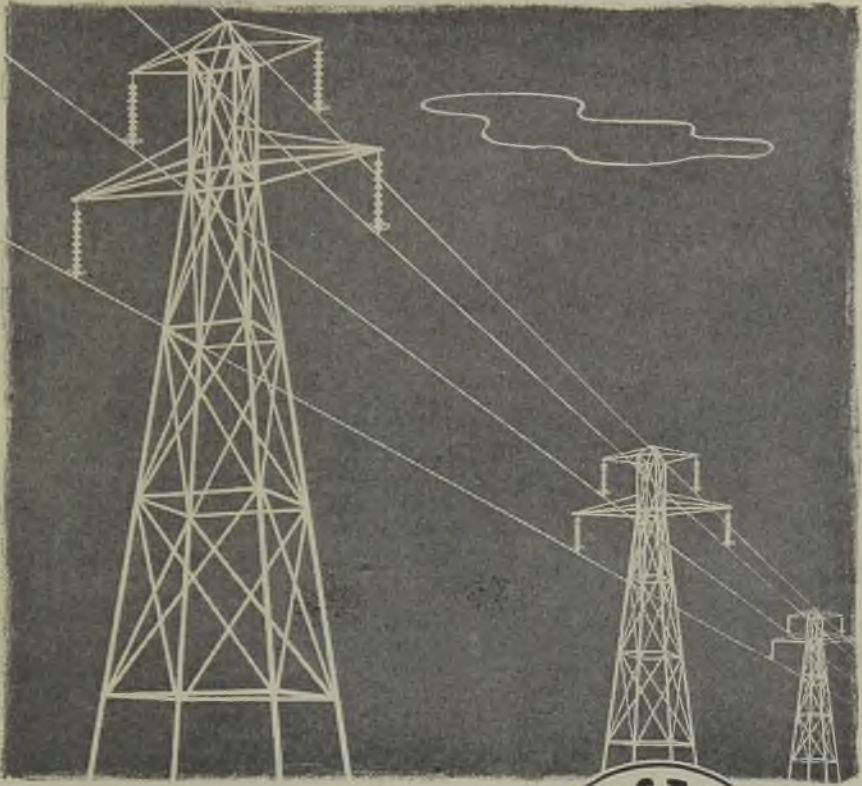
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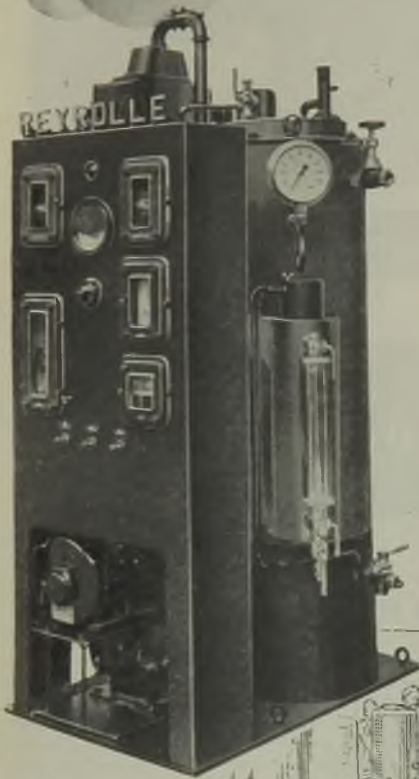
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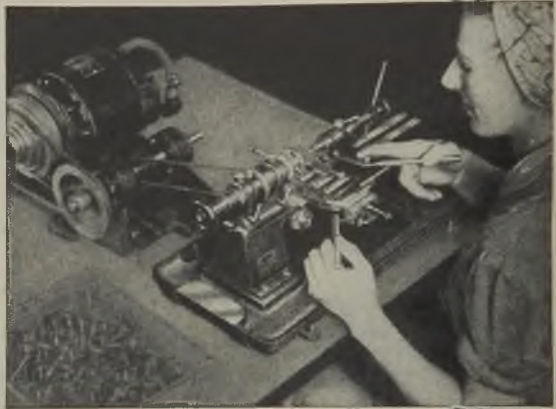
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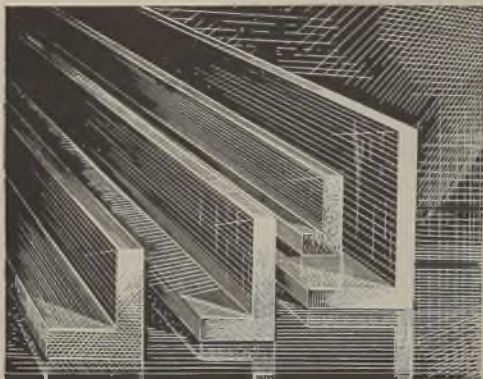
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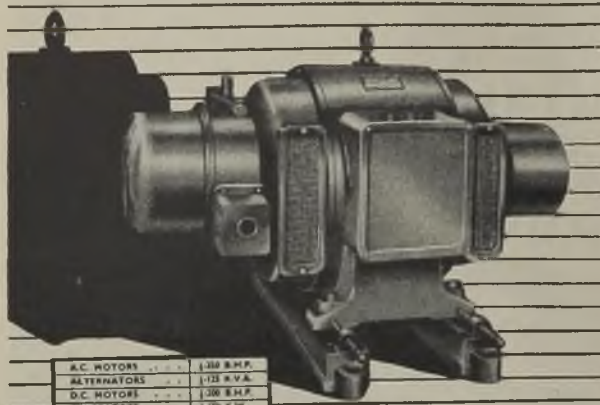
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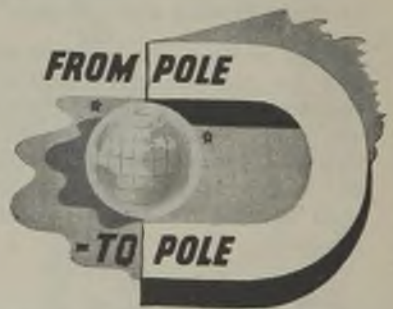
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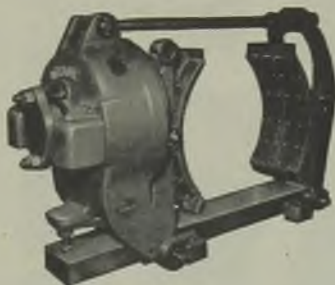


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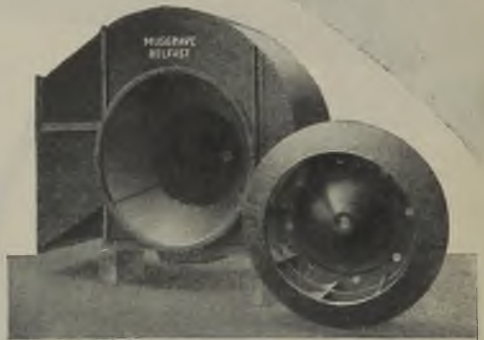
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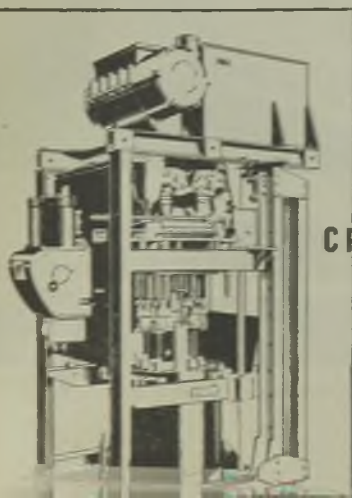


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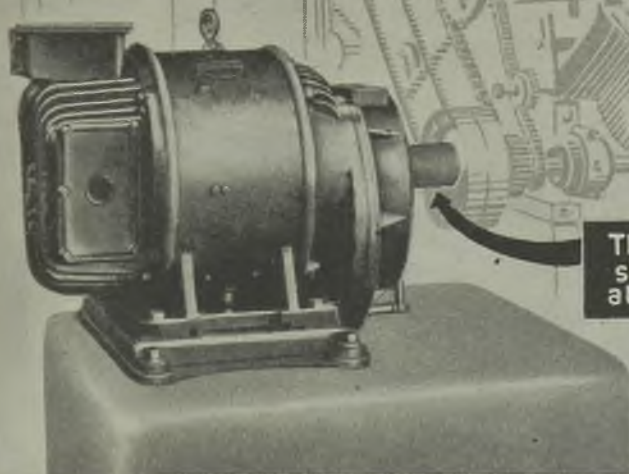
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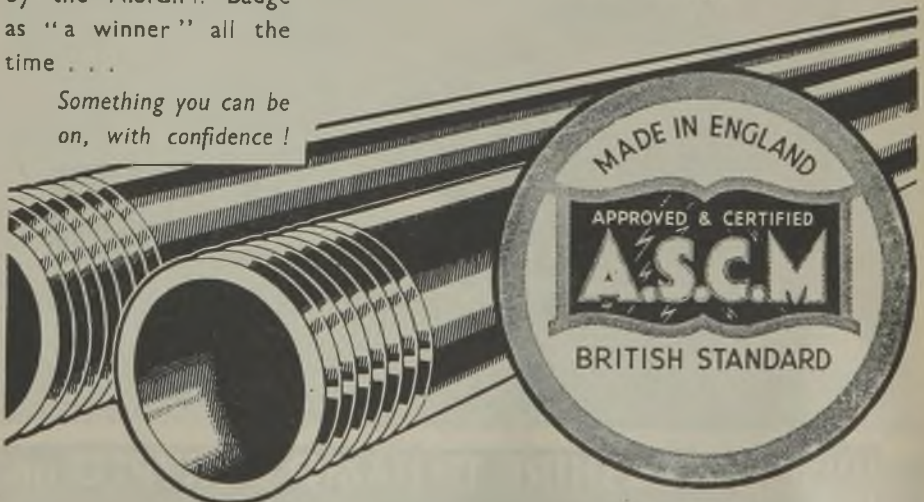
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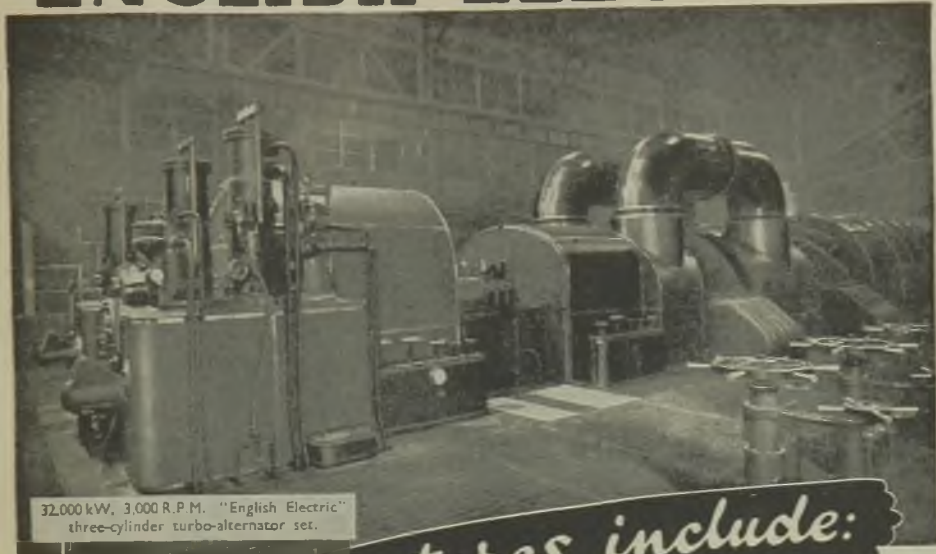
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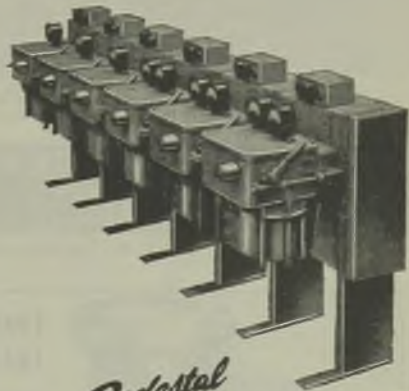
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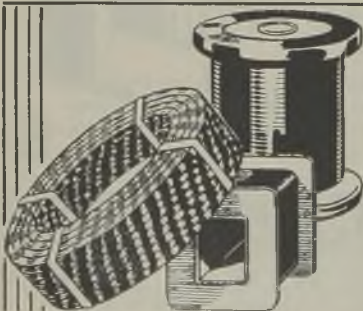


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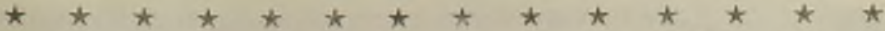
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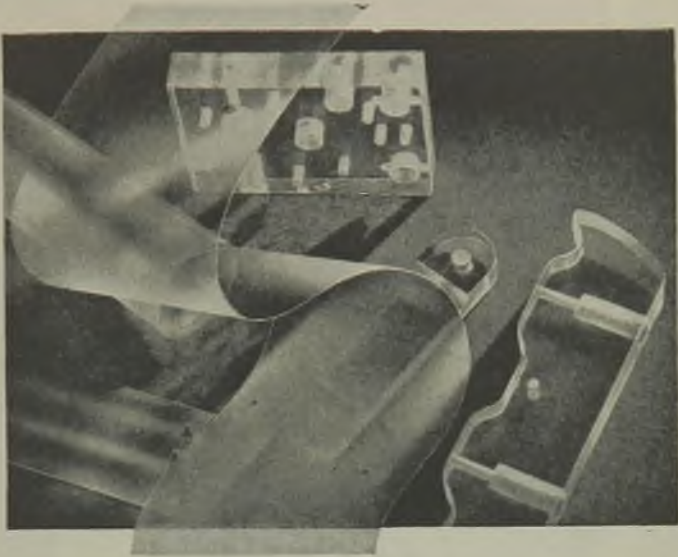
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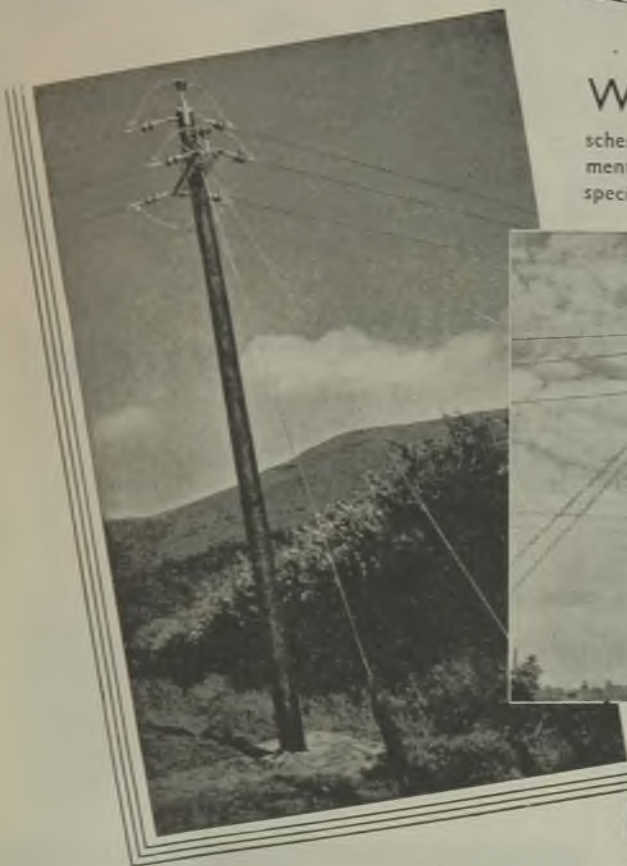
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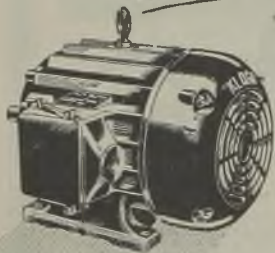
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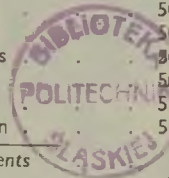
September 27, 1946

Managing Editor :
Hugh S. Pocock, M.I.E.E.

Technical Editor : Commercial Editor :
C. O. Brettelle, M.I.E.E. J. H. Cosens

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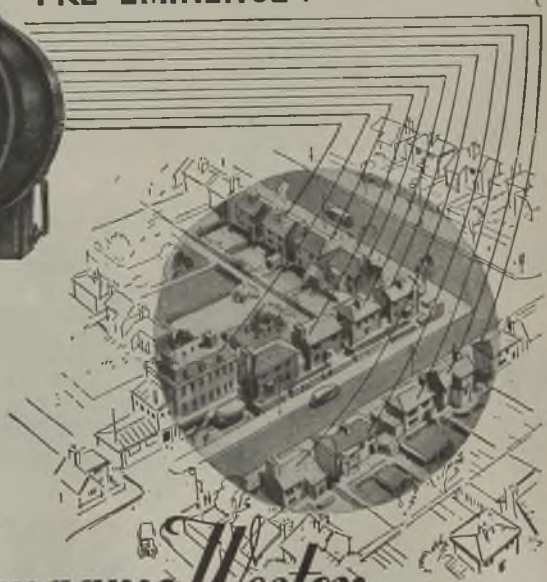
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ELECTRICAL REVIEW

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Coal and Plant

Prospects for Electricity Supply



IT is a galling thought that electricity has been checked (though not stopped) in its rapid upward flight by a series of external adverse influences. Admitted to be essential in war and no less vital in recovery from war's effects it is curbed by the very shortages which itself it should be able to relieve. It is in a vortex—a vicious diminishing circle. Recent recriminations have not cleared up the situation nor given a gleam of hope. Indeed they have merely confused the issue by failing to allot responsibility in the right quarters.

Stocks and Quality

Coal and plant shortages are the dominating factors. From all over the country we hear of dangerously diminished coal stocks. The Ministry of Fuel and Power last week gave the average stock for the whole country as equivalent to 3.2 weeks' usage. Yet some of the more important undertakings complain that they have only two weeks' supply or less. While some power stations may have had to slack off to avoid the total disappearance of their coal piles it is true to say that none has yet had to shut down. Supplies may have been on a hand-to-mouth basis but at least the undertakings have been fed. It now appears that special arrangements have been made by the Ministry to assure these supplies.

But if sufficient quantities are being just maintained there is little improvement in quality and that is where much trouble lies. Supply authorities do not insist on best coal, desirable though it may be, but they do want consistency. They

cannot expect their boiler houses to adapt themselves to fuel which varies from ton to ton. In this matter the Ministry could help to conserve generating capacity.

As regards plant, the position has been aggravated during the past week or two by the unseasonable weather during a period in which it is usually safe to have plant out of service for overhaul. The cuts in supply last week were due to this, not to coal shortage. The Central Electricity Board has had to make the decisions but the odium has fallen upon the local suppliers. This is unfortunate but the individual undertakings should try to envisage what their position would have been but for the grid.

No Immediate Relief

What are the prospects for improvement, and unrestricted electrical development? So far as coal is concerned the outlook is not promising. We can only hope that the National Coal Board will succeed where the private coal-owners have failed—but it will find itself up against the same problems. The plant shortage will be relieved by the extensions and new stations now in hand to catch up with wartime arrears but the relief cannot be immediate. It may be possible to speed up construction and amid the scramble for "priorities" surely power supply should stand well towards the head of the queue. Those responsible must realize how much home and export industrial production and national well-being are dependent upon electricity and act accordingly.

Electricity Cuts THE general warning given by the Central Electricity Board, which we referred to a fortnight ago, regarding the possibility of interruptions in supply has unhappily been justified by the event. The cut on September 18th, which was necessary to prevent the frequency from falling below the critical 48 cycles per sec, occurred within the period specified, viz., 11 a.m. to 1 p.m. Weather forecasts for several hours ahead cannot yet be relied on as a basis for broadcasts that would infallibly indicate impending trouble. The temperature at the time was 10 deg. below what it was on the same day last year.

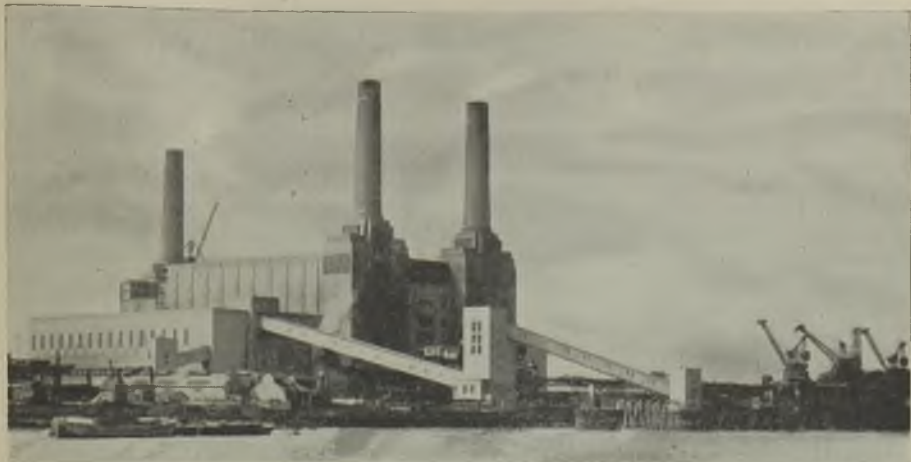
Final Abandonment? WHEN at the beginning of the war the Government put forward a scheme for the rationing of fuel, including electricity, we expressed doubt as to the practicability of such a plan. Millions of forms were printed but the whole thing was quietly dropped in favour of appeals for economy. There was a revival of the idea in 1942 when Sir William Beveridge produced an elaborate scheme at the Government's request. This was just about as workable as the earlier one and went the same way. Now, we are glad to see, Mr. Shinwell has described a suggestion that electricity rationing might be introduced as "a lot of nonsense." This seems to signify the end of attempts to achieve the impossible.

Institution Activities NEXT week sees the opening of the new session of the Institution of Electrical Engineers with the presidential address on Thursday of Mr. V. Z. de Ferranti. The rest of October will be given over mainly to the inaugural addresses of the chairman of the four sections. The programme for the first half of the session (ending with January) allows eight evenings for generation and transmission matters, including protective equipment, and four for industrial applications of electricity—a ratio that will no doubt tend to be reduced in future years. Measurements will be discussed on two evenings and education at an informal meeting. Telecommunications provide another theme. The diversity of subjects grouped as radio is revealed in the subjects of papers on seven evenings.

Isolated Farms PROPOSALS to spend £72 million on providing electricity for 150,000 farm holdings within five years are to be discussed to-day between the electricity supply authorities and the National Farmers' Union. The sum mentioned is equivalent to nearly a quarter of the total expenditure on distribution to all pre-war consumers, and most of it will presumably be borne by the power companies. The cost of connecting each consumer, about fourteen times the present average, would no doubt be reduced considerably by other connections on the way. High "priorities" in labour and material are expected; the latter should include imported poles. The adoption of the new B.S. 1320, described by us on August 23rd, should expedite the work considerably.

Rubber-Insulated Cables OUR recent extracts from the "Rubber Statistical Bulletin" have made it clear that supplies of natural rubber have been increasing at a very satisfactory rate during the past year. The United Kingdom cable industry consumed during the first half of this year 2,125 tons of natural rubber and 2,260 tons of synthetic as compared with 1,983 tons and 4,090 tons, respectively, during the whole of 1945. It is not surprising therefore to learn from the Cable Makers' Association that its members have gradually "enriched" their rubber insulation with the natural product until cables are now nearly back to the pre-war standard. As from October 1st cables will be marketed in which no restriction has been placed on the use of natural rubber.

Surplus Emergency Plant READERS may recall that in our issue of January 11th last we published an account of the establishment and operation of the national pool of electrical plant under the auspices of the Central Electricity Board and mentioned that the Board was inviting offers from electricity supply authorities for the plant. In this issue the Board is advertising the sale of the equipment which remains, including a number of transformers ranging from 10 to 20 MVA, 11-kV switchgear, cables and sealing ends. When we inspected the plant it was in first-class condition; the arrangements for maintenance were excellent.



Buildings for the new section (left) were envisaged at the outset and symmetry has been maintained

WHILE so much of the original Battersea Power Station of the London Power Co., Ltd., such as the river works, circulating-water system and the coal-handling plant, is so essentially part and parcel of the now partly commissioned "B" station as to make it merely an extension, the vastly different steaming and operating conditions suggest its classification as a new station. But whichever view is taken the establishment of Battersea "B" represents one of the largest generating-station developments during the war years, and we have long looked forward to the opportunity of publishing this illustrated description which has been prevented first by wartime censorship and later by the plant-protecting structures which defied the camera but are now happily removed.

It will be recalled that the original design adopted for Battersea aimed at a total capacity of between 400,000 and 500,000 kW. With the first instalment of the "B" station, the 100,000-kW e.h.p. cross-compound turbo-alternator and its associated boiler plant, which were completed and commissioned during the war, the total capacity of both stations is 343,000 kW.

The further 60,000-kW e.h.p. extension which is now in the very early constructional stage will still leave a space for another

extension of up to 100,000-kW capacity.

The complete 15-acre site east of the Southern Railway bridge leading to Victoria station has a river frontage of nearly 700 ft at the north, and the buildings for both "A" and "B" stations run normally to the river frontage, the north ends of the buildings being about 300 ft from the river wall.

Whereas from west to east the main buildings of station "A" are disposed in the order switch-house, turbine house and boiler house, this order is reversed

Battersea "B"

100,000-kW Turbo-Alternator and E.H.P. Boilers

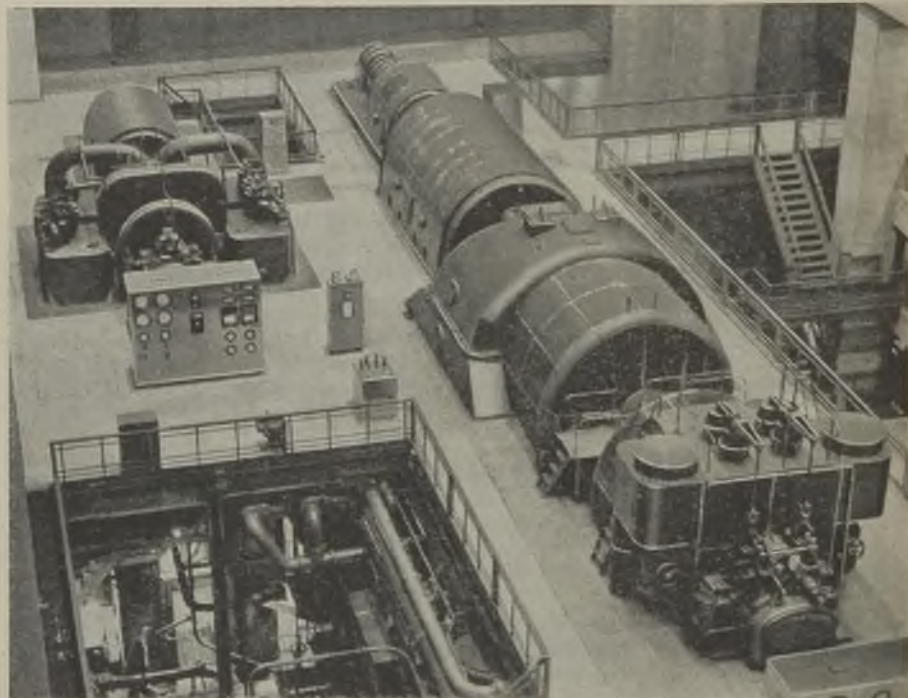
for station "B," the boiler house being on the west side and the new switch-house on the east side. With the removal of the temporary eastern wall of the station "A" boiler house, the complete boiler installations will be under one roof and in two parallel lines. The first part of station "B" is at the north or river end, and it embraces the third of the four chimneys envisaged for the completed "A" and "B" stations at the north-east corner of the dual boiler house. Like the others this chimney is 337 ft high and has a maximum internal diameter of 28 ft.

The buildings which house the station "B" plant were envisaged before the construction of the original station, and in consequence the symmetry of the buildings has been maintained. This explains the central firing aisle which is common to, and

is the axis of, the two boiler installations.

The Battersea "B" turbine hall is a structure of simple dignity achieved by the employment of effective architectural and decorative treatment and carefully planned ceiling lighting. As far as it is at present developed, from the north end and mainly for housing the cross-compound turbo-alternator set, it is about 300 ft long and 80 ft wide, excluding the side aisles. The new section of the boiler house, which is 105 ft wide and 150 ft high, has been developed

240-tons-per-hour travelling grab cranes on the jetty deliver the coal from the steamers to two belt conveyors disposed along the 426-ft length of the jetty. From these it is transferred to another pair of conveyors which cross the barge berth between the jetty and the river wall. From a control and weighing tower at the delivery end of the cross conveyors the coal may be carried via a junction tower to the boiler-house bunkers or to a reversible conveyor running alongside the 75,000-ton coal store between the river



E. h. p. section (left) of the 100,000-kW turbo-alternator set comprising a back-pressure turbine driving a 16,000-kW alternator ; the lower pressure section (right) is a condensing turbine driving a 78,000-kW main alternator and a 6,000-kW house alternator

to about the same extent, but both the turbine and boiler houses are about to be further lengthened to accommodate the 60,000-kW extension.

The major coal-handling and storage scheme is common to both "A" and "B" stations, and the "B" station is served by new spurs from the main conveyor system. For dealing with the water-borne coal there is a concrete jetty, parallel to and about 50 ft from the river wall, at which the company's colliers discharge their loads. Three

wall and the north end of the station buildings. Spanning the coal store is a travelling transporter which is equipped with upper and lower cross conveyors and two grab cranes.

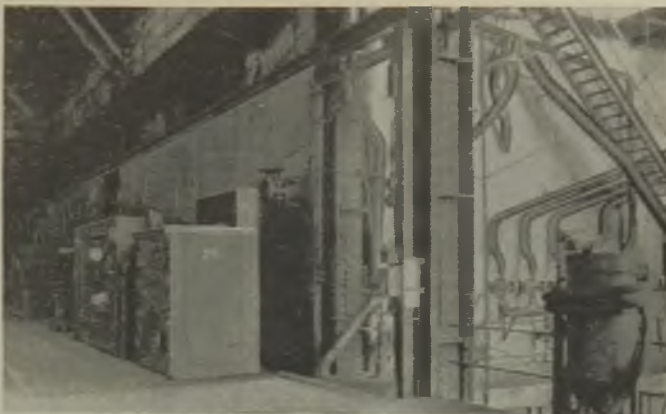
Thus coal can be readily transferred from the reversible conveyor to the store, from the store to the bunkers, or into railway wagons on a track alongside the river wall for transit to other stations of the company. Rail-borne coal is received by wagon tippers on the east side of the site and conveyed first to the junction tower and thence by the other

parts of the system already referred to. Railway tracks encircle the whole generating station site and serve for the marshalling of wagons, including the meeting of ash-removal requirements.

The initial boiler installation in Battersea "B" comprises two e.h.p. boilers, each having a nominal rating of 440,000 lb per hour and generating steam at 1,420 lb per sq in. and 965 deg F from water fed to the economizer at 400 deg

F. Each of the boilers, which were supplied by Babcock & Wilcox, Ltd., has a radiation chamber of straight tubes, followed by a Stirling convection section which has three drums. They are retort stoker fired, each being equipped with twenty Taylor retorts, the coals consumed being mainly Welsh coal and Durham and Northumberland soft coals—often burnt as a mixture.

For boosting the stoker firing to the extent of 20 per cent of the normal rate, however, each boiler is equipped for pulverized-fuel firing by burners situated about half-way up the combustion chambers. The pulverized fuel is provided by two small "Attritor" mills housed, with the associated fans, etc., in the ash basement. The grate surface of

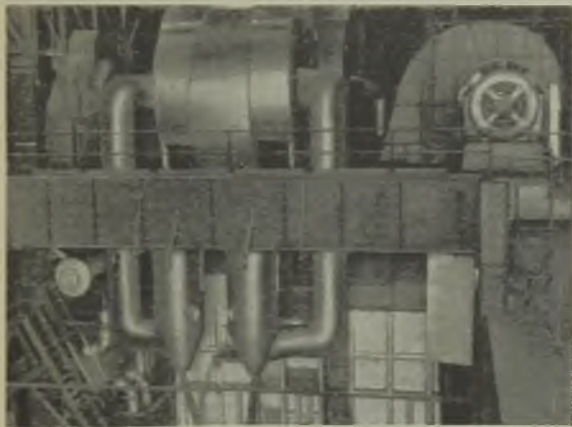


Control of each boiler is from a central desk-type panel; note pulverized fuel booster inlet to burner top right

each boiler is 918 sq ft, and the combustion chamber volume is 31,800 cu ft. The chamber has Bailey walls which present a surface of 4,737 sq ft to the fire, and the entire heating surface of the boiler is 18,603 sq ft.

The B. & W. hair-pin loop-type economizer is integral with the boiler and has a heating surface of 20,713 sq ft. There are two Howden regenerative air heaters to each boiler, situated above the uptake and down-take drums and at about 113 ft O.D., and they have a combined heating surface of 170,000 sq ft. The superheater is located between the radiation and convection sections of the boiler, at about 80 ft O.D., and it consists of a primary and a secondary sections, equipped with spray attenuators for the control of the superheat arranged between the two portions. The total heating surface of both sections is 14,540 sq ft. The control of the superheat may be effected manually or automatically, and gas by-pass dampers are fitted to assist in obtaining a constant final steam temperature.

Each boiler is served by duplicate forced-draught, induced-draught and secondary-air fans, all Howden, the i.d. and f.d. fans being driven by two-speed motors, and the secondary fans by single-speed motors. They also have vane control actuated through Tate control equipment. The secondary-air fans are located at about 34



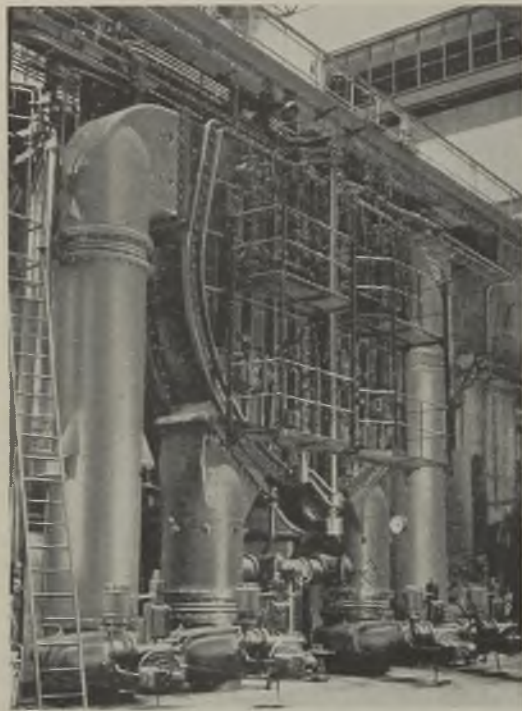
F.d. and i.d. fans, at the 134-ft O.D. level, are two-speed motor driven and vane controlled

O.D., at the stoker-driving end of the boiler, and the f.d. and i.d. fans are situated at

there will be gas washing at Battersea "B," as is the case in the "A" station. Instead the gases will be passed first through a very large scrubbing chamber which occupies a position to the left of the first boiler unit. From this scrubber the gases will pass to the north-east chimney tower for the final gas washing and alkali spraying. The conditioned gases will then pass on to the north-east chimney, a replica of the two station "A" chimneys.

The 100,000-kW turbo-alternator set, by the Metropolitan Vickers Electrical Co., Ltd., is a cross-compound equipment with its two sections on separate axes. The e.h.p. section is a single-cylinder back-pressure turbine directly coupled to a 16,000-kW alternator and running at 3,000-r.p.m. The h.p. section comprises a two-cylinder condensing turbine driving a main 78,000-kW alternator and a 6,000-kW "house" alternator in tandem at 1,500 r.p.m.

The normal method of operation of the equipment is to supply e.h.p. steam to the 16,000-kW machine and to pass the exhaust from this, at about 600 lb per sq in., directly to the 84,000-kW machine. Arrangements have been made, however,



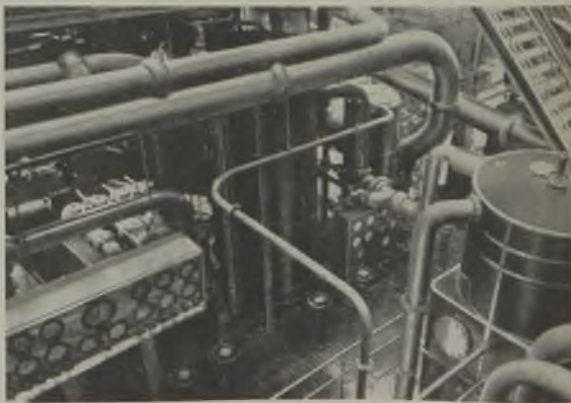
Single unit condenser with divided water head for on-load cleaning

about 134 ft O.D., above the air heaters.

Each boiler is fitted with a very comprehensive system of Hopkinson operated soot blowers which may be actuated either manually by push-button control or in automatic sequence. An exhauster plant provides for the removal of dust from the various passes of the plant. Ash from the stokers is passed through crusher rolls and is then carried away by a sluice system to a collection pit for reclamation by plant serving both stations. Each boiler is controlled manually but remotely from its own desk-type panels at the firing-floor level.

Waste gases from the boiler units are led into the first portion of a dry flue which will ultimately traverse the entire length of the station. Although

to run the h.p. machine with steam taken direct from the station "A" boilers at 600 lb per sq in. and 850 deg F, or from the



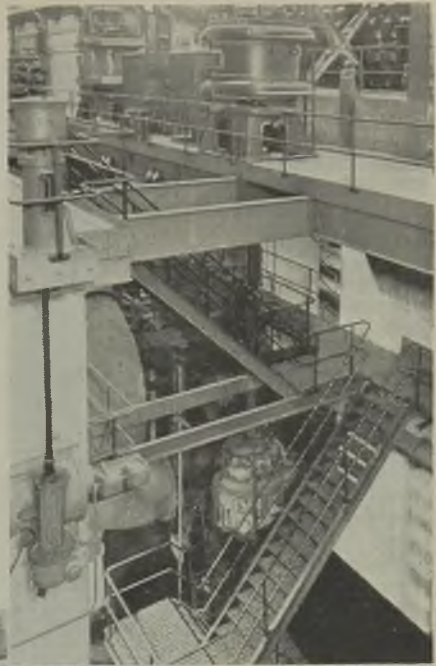
Left to right: Air extractors, No. 1 i.p. feed heater, gland steam condenser, de-aerator

station "B" boilers at 1,420 lb per sq in. via reducing and de-superheating equipment. These alternative methods of steam supply can be employed at times when the e.h.p. machine is out of commission for inspection, maintenance, etc.

The 16,000-kW impulse turbine has twelve stages, the maximum blading diameter being 26.375 in. The stop-valve steam conditions are 1,350 lb per sq in. and 950 deg F, while the exhaust conditions at the economical rating are 615 lb per sq in. and about 767 deg F. The two-cylinder turbine, also an impulse machine, has twenty-six stages in the h.p. cylinder and seventeen in the l.p. cylinder, with a maximum blade diameter of 135 in. In the larger turbine the steam expands to a condenser vacuum of 29.1 in. Hg. The condensate is heated regeneratively to a temperature of 400 deg F, there being six stages of feed-water heating. All the bled steam is taken from tapping points on the two cylinders of the lower-pressure set.

The plant which is arranged on a closed-feed system, is complete with air extractors, an evaporator, gland steam condensers, drain coolers, etc., and one of the feed heaters is of the de-aerating type by which the oxygen content of the condensate is reduced to the lowest possible figure. The earlier sets in station "A" whilst also arranged on a closed-feed system were not equipped with de-aerators as well; the addition has been occasioned by the adoption of extra high pressure steam at Battersea "B."

The Richardsons Westgarth condenser is unusually large, weighing about 180 tons and having a cooling surface of about 70,000 sq ft over a total of 10,300 tubes which are 26 ft long. The condenser is a single unit with a divided water head for on-load cleaning. The circulating water is handled by two vertical 525-HP motor-driven Drysdale pumps, each having a capacity of 2,000,000 gallons per hour under a head of 40 ft. They



Above: Vertical 525-H.P. motor-driven pumps for circulating water. Left: Five feed pumps—four motor- and one steam-driven—in line in the western aisle or mechanical annexe

discharge through Deptford - type rotary strainers. The water is taken from the river at an intake at the east end of the jetty, which is entirely separate from the station "A" intake.

It is returned via culverts to the river at the far side to avoid possible re-circulation at low water. Electrically operated penstocks are installed at the inlet and outlet ends of the culverts to permit examination of the chambers. The circulating water is chlorinated on the intermittent system, injection taking place at the condenser inlet.

There are three boiler feed pumping units comprising a total of five pumps, four motor-driven and one steam-turbine driven—all in

line in the western aisle or mechanical annex of the turbine hall. The motor-driven pumping units are arranged in pairs consisting of one h.p. and one e.h.p. pump in series, but separately driven. The h.p. pumps can run in parallel with the "A" station feed pumps and can be operated alone when the 84,000-kW secondary set is being run by steam from the h.p. boilers in the "A" station if the e.h.p. boilers and the 16,000-kW primary set are out of service. The steam-driven pump is a two-speed unit, the low speed being used for h.p. working and the high speed for e.h.p. working.

Both the main alternators generate at 11 kV, and they each have main and pilot exciters on the main shaft. There is a separate motor-driven stand-by exciter. Both alternators are tied to 111-kV/66-kV transformers, so that all the main switching is effected at the transmission voltage of 66 kV. Both these "generation" transformers are Ferranti products. The larger one associated with the 78,000-kW alternator is rated at 87,000 kW and is cooled by forced oil circulation, with water cooling of the oil. The other transformer, for the 16,000-kW alternator, is rated at 18,000 kW and is self cooled. Both transformers are connected delta/star, and are housed in open-fronted cubicles on the ground floor of the 66-kV switch-house.

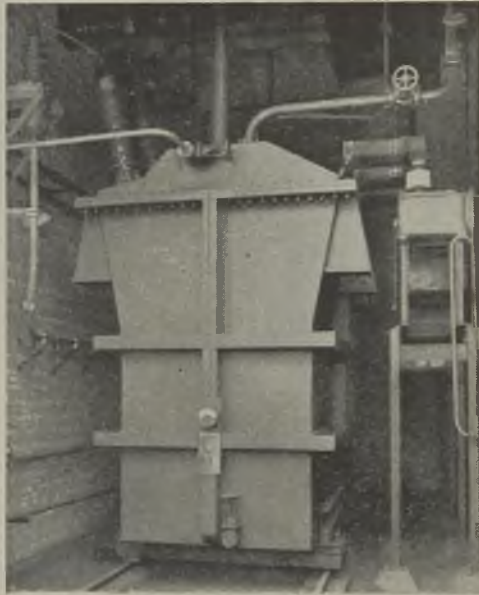
The main switchgear (Metrovick) is metal-enclosed double-busbar equipment with single-break circuit breakers rated to deal with 1.5 million kVA. It is representative of the modern small-oil-content circuit breaker, as distinct from the 66-kV switchgear in station "A" in which the circuit breakers are rated at one million kVA and contain very much larger quantities of oil. The layout of the new switchgear is very much more

comprehensive. There is, by comparison with older standards, a very large measure of physical separation between the duplicate bus-bars and the circuit breakers associated with them. Sectionalization by means of fire barriers is also thorough, and the whole assembly is protected against the spread of fire by the "Mulsifyre" system. Some of the 66-kV interconnectors between the two stations employ Callender's gas-pressure cables; the installation of these was a very early application of the development and has since proved successful.

The 6,000-kW alternator for supplying the auxiliaries generates at 3.3 kV and is directly connected to the house service switchgear. The station power system employs two voltages—3.3 kV and 400 V. In general motors above 150 H.P. operate at 3.3 kV, while the others are supplied from the 400-V system which is fed from step-down transformers. Broadly the auxiliaries are supplied half from the house service set and half from the house service transformers which are fed from the 66-kV bus-bars.

Squirrel-cage motors are very extensively used for driving the auxiliaries, but some notable exceptions to this scheme are the slip-ring machines driving the boiler feed pumps and the circulating-water pumps. D.C. at 230 V is provided from motor converters for the cranes, circuit-breaker operating gear, emergency lighting, etc., and there is a battery as a stand-by to the motor converters.

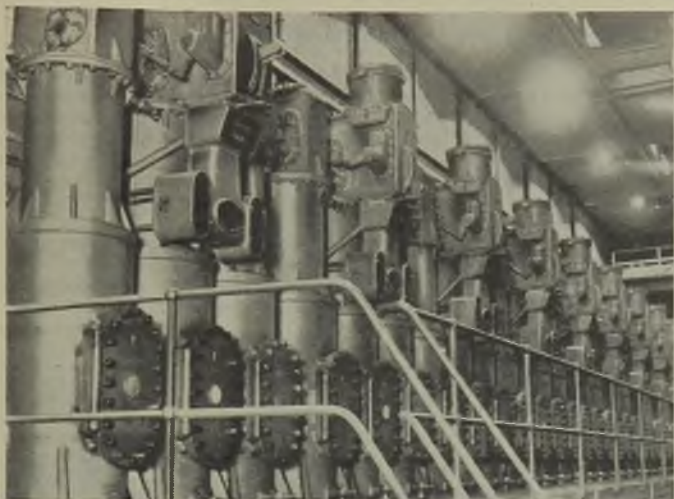
The main plant is normally governed from the existing main control room in station "A," but during the construction of station "B" the opportunity was taken to install an emergency control room which overlooks the turbine hall from the north end. It has thus been made possible in a time of emergency



18,000-kW delta/star transformer connected to 16,000-kW alternator

completely to shut down the normal control room and to exercise control of both the

been published, it is appropriate to repeat them in what we believe is the first illustrated



The 66-kV switchgear is representative of the modern small-oil-content circuit-breaker development

description of station "B" as a whole to be published. During a recent week the thermal efficiency figure for the e.h.p. section of the plant was 31.5 per cent on the basis of kWh generated, while the corresponding figure for the overall operation of both stations was 29.9 per cent.

The station was erected to the design and under the supervision of Sir Leonard Pearce, C. B. E., D. S. C., M. Inst. C. E., M. I. E. E., M. I. Mech. E., engineer-in-chief and chief executive officer of the London Power Co.,

stations from the emergency control room. Although the following figures have already

Ltd., to whom we are indebted for permission to visit the station and to publish this article.

Commercial Air Transport

THE Institute of Export has set up an Air Carriage Research Committee to consider aviation questions so that exporters may be kept informed of the possibilities of this mode of transport and the opportunities which it affords in relation to overseas trade. In connection with this subject the Institute has published, as one of its books for students, "Civil Aviation and the Export Trade" by S/Ldr. Norman J. Freeman. In a foreword the president of the Institute (Mr. Leslic Gamage) describes air transport as "potentially the most important medium for the invigoration of British export trade."

The book briefly reviews the history of air travel and the stages of development of civil aviation. In dealing with future prospects some idea of the operating costs and probable charges is given. The author is very optimistic with regard to future passenger fares but appears to share the American view that for some years yet it will be possible to employ air transport for two classes of goods only—those which have a high ratio of value to weight and those for which speed of transport is of extreme importance and where the expense is a secondary consideration.

There are, however, other considerations which will often make air carriage worth while—the inaccessibility of some places to other methods

of transport, the saving of interest on capital locked up in goods, and so forth.

A great deal of information is given regarding the organization and services of British and foreign air lines, on insurance and on the legal aspects of air carriage, including appendices on these matters. The book is published at 6s. 6d., and is obtainable from the Institute, Royal Empire Society Building, Northumberland Avenue, W.C.2.

Post Office Engineers

ORDINARY meetings for the first half of the session of the Institution of Post Office Electrical Engineers (London Centre) are to be held at the Institution of Electrical Engineers, Savoy Place, on Monday, October 7th, "Piezo-Electric Quartz and its use in Telecommunications" by C. F. Booth and J. L. Creighton; and Tuesday, November 12, "Economic Telephone Exchange Area Planning," by H. T. A. Sharpe.

Informal meetings are to be held in Faraday Building (South Block), Knighttrider Street, the subjects being "Buildings for Telecommunications," by J. Eccles and "The Circuit Laboratory in Wartime," by C. H. Wright, on Wednesday, October 23rd, and Monday, December 9th, respectively.

Views on the News

Reflections on Current Topics

THE other evening I went to see "The Way We Live," the film dealing with the reconstruction of Plymouth, and was gratified to find that the audience appreciated such a departure from the type of programme usually provided. One sequence shows the Plymouth City Council in session discussing the rebuilding of the city and I think I caught a swift glimpse of Mr. H. Midgley, the city electrical engineer, as the camera swept round the chamber. It reminded me of Mr. Midgley's article in the *Electrical Review* about two years ago in which he put forward his proposals for an entirely new distribution system to fit into the reconstruction plan. In view of the importance of electricity in any scheme of this kind, it is a pity that the film contains little or no reference to the electrical aspect.

* * *

Those, who like myself, have had their holidays ruined by rain (and who hasn't) may perhaps derive some comfort from reports of better conditions in those countries which derive their power from water, as the result of the wet weather. In Eire the Shannon, which in recent years has been very low at times, is in spate and Irish consumers are promised a removal of restrictions upon their supply of electricity. The French, too, are hoping that as a result of the filling of their hydro-electric reservoirs they will have more electricity during the coming winter. Deliveries of coal to French steam stations have also improved, I am told; I wish the same could be said of this country.

* * *

Not often is the opportunity taken by electricity supply undertakings to link up their publicity with local events. Passing through Slough a few days ago I was particularly interested to notice how the Slough & Datchet Electric Supply Co., Ltd., has "cashed in" on the showing of the film, "Caesar and Cleopatra." Accompanying posters and "stills" advertising the film are the legends: "Caesar Golden Opportunity: Change to Electricity;" and "He's Gladiator Meal Cooked by Electricity." I feel bound to say that only the enterprise justifies such puns.

* * *

Another Lancashire undertaking (Bury was the last) is in difficulties over the filling of the post of borough electrical engineer. Bolton Corporation has advertised the position at a salary of £1,600, whereas the A.M.E.E.-E.P.E.A. Joint Committee says that the figure should be £1,917, rising to

£2,255, and has "banned" the post. Last week the chairman of the Bolton Electricity Committee said that the Corporation was not a party to any national agreement on salaries, but he rightly said:—"If we want to attract men capable of managing competently a £3,000,000 undertaking we shall have to pay the full scale."

I am surprised to see that the Secretary of the Bolton Labour Party suggests an effort to "break this ring" by advertising the vacancy throughout the Empire.

* * *

Following Fulham's lead, the Islington Electricity Department is to undertake the sale and servicing of radio sets; other London boroughs are also in the scheme. It is proposed to market in the first place a "Civic Concord" 5-valve superhet. receiver with an 8-in. speaker in a polished veneered-wood cabinet. Later the undertaking will introduce a cheaper set and it is also investigating the possibility of selling a television set. The sales will be outright or by instalments. The repair service will not be confined to the sets sold by the Department. This type of business is a considerable advance on that visualized in Clause 48 of the 1919 Electricity (Supply) Act, but of course broadcasting was a later development. The "trade" will protest but, I am afraid, with little effect.

* * *

From a glance through the American journals it would appear that everyone on the other side of the Atlantic is clamouring for electric door chimes. Also, the few models that have appeared on the British market have been well received. Though I personally find that they get on my nerves after a time, chimes are certainly more melodious than bells. Not satisfied on this score alone, however, the designers of the latest American model have combined it with a kitchen clock "to chime softly and sweetly, twice for front-door callers, once for those at the rear."

* * *

According to the *Evening News*, passengers on a certain London bus service (why just this one?) have complained of shocks from the handrail when boarding the vehicle. The reason given by a London Transport "official" is the compulsory wartime use of synthetic rubber tyres. "Now that natural rubber—with its better insulation—is becoming available the shocks should end." Or should they?—REFLECTOR.

Overseas Electrical Trade

August Electrical Exports Maintained

HOLIDAYS invariably have an adverse effect upon exports in August and last month the total shipments from this country fell by over 14 per cent as compared with July. Electrical exports declined by something under 12 per cent. Against the August, 1945, figure, however, there was a rise in the total of about 92 per cent, while electrical exports were about 18 per cent up. This discrepancy is explained by the fact that

average was £1.8 million and the August total £4.2 million—an advance of 133 per cent.

Inspection of the analysis of electrical exports in Table I shows that the increase of £780,997 as compared with August last year was due entirely to greater shipments in the "goods and apparatus" section; in fact exports of machinery registered a heavy decline—from £2,090,724 to £808,802,

TABLE I.—ELECTRICAL EXPORTS AND IMPORTS

Class	Exports			Imports		
	August, 1946	August, 1945	Monthly Av., 1938	August, 1946	August, 1945	Monthly Av., 1938
	£	£	£	£	£	£
Telegraph and telephone wires and cables, submarine	20,867	—	17,289			
Ditto, not submarine	280,446	97,471	71,803			
Wires and cables, other than telephone and telegraph, rubber insulated	236,737	129,749	117,533	1,808	35,243	31,246
Ditto, insulation other than rubber	343,308	122,219	153,256			
Radio apparatus	614,399	103,421	149,593	686,771	1,594,282	75,160
Telegraph and telephone apparatus other than radio	536,934	375,766	242,716	2,750	13,742	9,243
Electric carbons, furnace	*	*	*	2,238	208	4,054
Other electric carbons	*	*	*	3,401	19,768	2,301
Electric lamps	92,088	77,422	49,440	1,518	567	10,265
Other lighting apparatus	186,684	46,365	48,565	1,347	37,962	38,662
Primary batteries	49,916	19,086	13,572	423	10,599	3,549
Accumulators, portable	152,155	29,794	28,874	*	*	*
Ditto, stationary	27,785	2,141	19,773	*	*	*
Ditto, parts and accessories	32,338	25,027	*	*	*	*
Electric cooking and heating apparatus	120,528	51,973	30,664	*	*	*
Commercial electrical instruments, including ammeters, voltmeters, etc., and parts	43,543	52,937	15,878			
House service meters	34,219	9,975	15,791	6,348	18,987	32,057
Other electrical instruments	42,123	10,452	9,612	*	*	*
X-ray apparatus, vacuum tubes and parts	18,181	16,337	4,881	4,238	16,612	9,734
Insulating materials, not elsewhere specified	106,243	32,044	19,343	*	*	*
Unclassified electrical goods and apparatus	336,319	148,474	110,615	14,869	382,719	42,630
Generators, complete, up to 200 kW	53,629	235,720	38,071	*	*	*
Ditto, over 200 kW	73,090	120,082	119,079	*	*	*
Ditto, parts	22,582	—	*	*	*	*
Motors	220,440	161,332	145,045	7,167	14,763	26,033
Convertors and transformers	174,740	208,137	101,304	*	*	*
Rectifiers for power-house use	3,647	6,431	3,463	*	*	*
Motor starting and controlling gear	79,507	28,907	50,866	*	*	*
Switchgear and switchboards other than telegraph or telephone	168,465	350,602	184,533	*	*	*
Other electrical machinery	12,702	979,513	15,497	11,467	239,608	14,455
Electric vacuum cleaners	98,721	1,333	26,662	109	18	7,519
Other electrically-operated portable appliances	47,820	6,449	10,394	2,373	4,170	17,108
Total	4,230,156	3,449,159	1,814,112	746,827	2,389,248	324,016

* Not classified separately.

electrical exports recovered more rapidly after the war than those of most other classes of goods and a fairer comparison is with pre-war figures. The monthly average for all classes in 1938 was £44.4 million and the August total was £82.4 million—an increase of 86 per cent. For electrical goods, apparatus and machinery the 1938 monthly

because of the cessation of supplies to Russia. These supplies were valued at £1,647,665 in August, 1945. Australia's purchases of machinery also fell considerably but most other customers increased their demands, notably South Africa and India; a specified "foreign countries" also made a better showing. It should be mentioned

that exports of electric motors were actually greater in spite of the general decline.

Reverting to Table I, it will be seen that, apart from the cable class, the items showing the greatest advances were radio apparatus and telegraph and telephone apparatus which together accounted for over a quarter of the total exports. In this case, too, South Africa and India were the chief individual

took more cables with insulation other than rubber, but apart from this the Commonwealth's purchases were much lower. Argentina's share showed a substantial advance.

Table II sets out the details of purchasers of electrical goods and apparatus (not machinery). It shows that South Africa was easily our most important customer with India second; the two together were responsible for well over a quarter of the total exports. Australia, our principal market in pre-war days, has advanced insufficiently to catch up with the increased cost and the volume of her purchases in August was below the 1938 average.

As regards non-Empire countries, the most noticeable features are the total cessation of supplies to Russia and the substantial rises in purchases by France, Belgium, Spain, Argentina, and indeed most other foreign countries with the exception of Iran and Iraq.

Imports of electrical goods were again considerably reduced although the value was still above the pre-war monthly average. The greatest individual reduction was in the case of radio equipment.

As a general measure of the progress made in electrical export trade it may be stated that for the first eight months of the year the total exports of the classes shown in Table I had a value of £31,489,366. This compares with £17,391,438 in the first eight months of 1945 and with £14,512,930 as two-thirds of the 1938 total.

TABLE II.—DISTRIBUTION OF EXPORTS OF ELECTRICAL GOODS AND APPARATUS

Destination	August, 1946	August, 1945	Monthly Av., 1938
	£	£	£
Eire	91,406	37,856	37,562
Channel Islands	33,678	15,316	11,965
Palestine	45,362	898	8,371
British West Africa	37,162	37,379	12,864
Union of South Africa	554,585	236,428	157,602
Southern Rhodesia	37,593	18,752	9,574
British East Africa	56,857	8,483	7,830
British India	426,118	157,338	122,928
British Malaya	63,033	—	32,280
Ceylon	28,882	8,704	14,931
Hong Kong	45,526	—	12,874
Australia	227,619	238,078	196,823
New Zealand	133,329	71,839	95,851
Canada	16,146	25,556	12,482
British West Indies	24,007	3,721	12,887
Other British Countries	73,109	18,398	26,336
Soviet Union	—	271,574	36,780
Finland	20,439	—	5,824
Sweden	18,366	11,175	13,735
Norway	66,335	360	12,582
Denmark	83,150	—	18,282
Poland	12,559	1,006	9,626
Netherlands	74,998	833	20,190
Belgium	124,549	642	10,874
France	164,124	1,592	15,674
French West and Equatorial Africa	6,016	1,706	400
Switzerland	19,798	1,184	3,572
Portugal	72,070	48,852	6,498
Portuguese East Africa	5,570	2,000	6,924
Spain	82,678	917	3,808
Italy	71	357	5,659
Czechoslovakia	19,051	—	7,205
Yugoslavia	44,120	36	1,471
Greece	14,339	903	4,888
Roumania	—	—	13,350
Turkey	38,367	299	7,633
Egypt	48,454	11,520	12,872
Iraq	1,010	7,654	5,456
Iran	6,230	33,750	16,330
China	44,481	11,439	4,042
United States of America	13,903	9,777	5,546
Chile	9,996	410	6,635
Brazil	34,997	5,575	11,123
Argentine Republic	79,749	3,609	45,387
Other Foreign Countries	234,981	44,737	33,672
Total	3,274,813	1,350,653	1,119,200

markets although the collective "other foreign countries" took the largest share and manifested the greatest advance. The highest proportional increases appear to have occurred in the cases of vacuum cleaners and other electrically-operated portable appliances.

For all classes of cable, India and South Africa were the leading customers. Australia

Britain's Trade Opportunities

ADDRESSING a meeting of members of the Engineering Industries Association in London last week, Sir Frank Smith, chairman of the Ministry of Supply Scientific Advisory Council, said that the electrical industry was doing good business in the export market. We were selling brains, for our electrical goods were being improved continually both in quality and in novelty, e.g. huge turbo-generators, television, and radar equipment and immense switch control gear. In future many of the goods we exported must be made on mass production lines or we could not compete with other countries which did so produce. Indeed, there must be some bigger industrial units in this country—units like I.C.I., E.M.I., Levers and the G.E.C., if we were going to compete successfully in many markets. We must be able to pay good wages and at the same time produce goods which were comparatively cheap and of excellent quality. Could anyone suggest how this could be done without some reduction of labour by improved machinery, with extensive instrumentation and quantity production by big units?

Improved Appliance Design

Examples in the "Britain Can Make It" Exhibition

THE great amount of thought and attention that British electrical appliance manufacturers have been giving to their post-war designs is very apparent at the "Britain Can Make It" Exhibition, which was opened by the King at the Victoria and Albert Museum on Tuesday. Generally speaking,

and by the New Year over half of them will be obtainable to some extent. For export just over 40 per cent is available now and another 20 per cent will be ready by the end of the year.

Although a considerable amount of electrical apparatus selected has been incorporated in the many furnished rooms, most of the items have been grouped in a special Powered Domestic Equipment Section. Cooking apparatus is represented by the new "DC113" G.E.C. cooker, the "Baby Belling," and breakfast cookers by Moffatts and Clifton Aircraft. A glass plate-warmer is an English Electric novelty and there is also a warming plate by the G.E.C. A twin table boiling plate unit by Jackson and a

table griller by David Phillips have also been selected. Trends in toaster design are portrayed by an H.M.V. horizontal model, a



Display of smaller electrical appliances in the Powered Domestic Equipment Section

although there is an occasional departure from tradition, most of the designs are not revolutionary and follow the tendency, noticeable before the war put a temporary stop to development, towards "functionalism" coupled with graceful appearance, hygiene and saving of labour. The wartime necessity for "utility" apparatus has perhaps tempered the trend towards too severe simplicity but there is nothing in the way of unnecessary frills.

All the 6,000 exhibits have been selected on design merits alone from 18,000 items submitted by 3,582 firms.

Some of them will not be on sale immediately but about a third are said to be available for the home market now in limited quantities,



All-electric kitchen with dining recess

unit with a slide for removal of the toast (Hume Atkins & Co.) and a more conventional type made by the G.E.C.

Among the fires there is a Truvox reflector model with a 1-kW element enclosed in a tube of quartz, crystalline in appearance when cold but glowing bright orange when hot. By this construction, it is claimed, the radiant heat is increased by 46 per cent with only

a small reduction in convected heat. The use of new materials is exemplified in a Belling reflector fire for floor or wall mounting. Scientifically designed multi-parabola reflectors are features of G.E.C. units. Among other portable and inset models on view are



A few of the items on view at the "Britain Can Make It" Exhibition: (A) H.M.V. bathroom wall fire. (B) C.W.S. "Dudley" hand vacuum cleaner. (C) Belling plastic reflector fire for floor or wall use. (D) "Tru-glow" (Truvox) reflector fire with 1-kW element enclosed in a tough quartz tube. (E) Prototype of G.E.C. warming plate. (F) Hume, Atkins & Co. toaster. (G) New "Baby Belling" cooker. (H) H.M.V. horizontal toaster with reversible receptacle to enable toasting to be carried out on both sides of the grid. (J) Two new kettle designs: the H.M.V. "Maddox" tea kettle for table use, and a Truvox model

units by Bulpitt & Sons, Berry's Electric, Hume Atkins & Co., H.M.V., Bratt Colbran and E. K. Cole.

Two outside-bag type vacuum cleaners (Hoover and G.E.C.) and one cylindrical model (Sterling Engineering) are accompanied by a C.W.S. hand cleaner for use on stairs

(E. W. Stockham) has a switch in the form of a large plastic plate operated by the pressure of the hand, while another novelty is a combined bedwarmer and bedlight, utilizing an ordinary lamp bulb for both purposes.

In the Furnished Rooms Section a kitchen with a dining recess is equipped with a Moffat cooker (with oven thermostat, time control and simmering device), an Electrolux refrigerator, "Thermovent" convector, Gent clock, S.L.R. coffee brewer, Supervent extract fan and "Ultra-lux" totally enclosed lighting fittings. Also to be found in the section are many other types of lighting fitting, an electric towel rail (Lan-Bar), the "Lectross" electric clothes horse (John A. Grey & Partners) "Sadia" water heater, bathroom fire and convector (H.M.V.), hair-dryer (Bylock), wall fan (G.E.C.), iron (Beethoven), switch-



Simplicity and graceful lines are the keynote of the latest lighting fittings

or furniture. Hotpoint, Wilkins & Mitchell and English Electric have had their washing machines selected, together with the Burco wash-boiler. Irons, almost all of them thermostatically controlled, have been provided by Premier, Hotpoint, Thorn, Radio-Electric Development, Clayton, Lewis & Miller, C.W.S., Bulpitt, Morphy Richards, Falk, Stadelmann and H.M.V. An electric dry shaver, said to be already available, was supplied by Advance Components.

H.M.V. has almost "swept the board" with its three revolutionary designs of electric kettles and a percolator: one of the kettles has a massive moulded handle forming a steam guard while another model, looking more like a coffee pot, is intended for use on the table. A room thermostat (Rheostatic Co.) and a kitchen control unit (Reyrolle) emphasize the simplicity of electrical methods.

Simplicity, neatness and the use of new materials and finishes have been employed to exceptionally good effect in the design of the pendants, floor standards and table lamps shown by Best & Lloyd, Dernier & Hamlyn, G.E.C., Merchant Adventurers of London, S. L. Miller & Co., and E. K. Cole. Fluorescent fittings are represented by the B.T.H. Co. and Barlite Lamps, the latter showing a 3-ft. tube. A ceiling watertight fitting is an exhibit supplied by Rowlands Electrical Accessories. The "Touchlite"



Ultra-modern cooker in the "Designs for the Future" Section

plug and cooker control unit (D.S. Plugs), flush switch (General Accessories), oven thermostat (Sunvic), kettle (Truvox) and a Diamix toaster which has a telephone-type dial to give toast cooked to any desired degree. One of the bathrooms has a "sun-ray" couch equipped by Barber Electrical Services.

Modern methods of lighting, employing both fluorescent and tungsten lamps, are demonstrated to advantage in a general administrative office display; apparatus was supplied for the purpose by Troughton & Young and Herbert Terry & Sons ("Anglepoise" desk lamps). Other equipment includes a Smith clock, an "Ardente" inter-communication system and a Standard Telephones staff locator system. Several Ferranti television sets are to be seen among the furnishings of a technical office, which also contains another good example of fluorescent lighting, a desk Dictaphone and five-line auto-communication telephones (G.E.C.).

A glimpse of the kind of apparatus to be expected at a rather more distant time is provided in the "Designs for the Future" Section. Here is a cooker designed by Milner Gray and William Vaughan, in technical consultation with E. M. Ackery and with the technical advice of the B.T.H., British Thermostat Co., G.E.C., Gent, Sunvic and Venner. Two ovens, at waist height and with glass fronts, are provided to allow simultaneous cooking of dishes requiring different oven temperatures. Both ovens are fitted with time switches as well as thermostatic control. The radiant hotplates have thermostatic and simmer control. A sunk cooking well is provided for holding canned foods, puddings, eggs, etc., and there is a plate warming compartment. The grill has a hinged top and an

oven glass tray for use both in cooking and serving. A small food mixer hinges into a recess in the top of the cooker when not in use. Covers to the cooking and mixing units when raised automatically illuminate the working surface with concealed striplights. Another thing to look forward to is an air-conditioned bed in which a fan gently blows air at a controllable temperature into a rigid envelope. There is, too, a streamlined aluminium bicycle fitted with a battery (charged when going downhill) to assist the rider when going uphill: a radio receiver is also incorporated.

The use of a small high-intensity cathode-ray tube with an optical projection system to give an image 20 in. by 16 in. is forecast in a design for a television set (Murphy Radio). The design of radio and television cabinets seen in a separate section shows a tendency towards simplicity while at the same time seeking novelty in the way of wall mounting, etc.

In various parts of the exhibition coloured fluorescent tubes (supplied by Thorn Electrical Industries) have been employed to good effect. The warm and restful effect desired in the Rest Room has been achieved by the use of pink tubes, while blue-green units bring out the colour of grass in a view across the lawn from one of the furnished rooms. A convincing daylight effect is produced in the luxury bathroom by concealing tubes behind a wall of glass bricks.

Municipal Reports

Salford.—Domestic sales in 1945-46 reached nearly 51 million kWh, a gain of over 45 per cent in two years, and Mr. L. Romero, the chief engineer and manager, considers that the immediate prospect is one of continued rapid growth in this sphere. Power supplies decreased by 2.8 million kWh to 65.8 million, but a list of motors connected indicates an increase of 3,156 in the aggregate horse-power, making the total 83,322 H.P. Altogether sales, excluding bulk supply, amounted to 138.6 million kWh, compared with 133.3 million in 1944-45.

The year's income was £672,393 (£623,200) and working costs were £534,013 (£516,773). The net profit was £23,320 against a loss of £17,875. The average price received per kWh sold rose from 1.061d. to 1.119d.

The Department generated 81.1 million kWh compared with 82.0 million in 1944-45; the average quantity of fuel used per kWh generated was 2.13 lb (2.22 lb in the previous year) and the average price of coal per ton was 40s. 9½d. (37s. 0½d.). Preliminary work was continued

for the extension of the Agecroft station. A severe fire in Frederick Road substation on January 10th last caused an almost total failure of the supply for a short while. The fire originated from an earth fault on a 33-kV oil switch which was not cleared because of an open-circuit which had occurred in one of the breaker trip-coil circuits.

Nuneaton.—The 1945-46 accounts of the undertaking (borough electrical engineer, Mr. J. Lightbown) show a total revenue of £145,096 (against £139,020 in 1944-45), with working expenses at £120,559 (£108,715). The gross surplus, together with sundry income, was £25,547 (£32,292) and after meeting loan charges and income tax aggregating £21,697 (£24,189) there was a net balance of £3,850 (£8,103). A sum of £1,332 is applied to special expenditure, £1,587 goes to the local rates, and the remainder is transferred to reserve. Excluding bulk supplies of 9.1 million kWh (11.1 million in 1944-45) sales last year totalled 19.0 million kWh (16.8 million).

CORRESPONDENCE

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

Power-Factor Correction

REPLYING to Mr. M. Raht's letter in your issue of September 13th, commenting on my article published in the *Electrical Review* of August 9th, the purpose of the article was to show methods of calculation, employing possible values for the motor performance, and not necessarily to suggest actual corrected values for case B. In the event of the power factor approaching such a value as 0.985, it would, of course, be necessary to check the corrective kVA against the magnetising kVA of the motor, to avoid the risk Mr. Raht mentions of a leading power factor.

Manufacturers in general do list some useful information regarding the values of capacitors, and in particular there is an ingenious pocket calculator issued by one maker. This takes the form of a slide rule, one setting of which gives a multiplying factor, which in conjunction with the load kW, gives the capacitor kVA.

I feel, however, with due acknowledgment to the helpful ingenuity of the manufacturers, that direct calculation is in general preferable, ensuring as it does that one does not lose sight of first principles.

Cheshire.

H. NEALE.

Fluorescent Lighting Effects

MR. R. O. ACKERLEY, in your issue of September 13th, accuses me of making a false assumption in attributing headaches and eye troubles, etc., experienced by users of fluorescent lighting to some harmful effect of the light, without "carrying out an investigation." He then points out that people suffered from these troubles long before fluorescent lighting was invented, which is obviously true, but I was naturally referring to users who had not suffered from such troubles previously (when using ordinary filament lamps) but who did begin to suffer from them after working for some time with fluorescent lighting, or in which people who already had some such trouble found their troubles noticeably increased under fluorescent lighting.

My assumption is, therefore, quite reasonable, especially as there are several reasons why we should expect fluorescent lighting to be injurious. The light is said to be rich in

ultra-violet radiation and it is used with a.c. (at 50 cycles). The effect of the latter on the optic nerve is bad enough with ordinary filament lamps, where the alternations are damped by the retained heat of the filament, but the undamped alternations in the cold gas of the fluorescent tube are far more marked and the effect on the eye is correspondingly more devastating. Thus actual complaints have confirmed what we had reason to expect.

Makers and their representatives are naturally tempted to attribute such complaints to some other cause, but those who have complained have usually been quite unbiased, or if anything biased in favour of the new type of lighting as an attractive novelty, as a result of propaganda in its favour. On the other hand many other cases of eye trouble may well have been caused by it and would be attributed by users to something else, such as general strain or ill-health, simply because they had not been told of any reason to suspect the lighting.

In his original article Mr. Ackerley, or the medical people whom he quoted, seem to attribute such troubles to faulty installation. As I suggested in my previous letter, it is surprising that the makers and their agents should not be able to ensure that their products are correctly installed in the first place.

No independent investigation appears to be required in order to justify the assumption that fluorescent lighting is dangerous to eyesight, but an investigation might well be undertaken to ascertain which of the many possible factors is the most harmful, and how, if at all, it can be overcome. It is quite possible, for instance, and has in fact been suggested by Luckiesh, that the most harmful factor is glare due to the excessive brightness and length of the source.

Glare of course is a harmful factor with most forms of direct lighting and increases the unavoidable strain caused by the difference between artificial light and daylight for which the human eye is adapted. This difference is greater with fluorescent lighting than with older types.

In general, it is difficult to understand why so many "authorities" recommend such needlessly high intensities, thereby putting an

unnecessary strain on both eyes and pockets, unless as a result of the influence, conscious or unconscious, of the "commercial instinct." The result is that electricity instead of being a perfect servant of mankind is becoming the worst sort of master.

Considering that the *Electrical Review* is one of the most influential electrical journals in the world, it does seem important that the technical articles it contains should be genuinely unbiased.

London, W.C.1.

G. V. DOWNER.

Defective Wiring

THINGS are coming to a pretty bad pass when we are informed by the Chancellor of the Carlisle Diocese that he is "shocked" at the large number of cases in the Diocese where wiring for electricity has been improperly done.

As I have received very many similar "shocks" in churches, dwelling houses, public buildings, places of entertainment, etc., I cannot understand the attitude of those responsible for allowing such a state of matters to exist.

After many years' experience, I have no hesitation in stating that nine out of ten installations have been "improperly done" and do not comply with the Regulations for the Electrical Equipment of Buildings.

Notwithstanding the facts, we are informed by the "powers that be" that there is no need for any special action in this matter.

Glascow.

ALEX. MILNE, SENR.

Pandora's Box

IN page 470 of your issue of September 20th Dr. Dunsheath is reported to have said that the electrical possibilities of the British commonwealth countries are like a Pandora's Box. I hope he has not correctly described, but only grossly libelled, our "far-flung Empire," since Pandora's Box contained all mortal ills. Otherwise I for one shall give up even the hope that remained as the sole occupant of the box after it was opened.

Bromley, Kent.

R. WHEATLEY MINTER.

Shortage of Supplies

REGARDING the letter in last week's *Electrical Review* from Messrs. Emmett & Blowers, let me say that my letter in your issue of September 6th was meant to be ironical and was certainly taken so by one interested party. May I therefore trespass on your space by emphasizing my point,

especially in view of the quotation from Mr. Tomlinson in your correspondent's letter.

It is common knowledge that there is a shortage of such items as switch-plugs, switch and fuse gear, etc., owing to a shortage of labour and raw materials, especially porcelain. I therefore ask why these raw materials and labour should be used to manufacture similar articles to stock up chain stores and other non-electrical traders when they could be put to better use making the above items to complete houses which are urgently needed.

WALSALL CONDUITS, LTD.

Nottingham.

E. P. PRIOR,

District Manager.

All-Electric House Costs

MR. N. HUNTER, general manager and engineer of the Stockton-on-Tees Electricity Department, has prepared a report comparing the cost of operating all-electric and gas-electric "temporary" houses, based on data obtained from Ashton-under-Lyne, Chester, Liverpool, Manchester, Salford and Stockton. In the all-electric houses the installation comprises eight lighting points, cooker, wash-boiler, immersion heater, and plug points for radio, iron, etc. The gas-electric houses are similarly equipped but with gas cooker and wash-boiler. Neither type has a refrigerator.

The average consumption of the all-electric temporary houses (of which there are none at Stockton) is 50 kWh per week. The cost, at $\frac{1}{2}$ d. per kWh, and including 9d. fixed charge, is 2s. 10d. per week. In the gas-electric houses the weekly consumption is 30 kWh and 368 cu ft of gas and the total weekly cost is 3s. 7d. (including 1s. 7d. for gas).

The figures show a considerable balance in favour of the all-electric house and it is stated that the results are based on relatively short periods and cover the winter quarters. "There is every reason to suggest that the average cost per week over the whole of the year would decrease."

Mr. Hunter appends a summary of consumption and costs for the all-electric houses (with one coal fire) erected at Stockton before the war. The average varies from 56 kWh a week (costing 3s. 4d.) on the Sunderland Glebe Estate to 38 kWh (2s. 6d.) a week on the Blue Hall Estate.

Institute of Transport Examinations

The question papers set at the graduation and associate membership examinations of the Institute of Transport from 1944 to 1946 are now available in booklet form from the Institute, 15, Savoy Street, London, W.C.2, price 1s. per set for each examination (post free). Details of classes for the examinations in the London area are also available.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Ekco Symphony Orchestra made its first "public" appearance last Friday when performances were given in the works canteen during the lunch breaks, the proceeds going to St. Dunstan's. The conductor was Mr. R. K. Spencer of the Development and Engineering Department.

Mr. E. S. Little has been appointed to the board of Associated Electrical Industries Finance Co., Ltd. This company is concerned with the financial operations of all the companies of Associated Electrical Industries, Ltd., including the British Thomson-Houston Co. In consequence of his new appointment, Mr. Little has retired from the board of the British Thomson-Houston Co., Ltd., but he continues to be comptroller and secretary of that company.

Mr. T. Hands, O.B.E., managing director of the Cosmos Manufacturing Co., Ltd., has been appointed a director of the Edison Swan Electric Co., Ltd. Mr. V. Plascott, general works manager of Edison Swan Cables, Ltd., and Mr. F. E. C. Miller, director of the Edison Swan Electric Co., have been appointed to the board of Edison Swan Cables, Ltd.

We are glad to learn that Mr. F. W. Brecknell, borough electrical engineer of Birkenhead, who recently underwent a serious operation, is now making satisfactory progress.

Mr. C. G. Dobson, A.M.I.E.E., is resigning from the position of London sales manager for the Electrical Apparatus Co., Ltd., to go into business on his own account as consultant and manufacturers' agent in the north-western area. His address from October 1st will be C. G. Dobson & Partners, 7, Blackfriars Street, Salford, Manchester.

Mr. J. H. Enion, a director of the Igranic Electric Co., Ltd., and managing director of Metal Industries (Electrical Group), Ltd., has now joined the board of Metal Industries, Ltd.

Mr. Geoffrey Heyworth, chairman of Lever Bros., and Unilever, Ltd., has been appointed chairman of the Advisory Council for Scientific and Industrial Research, in succession to Lord Riverdale, who is retiring after holding the appointment for nine years.

The first travelling exhibition in electrical housecraft has been awarded by the Caroline Haslett Trust. The winner is Miss Joan Whitgift, who is going to America as soon as travel arrangements are completed. A committee of leading "home economics" women in the United States will help to plan her itinerary and subjects for study. These will include visits to domestic electrical equipment factories, exhibitions and demonstration centres. Miss Whitgift holds the diploma of the Electrical

Association for Women in electrical housecraft, and the diploma of the British Electrical Development Association for public speaking. For ten years before the war she was senior demonstrator for Central London Electricity, Ltd. During the war she took over the duties of consumers' engineer.

Mr. V. S. W. Smyth has resigned his directorship of the Union Lamp & Lighting Co., Ltd., having sold his interests. Mr. Smyth started the company in 1935 and was managing director until the outbreak of war, when he was recalled to the Royal Air Force, in which he served until after the end of hostilities. He then joined the board of Allander Industries, Ltd., radio manufacturers, Glasgow, of which he is managing director. He is also director of the Ellangowan Paper Co. and of Marr Downie & Co., Ltd.

Mr. V. H. Gilbert, late of A. C. Cossor, Ltd., and for the last seventeen years with Radiovisor Parent, Ltd., has resigned his post with the latter company as chief engineer and manager of technical development and is considering entering business on his own account. His address is 180, Twickenham Road, Isleworth, Middlesex (telephone: Hounslow 4710).

Mr. K. H. Harding has taken up the appointment of sales manager to Small Electric Motors, Ltd. Previously he held the position of South Eastern Area sales engineer for Foster Transformers & Switchgear, Ltd.

Delivering his presidential address to the Electrical Society of Glasgow, Mr. Alexander Milne traced the development of electrical contracting practice from the time when as an apprentice he used capping and casing. He spoke of "the good old days when accessories were substantial even if crude, and the workmanship conscientious and the supply authorities were really concerned that only good installations should be connected to their mains."

Mr. H. W. Mellor, assistant mains engineer to the Oldham Corporation Electricity Department, has been appointed senior assistant mains engineer.

Mr. Arthur J. O. Cruickshank, Dundee, has been appointed assistant lecturer in electrical engineering by Glasgow University Court. Mr. Cruickshank graduated B.Sc. with first-class honours at University College, Dundee. He has recently been on the research staff of General Electric Co., Ltd., Birmingham.

A popular pre-war function was revived by the G.E.C. Service Depot, Greycoat Street, Westminster, recently, when more than a hundred members of the staff and their friends went by coach to Margate. Mr. T. Dyke, joint

secretary of the company, and Mrs. Dyke, and Mr. C. E. Gerrett, manager of the depot, were among the party. Fortunately, the day chosen for the outing was one of the few fine days of this summer and the picnic lunch, which was followed by high tea in the evening, proved a great success.

At the annual luncheon of the Nottingham Centre of the Illuminating Engineering Society, best wishes were conveyed to Mr. R. Gillespie Williams, retiring chairman, who, with his family, is shortly leaving for the United States. The new chairman, Mr. R. G. Payne, gave an address on illumination.

Mr. C. B. Tutt, A.M.I.E.E., power station superintendent, Kettering, retired on September 12th. He had served with the Electricity Department for twenty-seven years, having been appointed assistant electrical engineer in 1919.

Mr. J. Bell, of Grappenhall, near Warrington, has been appointed assistant mains engineer in the Stockton Electricity Department.

The staffs of Frank Westerman (Wholesale), Ltd., Birmingham, and the Midland Depot of Holsun Batteries, Ltd., held a snooker competition on September 18th. Mr. F. Westerman and Mr. Dean (Midland manager, Holsun Batteries) were winners by a narrow margin.

The directors of the North Wales Power Co. gave 580 members of the staff an outing to Llandudno on September 18th. The programme included a steamer trip and an evening at the Pier Pavilion.

Appointments Vacant.—Among the vacancies advertised in this issue are the following:—Electrical engineers and managers for Sutton Coldfield Corporation and Long Eaton U.D.C.; assistant mains and distribution engineer for Birkenhead; assistant installation and meter superintendent, and showroom manager for Barking; mechanical maintenance engineer for Manchester; mains engineer and two assistant mains engineers for George Town, Penang; senior assistant for electrical engineering at Halifax Municipal Technical College; and principal for the Stockton Technical School and Evening Institute.

Obituary

Mr. W. A. Wales.—We regret to announce the sudden death on September 18th of Mr. W. A. Wales, A.M.I.E.E., A.M.Inst.C.E., of Ashton-under-Lyne, while on holiday in North Berwick. Mr. Wales was well known to supply, traction and industrial engineers, particularly in Lancashire and Yorkshire, on account of his long connection with the use and operation of mercury arc rectifiers, first as a representative of Hewitt Electric Co., Ltd., and of recent years with Bruce Peebles & Co., Ltd. He also specialized in condensers for power factor correction for the Telegraph Condenser Co., Ltd. Before taking up work on the electrical manufacturing side of the industry, Mr. Wales

was for a long time connected with municipal electricity supply, and was with the Ashton-under-Lyne Corporation Electricity Department for a considerable time.

Mr. James Scott, whose death we briefly reported last week, commenced business as an electrical engineer in 1908 in association with Oliver, Melville, Robb & Scott. After the 1914-18 war he formed the company of James Scott & Co., which with his partner, Mr. Isaac Selar, he built up to be one of the largest electrical contracting businesses in Scotland, with branches in Glasgow, Edinburgh and Perth. During the recent war the company undertook large contracts for the Government, especially for the Air Ministry, and it is at present taking a prominent part in the North of Scotland Hydro-electric Scheme.

Wills.—Mr. Harold William Firth, M.Inst.C.E., of Portstewart, Co. Londonderry, formerly of Peverells, Bradwell-on-Sea, Essex, at one time chief electrical engineer, Great Eastern Railway, who died on May 7th last, left £5,987 gross, with net personalty £5,906.

Mr. Edward Winram Dickinson, formerly rural development officer to the Electricity Commission, who died on March 16th last, left £2,245 gross, with net personalty £1,398.

World Engineering Conference

AT a meeting of the Comité d'Honneur of the 1946 International Technical Congress on September 20th it was decided to establish an organization known as the World Engineering Conference to carry on the aims of the Congress which met in Paris from September 16th to 21st.

The Conference will arrange for the holding of future international congresses and establish contact with those Councils of U.N.O. which are especially concerned with economic and social problems, and with U.N.E.S.C.O.

The Conference will have a Council made up of two delegates from every member country and will be administered by an executive board with a maximum of twelve members and a president elected by the Council. A provisional board, whose duty is to prepare the constitution, has been set up with members from the following countries:—China, Czechoslovakia, Egypt, France, Great Britain, India, Poland, Switzerland and the United States. Monsieur A. Antoine, president of the 1946 International Technical Congress and Inspecteur Général d'Electricité de France, has been elected president of the board until the next meeting of the Council.

In preparing the way for the establishment of the International Federation, the executive board is charged with studying the needs of engineers and technicians, the admission of international engineering associations and making contact with existing international technical associations.

“New Homes for Old”

Low-Cost Conversion of Premises.

IT is estimated that there are 150,000 large houses in London and another quarter of a million in other cities and towns suitable for modernization and conversion into flats accommodating several families. At an exhibition now being held until November 9th at the Tea Centre, Regent Street, the British Electrical Development Association has succeeded in showing in a most striking fashion how old-fashioned, ill-equipped rooms can be adapted and brought up to date with the minimum of structural alteration and expense. Side by side

with draining boards each side, cupboards below and a 1½-gal self-contained water heater above. The transformation has been completed by the replacement of a single pendant lamp by three totally-enclosed lighting units in the centre of the ceiling and over the cabinet and sink.

A more ambitious scheme shows a kitchen and utility room forming part of a large living room. Equipment of the kitchen includes the latest Jackson cooker, a 4-cu ft waist-high “Prestcold” refrigerator, G.E.C. toaster, S.L.R. coffee percolator, H.M.V. and “Mysto”



How electricity can modernize kitchens in old houses is demonstrated by this transformation carried out by E.D.A. at the “New Homes for Old” Exhibition

can be seen how a small kitchen looks before and after treatment. The outmoded dresser, copper, coal range, cupboard and badly-located sink have been replaced by a built-in kitchen cabinet with working space beneath, one of the latest G.E.C. cookers with table for kettle and shelves for utensils occupying the space left by the kitchener, and a sink at the correct height

kettles, Revo iron, and Smith and “Goblin” clocks. An inset “Thermovent” convector is provided, together with a Vent-Axia extract fan. In the utility room are an “Ajax” washing machine, a 20-gal “Dulec” water heater under the draining board, and an electrically-heated drying cabinet. Fitted into a small recess is a tubular heater for towel drying.

Illumination Design Course

PARTICULARS have been received of the next Illumination Design Course at the Lighting Service Bureau, London, from October 29th to November 1st. There will be an official opening by Mr. W. F. Moir, chairman of the E.L.M.A. Council, and this will be followed by a paper on “The Relation Between Light and Vision,” by Mr. E. B. Sawyer, acting manager of the Bureau. In the afternoon Mr. A. D. S. Atkinson and Mr. N. I. B. Harrison will read papers on “Illumination Design for Interiors.” “Codes of Practice” will be dealt with by Mr. Sawyer on the morning of October 30th, and Mr. A. G. Penny will discuss “The Development of the Electric Lamp.” The afternoon session will be devoted to papers on fluorescent lamps, accessories and fittings by Messrs. A. L.

Randall and C. R. Bicknell. The programme for the following day includes papers on “The Application of Fluorescent Lamps” (Mr. E. B. Sawyer), “Lighting in Industry” (Mr. W. Robinson), “School and Office Lighting” (Mr. C. J. King) and “Shop and Showroom Lighting” (Mr. N. I. B. Harrison).

On November 1st there will be papers on “Light and Colour” (Mr. I. D. Spark), “Exterior Lighting” (Mr. J. W. Howell), “Home Lighting” (Mr. T. O. Freeth) and “Load Building with Light” (Mr. W. J. Jones, director of E.L.M.A.).

The course is arranged primarily for electricity supply authority employees. There are no fees but admission can be gained only by tickets from the Bureau, 2, Savoy Hill, W.C.2.

New Scottish Scheme

Glen Affric—Glen Cannich Area

CONSTRUCTIONAL Scheme No. 7 (the Mullardoch—Fasnakyle—Affric project) has been prepared by the North of Scotland Hydro-Electric Board to utilize the water-power resources of the Glen Affric—Glen Cannich area in such a way as to leave the natural beauties of the Glens unspoiled. It involves a dam 120 ft high at Loch Mullardoch, a tunnel diverting the waters to Loch Benevean through an underground power house, a second dam 86 ft high at Loch Benevean and a power station near Fasnakyle. It leaves Loch Affric itself entirely unaffected. The total installed capacity of the two generating stations will be about 70,000 kW and the average annual output will be about 250 million kWh. The cost is estimated at approximately £4,800,000.

This is the third Affric hydro-electric scheme. The first was promoted by the Grampian Company in 1928, being rejected by a House of Lords Committee. The second, promoted by the same company in 1941, was approved by a Scottish Parliamentary Commission, but was finally withdrawn on the advice of the Secretary of State who promised an inquiry into the whole of the water-power resources in the North of Scotland.

Divergence from Earlier Proposals

The present scheme, prepared by the Board, diverges substantially from both the previous ones. The 1941 plan would have raised Loch Benevean by 60 ft and the loch would have fluctuated by the whole of that amount, whereas the Board proposes to raise Loch Benevean by no more than 25 feet, thus not reaching the level of Loch Affric, and the method of operation will normally restrict the variation in the level of Loch Benevean to about 6 ft in summer and double that in winter. The present natural fluctuation in Loch Affric itself is about 10 ft. A flow of water in the River Affric will be guaranteed to maintain a minimum of 15 million gallons per day below its junction with the Tomich Burn. In addition, the Board undertakes to give from Loch Benevean a "block guarantee" of 2,000 million gallons per year to be used at such times and in such quantities as may be agreed with the Fisheries and Amenity Committees. Loch Mullardoch will be raised 113 ft (the 1941 scheme would have raised it 61 ft). The increased height in the Board's scheme will compensate for the reduction in the storage in Loch Benevean.

The Fasnakyle power station, seen from the Cannich—Tomich road, will appear as a low building on the river's bank. The substation, which will step up the supply to 132 kV for transmission, will be out of sight of the road and linked with the power station by underground cables. Strath Glass has always been subject to violent floods which the scheme will materially reduce.

Voltage Standardization

IN a circular letter dated September 26th, the Electricity Commissioners refer to the announcement made by the Minister of Fuel and Power in Parliament on February 12th regarding the decision to adopt 240 V as the standard for low voltage a.c. supplies: (*Electrical Review*, February 22nd). The Commissioners now prescribe as standard an a.c. 50-cycle system at 240 V on two-wire single-phase circuits, 280–240 V for three-wire single-phase, 415–240 V for four-wire three-phase, and 415 V for three-wire three-phase. This standard will apply forthwith to existing a.c. 50-cycle systems supplied at these voltages. New systems brought into use after October 1st, 1947, will be required to comply exclusively with this standard unless the Commissioners specifically approve some other system.

The standard system will apply to present non-standard systems, including those to which approval had previously been given, as from the date when they are brought into conformity with the standard. Where new non-standard equipment is being installed or is on order for new systems, the standard will be permissive forthwith and mandatory at the end of twelve months. Where the construction of any new non-standard system cannot reasonably be avoided, any apparatus or equipment should be suitable for use in due course on the standard system.

Load Shedding

ON September 18th curtailment of public supplies of electricity was necessary in all areas of England and Wales. A first cut of 5 per cent was made at 11.14 a.m. in three of the seven operational areas and at various times up to 11.48 elsewhere. A second cut of 5 per cent proved necessary in five areas starting at 11.25 in the most affected area—S.E. England (northern ring)—where it lasted until 12.09 p.m., full supplies being restored one minute later. In other parts of the country the situation became normal earlier, S.W. England being most favourably situated with a 5 per cent cut only for 22 min. The late night weather forecast, the Central Electricity Board states, did not appear to justify a broadcast appeal, but the early morning forecast indicated a deterioration in the prospects. The load dealt with was 6,912 MW at 48 cycles, which was 1,000 MW more than that at the corresponding date last year when the temperature was 10 deg F higher. To meet this greater demand the total output capacity of generating plant had been increased by only 83 MW, but a larger proportion of the whole was in service.

In some industrial areas dislocation was minimized by the operation of arrangements by which, at short notice, manufacturers voluntarily reduced their demand for brief periods.

I.E.E. Meetings

Programme for First Half of 1946-47 Session

PARTICULARS have now been issued of the London meetings of the Institution of Electrical Engineers. The new President, Mr. V. Z. de Ferranti, will deliver his inaugural address on Thursday next, October 3rd. Papers to be read at subsequent ordinary meetings are as follows:—November 7th, "The Extinction of Arcs in Air-Blast Circuit Breakers" by Messrs. A. Allan and D. F. Amer; November 21st, "The Development and Design of Colonial Telecommunication Systems and Plant" and "The General Planning and Organization of Colonial Telecommunication Systems" by Messrs. C. Lawton and V. H. Winson; December 5th, "Power Supply for Generating Station Auxiliary Services" by Mr. W. Szwander; December 19th, "The Future of Pulverized-Coal Firing in Great Britain" by Mr. C. H. Sparks (Joint meeting with the Institution of Mechanical Engineers); January 16th, "Industrial Applications of Electronic Techniques" by Dr. H. A. Thomas.

Radio Section.—October 9th, Inaugural Address by the chairman, Professor Willis Jackson; October 30th, Symposium of papers on Direction Finding by Dr. R. L. Smith-Rose, Mr. W. Ross, Mr. R. R. Pearce, Dr. F. Adcock and Mr. C. Clarke; November 6th, "The Pulse Testing of Wide-Band Networks by Dr. D. C. Easley, Mr. E. C. Cherry and Mr. M. Levy; November 20th, "The Voltage Characteristics of Polythene Cables" by Mr. R. Davis, Dr. A. E. W. Austen and Professor Willis Jackson; November 26th, "The Economics and Subjective Requirements of Television Picture Sizes," discussion opened by Mr. D. C. Birkinshaw; December 4th, "The Elements of Wave Propagation using the Impedance Concept" by Dr. H. G. Booker; December 10th, "The Design and Performance of Receiving Aerials for Television," discussion to be opened by Mr. E. C. Cork; January 15th, "Crystal Valves" by Dr. B. Bleaney, Mr. J. W. Ryde and Mr. T. H. Kinman.

Transmission Section.—October 16th, Inaugural Address by the chairman, Mr. J. Andrew Lee; November 13th, "The Development of the Gas-Cushion Cable System for the Highest Voltages" by Mr. T. R. P. Harrison; December 6th, Joint meeting with Measurements Section, Discussion on "Desirable Features of Protective Relays" (opened by Messrs. C. Ryder and F. H. Birch); December 11th, "Lightning Surges on Transmission Lines in Ireland" by Mr. R. C. Cuffe; January 22nd, Joint meeting with Measurements Section, Discussion on "Switchgear Alarms and Indications" (opened by Messrs. T. S. Andrew and T. R. Reyner).

Installations Section.—October 17th, Inaugural Address by the chairman, Mr. J. F.

Shipley; November 14th, "Electrical Control of Dangerous Machinery and Processes" by Mr. W. Fordham Cooper; December 12th and January 23rd, particulars later.

Measurements Section.—October 25th, Inaugural Address by the chairman, Mr. L. J. Matthews; November 8th, Discussion on "Current and Voltage Transformers for Protective Gear Purposes" (opened by Messrs. J. G. Wellings and F. J. Lane); November 22nd, "The Design of an Ellipsoid Voltmeter for the Precision Measurement of High Alternating Voltages" and "Calibration of Uniform-Field Spark-Gaps for High-Voltage Measurement at Power Frequencies" by Dr. F. M. Bruce; December 6th, see Transmission Section; December 13th, "A Millisecond Chronoscope" by Messrs. R. S. J. Spilsbury and A. Felton; January 22nd, see Transmission Section; January 24th, "The Application of Electrical Technique to the Service of some other Industries" by Messrs. H. Cobden Turner and G. M. Tomlin.

Informal Meetings.—October 28th, Discussion on "Electricity" to be opened by the President; November 25th, Discussion on "The Heat Pump" to be opened by Mr. J. A. Sumner; January 27th, Discussion on "National Certificates and their Relation to the Needs of Industry" to be opened by Mr. S. E. Goodall; further meetings on February 24th, March 31st and April 28th.

There is to be a Radiolocation Convention from March 25th to 28th and a Convention on Automatic Regulators and Servo Mechanisms from May 19th to 23rd.

Non-members of the Institution can gain admission to the meetings by obtaining (for a fee of 10s.) an invitation card from the Secretary of the I.E.E., Victoria Embankment, W.C.1.

Disposal of Emergency Plant

ARRANGEMENTS were made early this year for the dispersal of the National War-time Pool of spare electrical equipment, and the Central Electricity Board, which is disposing of the plant and stores buildings, has now realized over £720,000. A considerable proportion of the equipment has been acquired by electricity supply undertakings in this country and a larger proportion by overseas buyers, mainly through the agency of U.N.R.R.A. The approximate value of the sales to foreign countries, including Poland, Yugoslavia, China, France, Spain, Belgium and Palestine exceeds £460,000, while sales in Great Britain account for over £250,000, which includes about £90,000 in respect of a number of the stores buildings. The remaining items in the Pool which are still available for purchase include a quantity of transformers from 5 MVA to 20 MVA, together with a quantity of 11-kV switchgear and 11-kV cables.

E.D.A. Conference

Mid-East England Area Papers

THE autumn conference arranged by the Mid-East Area Committee of the British Electrical Development Association (area officer, Capt. A. W. Brown, M.B.E.) at Scarborough this week opened with a reception by the area chairman, Mr. A. Kelso. This was followed on Wednesday afternoon by a civic welcome by the Mayor of Scarborough and then Mr. N. H. BRIDGE (Lancashire Electric Power Co.) read a paper on "The Economics of Hire and Hire-Purchase."

Mr. Bridge surveyed the subject from a number of aspects and with special reference to particular electrical appliances and came to a number of conclusions, among them being that the regulation of hire-purchase trading was a possible supplementary instrument for boom and slump control. He was against hire-purchase contracts which were too long in relation to the life of the articles concerned and the hiring-out of articles subject to constant improvement. Maintenance was most important and its cost must be included in the charges and it should be continued under separate contract when the hire-purchase contract terminated.

With the same class of consumers, there is no evidence that maintenance costs are greater for hired than for hire-purchased equipment. The real cost of schemes should be faced; if during a transition period they had to be subsidized the fact should not be concealed. Charges should be collected monthly or weekly. Appliances subject to continued improvement should be built for a short life and marketed at correspondingly lower prices. Cookers costing nearly £20 could not be hired out at less than a shilling a week which was as much as consumers in the small income groups were able or willing to pay. The supply industry needed to take collective action to bring down the price of appliances.

The Legal Side

On Thursday morning Mr. J. P. CROWTHER (Electrical Distribution of Yorkshire, Ltd.) dealt with "Electricity Law and the Sales Engineer." In his paper he reviewed the legislation under which the supply industry operated and collated this under a number of headings: Granting of Supply Powers; Provisional and Special Orders; Electricity Regulations; Unity of Acts, Orders and Regulations; Definitions; Obligations and Rights of Undertakers; Price of Supply (methods of charging); Connection and Disconnection of Supply; Electricity Meters; Undertakers' Apparatus; and Miscellaneous. The paper presents in useful form a summary of the leading points with which a sales engineer should be acquainted.

The delegates were the guests of the Scarborough Electricity Committee at luncheon and

in the afternoon MR. A. G. CONNELL (Halifax) presented a paper on "Public Relations" in which he briefly discussed the means by which electricity supply undertakings could keep in harmonious touch with their consumers, actual and potential. He said he would like to see a public relations officer on the staff of every undertaking; smaller undertakings in an area might consider the employment of a joint public relations officer.

This official should possess a high degree of culture and skill and general all-round ability as an administrator. His was a "two-way" service; he had to collect information as well as distribute it. He should be present at housing conferences and maintain contact with the architectural profession. He would organize publicity in all forms on a continuous basis; arrange visits of organized parties to the electricity works; make the fullest use of both the editorial and advertising columns of the press; and advise on publicity campaigns.

Mr. Connell concluded by saying that whatever the future form of control might be he saw a permanent need for the constant spread of facts and information about electricity and its uses.

Forthcoming Events

Thursday, September 26th.—LONDON.—Connaught Rooms, 1 p.m. Batti Wallahs' Society lunch. "A Survey of Overseas Cable and Wireless During the War, with Personal Experiences," by Col. H. J. Wellingham.

Tuesday, October 1st.—LONDON.—The Odd-fellows' Hall, 186, Hammersmith Road, 7 p.m. Association of Supervising Electrical Engineers (West London Branch). "Electricity in Horticulture," by Mr. F. E. Rowlands.

MANCHESTER.—Engineers' Club, Albert Square, 6.30 p.m. I.E.E. North-Western Centre. Inaugural address by the chairman, Mr. E. T. Norris.

Thursday, October 3rd.—LONDON.—Institution of Electrical Engineers, 5.30 p.m. Inaugural address by the president, Mr. V. Z. de Ferranti. Certificates for premiums awarded for session 1945-46 will be presented at this meeting.

Friday, October 4th.—LONDON.—39, Victoria Street, 6.30 p.m. Junior Institution of Engineers. Informal meeting. Discussion, "Low Temperature Insulation," to be opened by Mr. A. Cooper.

Monday, October 7th.—LONDON.—At Institution of Electrical Engineers, Savoy Place, 5 p.m. Institution of Post Office Electrical Engineers. "Piezo-Electric Quartz and its Use in Telecommunications," by Messrs. C. F. Booth and J. L. Creighton.

BRISTOL.—University, Physics Laboratory, 5 p.m. I.E.E. Western Centre. Chairman's address by Mr. R. W. Biles.

COMMERCE and INDUSTRY

Further Factories Allocated. Russian Trade Prospects.

A MONG a further 51 allocations of Government factories by the Board of Trade to industrial firms are the following: Marshall Sons & Co., Ltd., Crook, for wire drawing and other machinery; Airedale Electrical Mfg. Co., Ltd., Bradford, for electrical equipment, switch-gear, etc.; Pye Radio, Ltd., Cambridge, for research and limited production of specialized instruments; Smart & Brown, Ltd., Biggleswade, for small machine tools; Cosmos, Ltd., Mount-fitchett, for valve components; Simms Motor Units, East Finchley, for fuel injection equipment for Diesel engines; Graseby Instruments, Ltd., Surbiton, for clocks, watches, meters and switches; Elliott Bros. (London), Ltd., Elstree, for fire control equipment; Cinema Television Ltd., Lower Sydenham, for cinema television, development and manufacture of scientific instruments; Bratt Colbran, Wembley, for fire grates; Lancashire Dynamo & Crypto, Ltd., Cardiff, for fractional-H.P. motors; Kelvinator, Ltd., Crewe, for commercial and domestic refrigerators; Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, for development of gas turbines for industrial purposes; C.W.S., Ltd., Trafford Park, for electrical vehicles, etc.; Rockman Engineering Co., Oldham, for bakelite mouldings and light electrical engineering; British Thomson-Houston Co., Ltd., Colne, for magnetos; Ever Ready Co. (Great Britain), Ltd., Glasgow, for dry batteries; H. J. Scott & Co., Ltd., Belfast, for electrical machinery; and British Power Transformer Co., Ltd., Lisburn, for transformers, etc.

Trade with Russia

Sir George Nelson (chairman of the English Electric Co.), head of a party of British electrical engineers visiting the Soviet Union for talks on "substantial orders," said before leaving Moscow on September 19th that he was more than ever convinced that there was great scope for collaboration between the industries of Britain and Russia in the work of rehabilitation and development that lay ahead.

Sir George told correspondents "We are impressed by the vision of those who planned and achieved the great engineering works executed in this country before the war." His party had been given every facility for seeing what had been achieved in industry, the devastation caused by the invasion and the work being carried out on reconstruction.—*Reuter*.

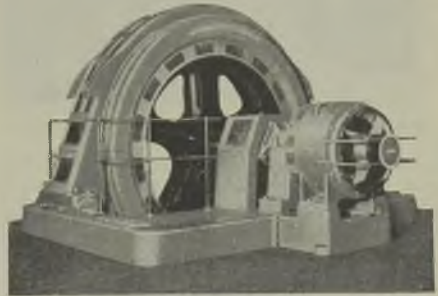
Generation Developments

An inaugural presidential address, in which he forecast the probability of atomic power being harnessed for the production of electrical energy in twenty years' time, was given at the Grand Hotel, Birmingham, last week to members of the Birmingham Electric Club, by Mr. F. W. Lawton, chief engineer and manager of the City Electric Supply Department. The title of his address was "Power Stations Past and Present" and Mr. Lawton, in reviewing the progress of electricity since the arc lamps of 1878, said that efficiency in power stations had

increased from 6 to 30 per cent since 1891. Mr. Shinwell, he said, should be thankful that while sixty years ago it required 11 lb of coal to generate one kWh of electricity, only a little over 1 lb was necessary to-day.

Mine Ventilation on the Rand

The motor illustrated is one of the largest slow-speed salient-pole synchronous induction motors constructed in this country. It was built by the General Electric Co., Ltd., for the Johannesburg Consolidated Investment Co., Ltd., to replace a steam engine driving a ventilating fan in a gold mine on the Rand. The motor is rated at 1,500 H.P. (unity p.f.) at 120 r.p.m. and is supplied direct from a 2,200-V three-phase 50-cycle system. This type of machine combines the high efficiency of the normal salient-pole synchronous motor with high torque-current ratio at starting; this is



Large mine ventilating fan motor

obtained by the use of a variable resistance connected to three-phase windings in the pole faces. The starting gear consists merely of an oil-immersed stator switch and a liquid starter.

Filtration Plant Contract

The Visco Engineering Co., Ltd., has received an order for what it says is probably the largest air filtration plant in this country. The plant comprises a "Visco" patent rotating self-cleaning filter with a capacity of 360,000 cu ft per minute for use in conjunction with Metropolitan-Vickers electrical equipment for a steel rolling mill.

Aviation Delegates Entertained

The opportunity of demonstrating Britain's pre-eminence in the field of television was taken recently when A. C. Cossor, Ltd., was host at an informal social gathering for the delegates to the Provisional International Civil Aviation Organisation, who are visiting this country at the invitation of the Ministry of Civil Aviation to discuss questions of safety in air travel, with particular reference to the peacetime developments of radar for this purpose. About 120

representatives of forty Governments were welcomed at the Clay Pigeons Hotel, South Ruislip, by Admiral C. S. Holland, Mr. J. S. Mitchell and Mr. L. A. Woodhead, on behalf of the company. Five standard Corsor all-wave television receivers were demonstrated and for the first time on record they worked off one aerial.

Delegates of the Provisional International Civil Aviation Organization paid a visit on September 14th to the New Southgate works of Standard Telephones & Cables, Ltd. Among other things they saw examples of the company's



P.I.C.A.O. delegates at the New Southgate works

selenium rectifiers and a working model of the d.c. bias system of street lighting control. This system was used during the war on R.A.F. stations for cutting out non-essential services during failures of the main electricity supply, thus conserving the outputs of the emergency plants.

Rating Appeal

The Valuation Committee of Shoreditch (London) Borough Council has urged the Council to contribute £5 "as a gesture" to help pay for Somerset County Council's action in the Court of Appeal between Yeovil Rural District Council and the South Somerset and District Electricity Co. on whether E.P.T. assessed on the company should be considered in arriving at the net annual value, plus rates, of the undertaking. Somerset County Council is backing the R.D.C. Shoreditch feels that the principle involved should be supported, even though the issue may not affect metropolitan boroughs.

Compensation Claim

At Stafford County Court recently a former employee of the English Electric Co., Ltd., Stafford, William Henry Fern, claimed compensation in respect of incapacity resulting from an accident at the company's works. It was stated that he had been employed by the company as a slinger. On January 18th, 1945, he slipped, and his left hand was trapped in a riveting machine. A hole was punched through his hand and his first finger was broken. He returned to the works on October 29th, 1945, and was employed as a storeman, being unable to resume his work as a slinger owing to the

injury. On February 7th the company claimed that he was no longer incapacitated and ceased to pay compensation, and on March 25th it obtained his release from the National Service Officer.

His Honour Judge Tucker said he was satisfied plaintiff was still partially incapacitated, but he could certainly do some useful work such as storekeeping, if he could get it. The Judge awarded plaintiff compensation at the rate of 7s. 1d. per week for the period October 29th to February 7th, and the difference between his actual earnings with defendants and his pre-accident wage of £5 9s. 5d. per week for the period February 7th to March 25th. His Honour estimated plaintiff's earning capacity from March 25th at £4 per week, and awarded him compensation at the rate of 14s. 8d. per week up to April 19th and thereafter to date and continuing at 17s. 8d. per week together with costs.

Flameproof Apparatus

The customary quarterly list of electrical apparatus, mining and industrial, for which certificates of flameproof enclosure were granted during the three months ended March, 1946, is now available. A few copies are on sale for 1s. 2½d. each post free from The Library, Ministry of Fuel and Power, King's Buildings, Dean Stanley Street, London, S.W.1.

Employees' Safety Booklet

Morris Motors, Ltd., Cowley, Oxford, have sent us a copy of a booklet which they have prepared setting forth a "Code of Safety." In this attention is drawn to the many risks which are inevitable in industrial establishments and simple advice on their avoidance is given to young workers and new employees. The section on electrical apparatus is brief but sound: "Do not interfere with any electrical apparatus. Any repairs or adjustments must be made by a qualified person."

Electrical Engineering Courses

Prospectuses are now available of part-time day and evening courses in mechanical and electrical engineering, etc., during the 1946-47 sessions at the South East London Technical Institute, Lewisham Way, London, S.E.4, and the Northampton Polytechnic, London, E.C.1.

Belgian Import Duties

Increases in a number of items in the Belgian Customs tariff are set out in the *Board of Trade Journal* of September 21st. Among the classes of goods affected are electric carbons, incandescent lamps, telegraph apparatus, vacuum cleaners, polishers, fans and irons.

Canadian Appliance Production

Our Montreal Correspondent says that many items which have been scarce during the past few years, such as household appliances, electrical supplies, radio sets and kitchen utensils are now appearing in increasing quantities. Over-all retail sales are generally running ahead of a year ago, but the striking advances in the former short-supply items far outstrip gains in other lines. In July there

was an increase of 104 per cent over July, 1945, in sales of household appliances, and electrical supplies and one of 150 per cent in sales of radio sets and musical instruments. The only retarding influences seem to be slowed-down production owing to strikes in basic industries and to a shortage of materials and labour.

Reports on German Industry

Among the latest reports upon German industry prepared by British and Allied investigating teams are the following:—B.I.O.S. 608, "The Manufacture of Electrical Instruments in Germany" (7s. 6d.); B.I.O.S. 684, "Production of Molybdenum and Tungsten for Radio Valves and Electric Lamps. Metallwerke Plansee. Reutte, Tyrol" (3s.); F.I.A.T. 489, "Survey of Fans and Turbo Blowers" (4s. 6d.); and F.I.A.T. 624, "Robert Bosch Development of a Low Tension Spark System (System 'Smitz'). Robert Bosch A.G., Stuttgart" (1s.). The prices given are those at which a few copies are available from the Stationery Office. The reports may also be seen at a number of the principal libraries.

Unions and Army Tradesmen

This week the War Office announced that agreement had been reached with certain engineering and electrical trade unions by which service in a trade capacity in the Army would qualify men for membership of the unions; they would be permitted to join before leaving the service.

Extension of the scheme to other skilled trades is anticipated and it is stated that a similar scheme is being applied to tradesmen in the R.A.F.

Export Policy Criticized

Mr. J. W. Rodger, general manager of Bruce Peebles, Ltd., who proposed a vote of thanks to Sir Stafford Cripps on his visit to Edinburgh on September 19th, spoke of the resentment he sensed in many people that we should see such a state of disillusionment, disappointment, and discouragement permeating the whole of the country at a time when we should be ready and willing to do everything we could for its export trade. He was firmly of opinion that, if we made our people at home happier than they were before, if we sacrificed a little of those exports to share among our people, that sacrifice would be made up in the great efforts he knew they were anxious to make, but could not make in the present state of depression.

E.D.A. All-Electric Kitchen

A new all-electric working kitchen, which has been specially planned by E.D.A. for the limited accommodation in modern houses—although feasible enough to serve equally well for more spacious dwellings—has been on view at Mansfield as part of the "Fuel and the Housewife" Exhibition at the Corporation electricity show-rooms, and will tour the Midlands and East Coast.

Included in the equipment, which has been assembled in logical working sequence, is the latest type electric cooker, complete with simmer controls for the boiling plates, and thermostatic control for the oven, and a 4 cu ft

"Reach-in" model electric refrigerator. This is built in to save space, and is of the approved post-war family size. Hidden beneath one of the draining boards is a 20-gallon "Dulec" water heater. Under thermostatic control water is maintained at a suitable temperature for both kitchen and bathroom requirements. The washing machine fits under a draining board if required: the detachable wringer can be housed in the body of the machine when it is out of use. Alongside, there is a roomy airing and drying cupboard, also heated by electricity.

Mr. Morrison on Nationalization

Speaking at Glasgow on Sunday last Mr. Herbert Morrison said: "Of all the socialization propositions the case in respect of electricity supply was perhaps the clearest and most certain of the lot." What it needed was good engineers and commercial men and progressive officers to take care of the needs of the consumers. It was not possible to get the best out of the industry, which was already two-thirds publicly owned, unless existing complications were straightened out and an end was made of a system which involved about 600 distributing authorities.

Private companies had every right to oppose nationalization but he was not sure that they had a right to spend money drawn from their funds (and therefore provided by their consumers) in conducting a great political publicity campaign.

In a reply to Mr. Morrison, Sir Robert Renwick said that in his reference to 600 undertakings he was "on thin ice." There were over 300 local authority undertakings but the company undertakings were grouped into some 70 ownerships. The companies had already submitted a scheme for this straightening-out without the upheaval of nationalization. The industry only asked for Government co-operation and sympathy and maintained that less nationalization now meant better living sooner.

Unfenced Machinery

For failing to fence a rotating spindle, Rycroft Electric, Ltd., were fined £20 at Manchester City Magistrates' Court last Friday. It was stated that a woman engaged on assembly work was partly scalped as she bent forward to pick up a fallen component.

Crane Orders

Sir William Arrol & Co., Ltd., have secured a contract valued at approximately £230,000 for the supply of twenty-six wharf cranes to the Dublin Port Authority.

Babcock & Wilcox, Ltd., have received an order from Belfast Harbour Board for a three-ton travelling electric crane at York Dock in connection with the transfer of the berth of the Clyde Shipping Co., Ltd., Glasgow, from Donegall Quay to York Dock, East Belfast.

Effective Export Brochure

From the Wellman Smith Owen Engineering Corporation, Ltd., Victoria Station House, Victoria Street, S.W.1, we have received an export brochure produced on most lavish, but tasteful, lines, comparing very favourably with publications which we have had from the

United States, Switzerland and Sweden recently. The main feature is a series of illustrations of the company's heavy engineering products in colour and various tones accompanied by brief conveniently placed descriptions in English, French, Russian and Spanish. The equipment shown includes large electrically-operated cranes, steelworks charging machines and other steelworks plant, hydraulic presses, gas producers, steel-melting and heat-treatment furnaces, etc.

Farming Equipment Demonstration

With the object of showing Surrey farmers how electricity can help them, a demonstration of electrical farming equipment was held on September 14th, at Eashing Farm, Godalming. The British Electrical Development Association co-operated with the Surrey War Agricultural Executive Committee in obtaining the assistance of electricity supply undertakings and manufacturers in supplying equipment for exhibition, while the co-operation of the owner of Eashing Farm, Mr. F. R. Stovold, made it possible to demonstrate the farm's electrical apparatus in action. Reference to the efficiency and long life of electric motors was made by Mr. W. A. H. Parker, M.I.E.E., electrical consultant to the N.F.U., in a short talk. The modern cowsheds are lighted by fluorescent lamps and milking is carried out by Gascoigne apparatus. An electric clock and a radio receiver are installed in the milking shed and an electric water heater is provided over a wash-basin near the shed. Other equipment includes a Frigidaire cold room for storing the milk, bottling equipment, battery-operated trucks and a cold-room for ice-cream. Domestic interest was catered for by a display of refrigerators and a selection of cookers, washers and smaller appliances shown by F. J. Wakeford, electrical and radio engineer, Guildford.

F.B.I. Conference on Export

Vital issues facing Britain's export trade will be discussed at a two-day conference on export to be held by the Federation of British Industries at the Central Hall, London, on November 27th and 28th. The conference will be opened by Sir Clive Baillieu, president of the F.B.I., and presided over by Mr. Leslie Gamage, member of the Grand Council of the F.B.I., president of the Institute of Export, and chairman of the British Export Trade Research Organization. Sir Stafford Cripps, President of the Board of Trade, will speak at the opening session on the significance of exports to the national life. At this session Mr. Leslie Gamage will outline the objectives of the conference and the Rt. Hon. S. M. Bruce, C.H., formerly High Commissioner for Australia in London, will speak on British exports from the point of view of the Dominions.

At the second session "The Functions of Government and of Industry in relation to the Export Trade" will be discussed, the principal speakers being Sir John Woods, Permanent Secretary to the Board of Trade, and Sir Norman V. Kipping, director-general of the Federation of British Industries. On the second morning the subject will be "Production for Export and its Relationship to Production for the Home Market," when the speakers will include Lt.-Col. H. B. Riggall, member of the Grand Council of the F.B.I. and president of the British

Engineers' Association. "Export Selling" is the subject of the final session, when the merchant's selling methods will be discussed by Mr. E. A. Carpenter, J.P., vice-president of the Manchester Chamber of Commerce, and the manufacturer's selling methods by Sir Frederick Bain, deputy-president of the F.B.I.

Trade Publications

General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.—Illustrated brochure (Acro 9987) describing electric cooking, water heating, refrigerating and ventilating equipment, lighting fittings and stewards' call signals for passenger service aircraft.

British Thomson-Houston Co., Ltd., Bridle Path, Watford.—Illustrated leaflet relating to "Mazdalux" horizontal enclosed and side-entry street lighting lanterns.

Measurement, Ltd., Terminal House, Lower Belgrave Street, London, S.W.1.—Illustrated brochure on the type EWG telewattmeter for indicating, recording and summing the readings of distant power meters.

Ardenne Acoustic Laboratories, Ltd., Guildford, Surrey.—Illustrated folder on mains energized "Intercom" loud speaking telephones for business and catering establishments; also technical catalogue of "Philharmonic" sound amplifying and reproducing equipment.

Western Union Telegraph Co., 22, Great Winchester Street, London, E.C.2.—Illustrated pamphlet describing a concentrated-arc lamp as a new source of light.

Alar, Ltd., 35, New Broad Street, London, E.C.2.—Stiff cover folder containing loose leaf data sheets for aluminium casting alloys.

Nevelin Electric Co., Ltd., Purley Way, Croydon, Surrey.—Illustrated brochure dealing with glass-bulb rectifiers, available in capacities of from 0.5 to 5,000 kW at from 25 to 10,000 V.

Ransomes & Rapier, Ltd., Waterside Works, Ipswich.—Illustrated brochure on excavators of various types, Diesel or electrically driven.

[Applicants for copies of these publications should write on their firms' business notepaper.]

Trade Announcement

Engineering & Industrial Exports, Ltd., 72, Horseferry Road, London, S.W.1, have been appointed sole world export distributors of D. Walter & Co., Ltd., manufacturers of studio lighting equipment.

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 makers of the following:—

"Jefferson" mercury switches.
"Draxem," "Rowlett," "Little Atom" toasters.

"Glowbar" silicon carbide rods.

Lamp Publicity—II

Details of Makers' Display Material

A VARIETY of window displays will be available to assist "Osram" lamp dealers. In addition an intensive advertising programme will embrace all the national and provincial newspapers, with supplementary advertising in the



One of the G.E.C. "Osram" displays

popular magazines and the technical press of every industry. The displays have a wide range of appeal, with the accent on maximum light for a minimum of consumption and emphasizing the reliability of "Osram" lamps. They are cheerful in conception and tasteful in design. Each is about 6 ft by 4 ft and forms an admirable centrepiece for the average shop-window.



The Atlas advertising campaign which has been continued throughout the summer will be extended further. Apart from the national daily, Sun-

Atlas window bill

day and evening newspapers, large circulation weekly magazines are being used as well as many of the leading provincial newspapers.

The chain of main road poster sites is being further extended, in addition to positions at railway termini, London Underground stations, etc.

The theme of "Atlas Lamps for Staying Power" will be consistently followed and in the national press this is reinforced with amusing drawings by the well-known artist, Mervyn Wilson, depicting situations in which consumers are registering the resolve "Next Time I'll Get an Atlas." Attractive sales aids for retailers include posters, showcards, cut-outs, window bills, etc., and a new window pelmet.

Crompton Parkinson's plans for the forthcoming lamp season are on the accustomed extensive lines. For Crompton

Kye showcard

lamps, the London national and evening newspapers, a strong list of provincials, and also weekly and monthly periodicals will carry a new type of advertising. There will be a departure from the successful "Hats on Lamps" campaign, and instead a feature will be made of the early installations carried out by Colonel Crompton, the founder of the company.

Kye lamps, too, will be advertised in the national, provincial and periodical press, but



Crompton window arrangement

not in the same media as Crompton lamps. For both Crompton and Kye, new window

display pieces will be available. The main Crompton display cut-out measures 30 in. high by 30 in. wide by 15 in. deep. It is printed in several colours, is in two planes, and is quickly erected. Behind the first plane, which is a most realistically produced lamp, appears a fan-shaped background in attractive colours, surmounted by the slogan and the name. The foot of the display consists of two shelves

useful for the placing of cartons. This display is supported by a showcard cut-out measuring 17 in. square also in colour. It represents the corner of a room, showing a built-in bookcase, fireplace, etc., on the back plane, and the front plane is the cut-out lamp with the message "Use Crompton—Be Bright." The Kye cut-out showcard, also in two planes and several colours, measures 4 in. high by 14½ in. wide.

ELECTRICITY SUPPLY

Islington Welding Tariff. Improvements at Kirkstall.

Alderley Edge and Wilmslow.—INCREASED CHARGES.—The Alderley Edge and Wilmslow Electricity Board is increasing the wartime addition of 7½ per cent on the tariff charges to 15 per cent, as from the December quarter. Hire charges are also increased by 15 per cent on the pre-war rentals.

Bedford.—FARM SUPPLIES.—The Electricity Committee is to extend the mains to supply farms at Haynes, Cranfield, Kempston and Stagsden.

LOANS SANCTIONED.—Sanction has been obtained to borrow £5,507 for mains, £3,863 for substation equipment and £4,310 for change of voltage at Amptill.

Berwick.—STREET LIGHTING CHANGE-OVER.—Steps are being taken by the Town Council to change over the street lighting system from gas

Bury.—SUPPLY TO HOUSES.—The Electricity Committee is to lay cables for supplying electricity to houses at Nangreaves.

Clapham (Beds).—GRID TRANSFORMER STATION.—The Central Electricity Board is to extend the Clapham grid transformer station.

Colwyn Bay.—RURAL ELECTRIFICATION.—The Electricity Committee is applying for sanction to a loan of £51,244 for rural electrification and strengthening of the existing supply network. It is intended to provide an additional intake station at Penmaenhead to control the incoming supply from the North Wales Power Co. at that end of the borough. A centralized control system is also included in the scheme.

Haltemprice (Yorks).—STREET LIGHTING.—The chairman of the Urban District Council (Councillor C. A. Arnett) recently switched on

the new street lighting provided by the Hull Corporation Electricity Department at Hessele and Anlaby, which had been lighted by gas for many years. The new lamps are the first instalment of a total of over 600.

Islington.—RESISTANCE WELDING TARIFF.

Terms on which supplies will be provided for resistance welding have been recommended by the Electricity Committee. These come into force on October 1st and are in a form to enable revision to be made when more data become available. The consumer must pay for the cost of the extension required to cater for the

resistance welder load and any further expenditure on alterations or additions to obviate undue interference with other consumers' supplies.

The disturbance kVA rating of the resistance welders is to be computed on the welder rating proposed by the B.E.A.M.A. and E.R.A. Technical Committees pending settlement by the E.D.A. Tariff Welding Sub-Committee of the basis for charge, due allowance being made for any reduction by the installation of power factor correction equipment.



Scraping the Pot: Many electricity supply authorities have sadly-depleted coal stocks. This is the dump of the Gravesend undertaking, representing about eight days' supply; at this time last year there was six weeks' stock

to electricity. The cost will be about £5,500 and the work will be undertaken by the Scottish Southern Electric Supply Co., Ltd.

Bristol.—MEETING INCREASED LOAD.—Sanction has been given by the City Council to the Electricity Committee for the compulsory acquisition of land in several areas of the city. A proposal to continue the 33,000-V cable from Portishead generating station across the River Avon from Portview Road to the Avonmouth distribution centre has also been approved. The estimated cost is £44,000.

Lancashire.—ROAD LIGHTING.—Improved main road lighting is likely to result in seven Lancashire towns from negotiations between the local authorities and the Lancashire United Transport and Power Company. The towns concerned are Worsley, Tyldesley, Westhoughton, Ince, Abram, Hindley and Golborne through which trolley-buses operated by the power company pass. According to present-day standards the lighting is inadequate, and the company has made an offer, on which final agreement is likely to be reached at a conference of the parties.

Leeds.—MINIMIZING DUST EMISSION.—Application is to be made to the Electricity Commissioners by the Electricity Committee for permission to install three electrostatic dust precipitators at No. 1 boiler house at Kirkstall power station, and to erect a 350 ft reinforced concrete chimney connected to Nos. 1 and 2 boiler houses. These alterations are estimated to cost £200,000, and a further chimney for Nos. 3 and 4 boiler houses, which the Committee proposes to deal with at a later stage, will cost another £100,000.

START ON NEW STATION.—The Lord Mayor (Alderman D. Beever) recently cut the first sod at Skelton Grange, Knostrop, where excavation work has commenced for the new £5,000,000 power station.

Middlesbrough.—SUPPLY TO HOUSING SCHEME.—The second section of the Town Council's scheme for supplying electricity to the Thorntree estate to provide for 500 houses is to cost over £28,000. Two substations will be needed.

STREET LIGHTING IMPROVEMENTS.—Contracts are to be let shortly by the Town Council for electric street lighting equipment.

Rochdale.—LOAN APPLICATION.—The Electricity Committee proposes to apply to the Electricity Commissioners for sanction to borrow £37,500 for meters, mains and services.

Scarborough.—HIRE AND HIRE-PURCHASE.—Certain types of electrical apparatus are to be made available on hire-purchase terms. Electric kettles are to be hired to tenants of all-electric temporary houses as far as supplies permit.

Selkirk.—STREET LIGHTING.—The Town Council has invited Mr. Norman G. Wilson, lighting engineer and manager, Edinburgh Corporation, to advise on a suitable system of street lighting for the burgh.

South Shields.—PURCHASE RIGHTS.—The Electricity Commissioners have made an Order extending for one year the rights of purchase by local authorities under the South Shields Rural Electric Lighting Act.

Stalybridge.—SURPLUS DISTRIBUTED TO LOCAL AUTHORITIES.—The Stalybridge, Hyde, Mossley and Dukinfield Transport and Electricity Board is to distribute £40,000 amongst the four local authorities from the surplus of the undertaking. Each will receive £10,000.

Stirling.—CHANGE-OVER.—The Town Council is to apply to the Electricity Commissioners for consent to change over the system from d.c. to a.c. distribution with a voltage of 240.

Stockton-on-Tees.—SUBSTATION.—The Town Council proposes to build substations to serve the new Le Tourneau factory, the Fairfield House site and Newham Grange.

Swansea.—MEETING HOUSING NEEDS.—The Electricity Committee is to install electricity in army huts used for housing purposes at a cost of £1,100.

FACTORY SUPPLY.—Mains extensions and a new substation to provide an increased supply to Rees & Kirby, Ltd., at Morrington will cost £4,600.

Swinton and Pendlebury.—TRANSFORMERS AND MAINS.—The Electricity Committee has authorized the borough electrical engineer to accept a suitable tender for the supply of power transformers. It is proposed to lay cables to houses in the Deans Road area.

Urmston.—IMPROVED LIGHTING.—The U.D.C. proposes to carry out improvements to the public street lighting, estimated to cost £8,000.

Walsall.—SUPPLY TO LITTLE BLOXWICH.—The Electricity Committee has approved an amended scheme for supplying Little Bloxwich at a cost of £3,700.

Overseas

Argentina.—POWER PRODUCTION.—Some interesting details of the activities of the Compania Hispano-Americana de Electricidad (Chade), which controls the power supply in the city and province of Buenos Aires have recently been made available. They show that there was a steady increase during the war period in the number of consumers supplied—from 714,486 at the end of 1939 to 900,425 at the close of 1945. Despite the fuel supply difficulties the combined output of the different power stations underwent a steady rise—from 1,359 million kWh in 1939 to 1,790 million kWh in 1944. In 1945, owing to the restrictions in supply due to the fuel shortage, the production dropped slightly to 1,728 million kWh. The difficult time experienced by those responsible for steam production is indicated by the figures relating to the different sorts of coal and fuel oil substitutes used during 1944. Thus, from 144,000 tons in 1941 coal imports declined to 16,000 tons in the later year, while those of fuel oil dropped from 169,000 tons to nil. During 1944, 36,000 tons of Argentine fuel oil was used together with 8,000 tons of native coal and coke, 165,000 tons of charcoal, 52,000 tons of linned oil and 1,023,000 tons of maize, wheat and other vegetable products, the utilization of which rendered necessary many modifications of the boiler-firing equipment. It was found that a ton of the vegetable fuel yielded a third of the steam production from one ton of coal. The combined capacity of the Chade Co.'s generating stations, despite the fact that the addition of much new plant had to be postponed, increased from 567,850 kW at the close of 1939 to 626,100 kW at the end of last year.

I.E.E. Students' Journal

THE I.E.E. "Students' Quarterly Journal," is issued free of charge to students, and also to graduates until their membership of the Students' Section ends, but other members may obtain it on payment of an annual subscription of 6s. to the secretary of the Institution. The charge to non-members is 10s. per annum.

RECENT INTRODUCTIONS

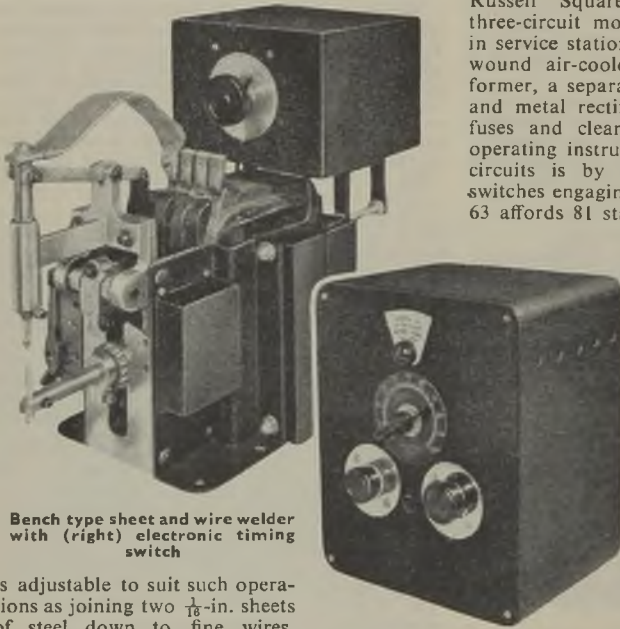
Notes on New Electrical and Allied Products

Resistances and Elements

FLEXIBLE resistances and heating elements have for some time been made by ELECTRO METHODS, LTD., 220, The Vale, London, N.W.11, for operation at up to 150 deg C. They are now being made for temperatures of the order of 250 to 300 deg C. This result has been achieved by silicone varnish impregnation, so rendering the treated elements suitable for use in tropical climates.

Bench Welders and Controllers

The electrode pressure of the range of bench welders made by HIRST DEVELOPMENT, LTD., 138, Lever Street, Clerkenwell, London, E.C.1,



Bench type sheet and wire welder with (right) electronic timing switch

is adjustable to suit such operations as joining two $\frac{1}{16}$ -in. sheets of steel down to fine wires, including thermocouples. The machines weigh 1 cwt and measure 12 by 12 by 18 in. They are rated at 0.5, 1, 2, 3 and 4 kVA for one-, two- or three-phase inputs at from 110 to 400 V. The toggle electrode (top) carrier can be varied in height and is interchangeable with press-type mechanism while the bottom electrode holder is also adjustable in height, quickly and simply, or it can be replaced by a jig assembly holder and work table. An attachment may be fitted for butt welding wires. The mechanical circuit breaker is easy to get at for contact renewals and all transformer taps furnish full output

with stepless control of intermediate primary current.

A range of electronic timers is also produced. Type "E" measures 7 in. by 8 in. by 10.5 in. and has been specially developed for resistance welding and general processing; it is capable of switching more than 6 kVA with a range of from 1/50th to 10 seconds, or more, which is infinitely variable. The less elaborate type "N" for ferrous welding ranges up to 6 seconds and the type "H" for controlling 80 kVA ranges from 1/100th second down to zero.

Battery Chargers

The range of thirty battery chargers manufactured by F. C. HEAYBERD & CO., LTD., 28, Russell Square, London, W.C.1, includes three-circuit models specially designed for use in service stations. They incorporate a double wound air-cooled vacuum impregnated transformer, a separate 2½-in. moving iron ammeter and metal rectifier for each circuit, protective fuses and clearly engraved labels giving full operating instructions. Current control on all circuits is by means of rotary snap action switches engaging transformer tappings. Model 63 affords 81 stages of control on each circuit, while model 64 has 81 stages of control on the first circuit, 45 on the second and 36 on the third. The cabinets are constructed of well ventilated sheet steel 24 in. high by 18 in. wide by 14 in. deep and are finished in grey glossy enamel.

Heat-Controlled Iron

A household clothes iron known as the "Powquip" is being made by the POWER EQUIPMENT CO., LTD., Kingsbury Works, The Hyde, Hendon, London, N.W.9, and distributed in London and the home counties by the LONDON ELECTRICAL CO., LTD., 92, Blackfriars Road, London, S.E.1. It is loaded at 750 W and has a regulator for controlling the heat within ± 5 per cent of the pre-selected temperature.

The iron's moulded bakelite "spade grip" handle is open at the front to enable the point of the iron to pass well inside sleeves, cuffs and collars. The fixed side-entry connector is provided with a flexible steel spring to minimize chafing. The sole plate is nickel-plated and the body is an aluminium alloy diecasting finished in pastel colours.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Metal Industries, Ltd.—The annual general meeting was held at Glasgow recently, Sir J. Donald Pollock presiding. The chairman in the course of his speech said that the electrical interests of the group—it owns the whole capital of the Igranic Electric Co., Ltd., and holds all the ordinary stock of Electrical Switchgear & Associated Manufacturers, Ltd.—were now organized under their wholly owned subsidiary, Metal Industries (Electrical Group), Ltd. Other interests came under Sentinel (Shrewsbury), Ltd., and Metal Industries (Salvage), Ltd., and when the transfer of certain operations to the last-named was completed Metal Industries, Ltd., would act solely as the parent company, co-ordinating and developing policy in the various spheres of activity. Referring to the electrical group, he said that the profits to be earned depended on the production which could be achieved, and this was conditioned by continuance of labour shortages. The value of work waiting attention was fully satisfactory.

Regarding the question of a capital issue in view of the development programme of the group, the chairman said that the directors would advise members of their proposals so soon as it was possible to do so.

Vactric, Ltd.—The accounts for the year ended March 31st show a trading loss of £121,852 (compared with a profit of £64,660 for 1944-45). After providing for directors' fees £912 (£1,037) and depreciation £1,070 (£25,849) the net result is a loss of £123,834 (against a profit of £37,774), to which is added £26,061 taxation reserve not required. As already announced, there is to be no distribution on the ordinary shares (last year 22½ per cent) and payment of the preference dividend for the half-year ended March 31st last has been deferred. A debit balance of £76,513 is carried forward against a credit of £21,955 brought in. A combined statement shows a net trading loss for the group of £117,709 against a profit of £55,439. The report states that the loss carried forward is more than counter-balanced by a profit of £91,988 made on the sale of two freehold properties. The company's new factory in Scotland is many months in arrear on the construction programme and it contributed nothing to production in the year under review. The transitional period between war and peace has proved longer and more onerous than seemed likely, but on the long view the prospect appears favourable, although this depends to a large extent on the date of completion of the new factory, the successful handling of labour problems and the obtaining of a reliable flow of new materials.

Thomas De La Rue & Co., Ltd., held their annual meeting in London last week when Mr. B. C. Westall (chairman and managing director) presided. In his address, which had been circulated, the chairman referred to the progress of the various subsidiaries. Regarding De La Rue Plastics, Ltd., he said that under the dis-

persal scheme a considerable number of presses had been sent to their Scottish factory. They had hoped to be able to obtain sufficient orders from local sources to keep these presses busy, but after a protracted trial they had come to the conclusion that they could not expect a sufficient volume of business to operate the plastics plant at Strathendry economically. It was therefore decided to remove the plant back to their Walthamstow factory. The output of the latter factory was now improving.

During the year they had decided to put into force their plans for the expansion of De La Rue Insulations, Ltd. A factory was being built at Tynemouth which would house not only the existing laminated plant at Walthamstow, but the considerable new plant which was now being installed, as well as that for the manufacture of "Traffolyte" acquired from Metropolitan-Vickers.

The chairman announced that an extraordinary general meeting would be held to deal with proposals for subdividing the £1 shares into four shares of 5s. each, and for increasing the capital.

Brush Electrical Engineering Co., Ltd.—A reduction in net profits from £147,257 for 1944 to £45,447 last year is reported. The latter figure is arrived at after bringing into the profit and loss account a sum of £170,000 from general reserve to meet a provision of £163,006 for turbine rectification and incidental matters. Goodwill of £73,041 has been written off from share premiums account. The directors have decided not to recommend a final dividend, so that the total distribution for the year will be 4 per cent against 10 per cent for 1944. The half-yearly preference dividend due on October 1st has been declared. A sum of £56,744 is carried forward against £11,560 brought in.

Nigerian Electricity Supply Corporation, Ltd.—In his review of the year's activities Mr. E. Seaborn Marks (chairman and managing director) says that at the moment the future of the Nigerian tin industry, which absorbs about 98 per cent of the company's power, is not clear, as it hinges on the price which the Ministry of Supply proposes to pay to tin producers. During the year to February 28th last the company sold just under 56 million kWh, a decrease of 10.9 per cent on the previous year. The average price received per kWh sold was 0.858d. Part of the scheme for modernizing the Kwall station has been carried out and operations generally have improved over the system.

Max Stone, Ltd., report an increase in net profit, before taxation, from £69,706 for the year ended June 30th, 1945, to £115,057 last year. The final dividend of 25 per cent makes the total distribution for the year 40 per cent (against 15 per cent).

Radiovisor Parent, Ltd., in a preliminary statement, shows a net profit for the year to March 31st of £3,200 (against £5,708). This reduces the deficit brought in from £28,476 to £25,276.

The Dubilier Condenser Co. (1925), Ltd., records a net profit for the year to March 31st

last of £29,822 against £19,917 for 1944-45, after providing £21,000 (£18,000) for taxation. The dividend is maintained at 20 per cent and £24,076 (£22,895) is carried forward.

Engineering & Lighting Equipment Co., Ltd.—A reduction in trading profit from £46,254 for 1944-45 to £19,614 for the year ended March 31st last is reported and is attributed to the change-over from war to peace production. After taking into account £10,000 from E.P.T. recoverable and providing for taxation the net profit was £13,309 (£21,357). The ordinary dividend is maintained at 8 per cent but there is no allocation to the redemption fund (£8,118 in the previous year), and £2,571 (£1,553) is carried forward.

Thorn Electrical Industries, Ltd.—In our report of the annual meeting (*Electrical Review*, September 13th) reference was made to the company's lamp factory which was being transferred to Enfield. This should have read "lamp cap factory."

The Midland Counties Electric Supply Co., Ltd., is raising its interim dividend on the ordinary stock from 3 to 4 per cent.

The Woking Electric Supply Co., Ltd., has announced an interim dividend of 6 per cent less tax (against 3 per cent free of tax last year).

The St. Austell & District Electric Lighting & Power Co., Ltd., is repeating its interim dividend at 4 per cent.

Altrincham Electric Supply, Ltd., has announced an interim dividend of 10 per cent (same) on the deferred ordinary shares.

The Jerusalem Electric & Public Service Corporation, Ltd., proposes to pay a first and final dividend of 6 per cent against 5 per cent last year.

The Electrical Finance & Securities Co., Ltd., has declared an interim dividend of 4 per cent (same).

New Companies

National Electric & Engineering Co. (Birmingham), Ltd.—Registered September 9th. Capital, £2,500. To acquire the businesses of (1) Morgan Bros., electrical engineers and contractors, carried on at 1223, Pershore Road, Stinchley, Birmingham, by T. J. Morgan, A. Baker, A. Morgan, S. Morgan and H. Morgan, and (2) the National Electric & Engineering Co., carried on at 1663, High Street, Knowle, Warwickshire, by the same persons. Directors: T. J. Morgan, A. Baker, A. Morgan, S. Morgan and H. Morgan. Regd. office: 1663, High Street, Knowle, Warwickshire.

Welwyn Electricity Installations, Ltd.—Registered September 13th. Capital, £5,000. Electrical installation contractors. Directors: Sir Theodore G. Chambers, K.B.E., R. L. Reiss, L. T. M. Gray, Maj.-Gen. John Buckley, C.B.E., A. K. Graham, J. F. Eccles and C. E. Lumb, all directors of Welwyn Garden City, Ltd. Regd. office: Estate Office, Wigmores North, Welwyn Garden City, Herts.

G. N. Drinkwater, Ltd.—Registered September 11th. Capital, £500. To acquire the business of a radio, television and electrical engineer and salesman, etc., carried on by G. N. Drinkwater at 168, Chestnut Grove, Mitcham, Surrey.

Directors: G. N. Drinkwater and Mrs. D. M. Drinkwater. Regd. office: 168, Chestnut Grove, Mitcham, Surrey.

Rems (Refrigeration & Electrical Maintenance & Supplies), Ltd.—Registered September 9th. Capital, £2,000. To carry on business as indicated by the title. Directors: F. J. V. Minchin and H. W. Barker. Regd. office: 250, Yeading Lane, Hayes, Middlesex.

B.A.F. (Staffs), Ltd.—Registered September 9th. Capital, £5,000. Manufacturers of, and dealers in, batteries, electrical equipment, wireless and television requisites, etc. Directors: F. W. Anderson, H. J. Burns and H. Farrell. Regd. office: Copeland Street, Stoke-on-Trent.

Good Electric Co., Ltd.—Registered September 12th. Capital, £100. Manufacturers of, and dealers in, dynamos, motors, armatures, magnetos, batteries, etc. Directors: J. W. Good, 247, Billet Road, Walthamstow, E.17, and N. F. Allard, 14, Mons Avenue, Billericay, Essex.

T. M. Morton, Ltd.—Registered September 12th. Capital, £5,000. Electrical equipment specialists, electrical and radio engineers, etc. Directors: T. M. Morton, W. J. Reay and R. Kitchen. Regd. office: 9, Eldon Square, Newcastle-on-Tyne.

Potteries Refrigeration, Ltd.—Registered September 13th. Capital, £1,500. To acquire the business of an electrical and refrigeration engineer carried on by A. Roby at 1a, Winton Terrace, Porthill, Stoke-on-Trent. Directors: A. Roby and Maisie Roby. Regd. office: 52, High Street, Wolstanton, Staffs.

Jack English, Ltd.—Registered September 14th. Capital, £1,000. Electricians, electrical engineers, etc. Directors: J. D. English and S. F. Speight. Regd. office: 123, Granby Street, Leicester.

Companies Struck Off Register

The names of the following companies have been struck off the Register and they are thereby dissolved:—British Lion Battery Co., Ltd., British Radiotone Co., Ltd., Haigh Radio, Ltd., and Liberty Electrical Products, Ltd.

Increases of Capital

Bignell & New, Ltd.—The nominal capital has been increased by the addition of £3,000, in £1 ordinary shares, beyond the registered capital of £3,000.

L. & G. Francis & Co., Ltd.—The nominal capital has been increased by the addition of £1,000, in £1 ordinary shares, beyond the registered capital of £3,000.

Liquidations

Telephone Development Association.—General meeting of members at Brettenham House, Lancaster Place, Strand, W.C.2, October 17th, to hear an account of the winding-up by the liquidator, Mr. H. P. Walters.

Bankruptcies

T. D. Dawes, 10, Church Street, Oakengates, Salop, electrical and radio engineer.—Discharge suspended for three months. Date of discharge November 19th, 1946.

STOCKS AND SHARES

THE falls which took place in Stock Exchange markets as the result of a severe shake-out in New York, have been more or less forgotten in the subsequent recovery. Wall Street continues in a highly sensitive condition, rally being followed by fresh weakness; the latter, in its turn, is succeeded by another brief period of upward reaction. The London Stock Exchange has thrown off its allegiance to New York, and, under the resumed influence of investment buying, prices have recovered a good part of their previous losses.

Month's Price Changes

The majority of price changes during the past month have been adverse to stockholders, but Home electricity ordinary shares provide an exception, there being some half a score of moderate rises in this section. Indian utilities are lower. Tokyo electric sixes have fallen 2 points. Victoria Falls dropped to £5, and a rally to 5½ still left a fall of 5s. on the month. Cable & Wireless ordinary shed 5 points, receding to 108. The price has been down to 105½. Globe Telegraphs fell 1s. to 41s. 6d. The slump in New York is reflected in a 6½ point drop, to 21, in International "Tel. & Tel."

Equipment and manufacturing shares are mostly down as compared with a month ago. Siemens, however, are 1s. up at 38s. Burco at 28s. 3d., and British Vacuum Cleaner at 28s. 9d. show substantial improvement. At 54s., Greenwood & Batley are 2s. higher. In the "heavy" group, Vickers fell to 26s. 3d. before advancing to 27s. 6d. on hopes of an increase in dividend. Babcocks have fallen 2s. 6d. to three guineas.

Dividend Announcements

Midland Counties Electric Supply agreeably surprised the market with the declaration of an interim dividend of 4 per cent, which is 1 per cent better than last year's. For 1945 the company paid a total of 10½ per cent, including a bonus of 2½ per cent. The latter is given a firmer appearance by reason of the interim decision and the price is 1s. up at 46s. Dubilier Condenser doubled its ordinary dividend, to 20 per cent, a year ago, and now announces the maintenance of that rate for the year ended last March. At 4s. 3d. the 1s. shares pay 4½ per cent on the money. Radio & Television Trust (formerly the Philco Company) have announced the due payment of interest on the preference stock and sinking fund certificates. The ordinary are 6d. down at 9s. 6d. Scophony at 9s. are 1s. 6d. lower.

Transport Stocks

To holders of Home Railway stocks the possibility of another increase in railway fares and charges is largely of academic interest so long as the companies' revenues continue to be governed by the wartime agreement with the Government. Negotiations for the increase

have, however, had the moral effect of strengthening prices, on the view that success would fortify compensation claims in the event of nationalization.

On the conclusion of the Anglo-Argentine agreements, Argentine railway stocks have secured spectacular gains, especially in the senior stocks. Revival of optimism overflowed into other issues likely to benefit from better relations between the two countries. Anglo-Argentine Tramways issues are a notable case in point, the first preference having advanced from 2s. to 3s. 6d., and the 4 per cent income debentures from 4½ to 6½. Atlas Electrics rose 10 to 10s. on the hope of an improvement in the position of the Montevideo Tramway subsidiary.

A.E.I. Dividends

The strength of Associated Electrical Industries shares stands out prominently. Since the company broke with tradition recently with the payment of an interim dividend (5 per cent) the price of the shares has risen from 66s. to close on 70s. Hopefulness about dividend prospects had already been given some substance at the meeting in April, when the chairman spoke of the rewards due from a long-sustained policy of putting profits back into the business. For the last eight years ordinary shareholders received 10 per cent. Optimism calculates that at the present price of the shares, the yield on a 12½ per cent dividend would be over 3½ per cent, and on 15 per cent, more than 4½ per cent. Changes announced in the board will bring in the managing directors of the Metropolitan-Vickers and the British Thomson-Houston Companies, the principal subsidiaries of A.E.I.

Brush Electrical

After weakening to 8s. 6d. in advance of the final dividend announcement, the 5s. shares of Brush Electric fell another 1s. on the decision to make no further distribution in respect of the year ended last December. At 7s. 6d. the shares are 3s. down on the month. The price was nominally 5s. at one time. An interim of 4 per cent was paid last November; for 1944 the total payment was 10 per cent. According to the preliminary statement, the net profit has fallen from £147,000 to £45,000, after bringing in £170,000 from reserves to meet £163,000 for turbine rectification. Last April the company stated that a turnover of £4 millions was expected in the current year's business, and that the intention was to raise fresh capital. Associated British Engineering fell to 42s. 6d. in sympathy with the drop in Brush.

Thorn Electrics

For many years the earnings on Thorn Electric ordinary capital have been equal to more than double the regular 20 per cent dividends. Interest attaches, therefore, to the chairman's justification, at last week's meeting,

(Continued on page 513)

ELECTRICAL INVESTMENTS

Past Month's Price Changes

Company	Dividend		Middle Price Sept. 20	Month's Rise or Fall	Yield p.c.	Company	Dividend		Middle Price Sept. 20	Month's Rise or Fall	Yield p.c.	
	Pre-vious	Last					Pre-vious	Last				
Home Electricity Ordinary												
Bournemouth and Poole ..	12½	12½	63/6	-6d.	3 19 2	Baldwin, H.J.(2/-)	10	20	12/6	-9d.	3 4 0	
British Power and Light ..	7	8	32/6	+6d.	4 18 6	British Aluminium	10	8	42/6	-1/-	3 15 2	
City of London ..	6	7	31/-	..	4 10 4	British Insulated & Callender's ..	..	..	47/-	-1/6	—
Clyde Valley ..	8	8	42/-	+1/6	3 17 0	British Rola (2/-)	15	15	6/9	+3d.	4 8 9	
County of London ..	8	10	44/-	+1/-	4 11 0	British Thermostat (5/-)	18½	18½	23/9	..	3 18 0
Edmundsons ..	6	6	28/-	+6d.	4 5 9	British Vac.Cleaner (5/-)	30	20	28/9	+½	4 2 0
Elec.Dis.Yorkshire	9	9	44/6	+6d.	4 1 0	Brush Ord.(5/-) ..	10	4	7/6	-3/-	2 13 4	
Elec. Fin. and Securities ..	13½	15	62/-	+2/-	4 16 9	Burco (5/-)	15	20	28/3	+4/6	3 10 10
Elec. Supply Corporation ..	10	10	44/-	..	4 11 0	Chloride El.Storage	15	15	98/9	..	3 1 0	
Lancs. Light and Power ..	7½	7½	31/6	..	4 15 3	Christy Bros. ..	12½	17½	85/-	..	4 2 7	
Ltanelly Elec. ..	6	6	26/-	..	4 12 4	Cole, E. K. (5/-)	20	20	32/6	-¼	3 0 7	
Lond. Assoc. Electric	4	6	25/6	..	4 14 0	Cossor, A. C. (5/-)	10*	12½*	34/-	-6d.	1 16 9	
London Electric ..	6	6	26/-	..	4 12 4	Crabtree (10/-) ..	17½	17½	49/6	-½	3 11 0	
Metropolitan E.S. ..	8	9	42/-	..	4 5 9	Crompton Parkinson Ord. (5/-) ..	22½	22½	33/-	-1/-	3 8 3	
Midland Counties ..	8	8	46/-	+1/-	3 9 7	De La Rue ..	40	45	13½	+½	3 8 9	
Mid. Elec. Power ..	9	9	44/-	..	4 1 9	Decca (1/-) ..	100	112	57/6	-¼	1 19 9	
Newcastle Elec. ..	7	7	31/-	..	4 10 4	E.M.I. (10/-) ..	8	8	31/9	-1/-	2 12 0	
North Eastern Elec.	7	7	30/6	..	4 11 10	Elec. Construction	10	12½	67/6	..	3 14 0	
Northampton ..	10	10	48/-	..	4 3 4	Enfield Cable Ord.	12½	12½	58/6	-2/-	4 5 8	
Northmet Power ..	7	9	42/-	+1/-	4 5 10	English Electric	10	10	61/6	-2/-	3 5 0	
Scottish Power ..	8	9	40/-	..	4 10 0	Ericsson Tel. (5/-)	22*	20*	55/-	-1/-	1 16 6	
Southern Areas ..	5	5½	22/-	..	5 0 0	Ever Ready (5/-)	40	40	46/-	-1/6	4 6 0	
South London ..	7	7	31/-	..	4 10 4	Falk Stadelmann	7½	10	47/6	-½	4 4 2	
Yorkshire Elec. ..	9	9	45/6	+1/6	3 18 6	Ferranti Pref. ..	7	7	34/6	..	4 1 2	
Public Boards												
Central Electricity:						Pref. ..	6½	6½	37/6	..	3 9 4	
1963-93 ..	3½	3½	109	+½	3 4 3	Ord. ..	17½	17½	98/9	-½	3 11 0	
1974-94 ..	3½	3½	108	+1	3 0 2	General Cable(5/-)	15	15	23/-	..	3 5 2	
London Elec. Trans. 2½	2½	100	..	..	2 10 0	Greenwood & Batley	15	15	54/-	+2/-	5 11 0
Lond.Pass.Trans.Bd.						H.T.A. (10/-) ..	12½	10	21/6	..	4 13 0	
A ..	4½	4½	125½	..	3 11 9	Heatrae (3/-) ..	12½	12½	8/-	..	4 14 0	
B ..	5	5	120½	..	4 3 0	Henley's (5/-) ..	20	20	28/-	..	3 11 5	
C ..	3	3	60½	..	4 19 2	4½% Pref. ..	4½	4½	25/-	..	3 12 0	
Overseas Electricity Companies												
Atlas Elec. ..	Nil	Nil	10/-	+1/-	—	Hopkinsons ..	17½	20	98/9	-¼	4 1 0	
Calcutta Elec. ..	6*	6*	55/-	-7/6	2 3 8	Intl. Combustion	30	32½	9	-½	3 8 6	
Cawnpore Elec. ..	13	13	57/3	..	4 10 10	Johnson & Phillips	15	15	92/6	-½	3 12 10	
East African Power	7	7	46/-	+6d.	3 0 10	Lancashire Dynamo	22½	22½	5½	..	3 18 2	
Jerusalem Elec. ..	5	5	23/6	..	4 5 1	Laurence, Scott(5/-)	12½	12½	11/-	-6d.	4 9 3	
Madras Elec. ..	4	6	37/6	-½	3 4 0	London Elec. Wire	7½	7½	43/9	..	3 8 9	
Montreal Power	1½	1½	24	-½	—	Mather & Platt ..	10	10	54/9	-½	3 14 6	
Nigerian Elec. ..	10	12½	42/-	-1/-	5 19 0	Metal Industries(B)	9	10	58/9	-½	3 8 0	
Palestine Elec. "A" 5*	6*	6*	35/6	-6d.	3 7 5	Mid. Elec. Mfg. ..	25	25	8½	..	2 16 1	
Perak Hydro-elec.	6	7	16/-	-6d.	—	Murex ..	20	20	91/3	+¼	4 7 9	
Tokyo Elec. 6%	6	6	36½	-2	—	Newman Ind.(2/-)	22½	22½	9/6	+6d.	4 14 9	
Victoria Falls Power	15	19	5½	-½	3 10 4	Plessey (5/-) ..	20	20	37/6	-½	—	
Whitehall Inv. Pref.—	6	6	26/6	..	4 10 7	Power Securities	6	6	32/-	+1/-	3 15 0	
Equipment and Manufacturing												
Aron Elec. Ord. 15	10	57/6	-½	..	3 19 6	Pye Deferred (5/-)	25	25	36/-	-1/-	3 9 5	
Assoc. Brit. Eng. 8	12	42/6	-½	..	5 13 0	Radio & Tel. (2/-)	25	10	9/6	-6d.	2 2 0	
Assoc. Elec. :						Revo (10/-) ..	17½	20	53/6	-1/-	3 14 8	
Ord. ..	10	10	69/6	+6d.	2 17 6	Reyrolle ..	12½	12½	80/-	..	3 2 6	
Pref. ..	8	8	44/3	..	3 12 5	Scophony (5/-) ..	..	..	9/-	-1/6	—
Automatic Tel. & El. 12½	12½	74/6	-1/-	..	3 7 2	Siemens Ord. ..	7½	7½	38/-	+1/-	3 19 0	
Babcock & Wilcox 12	12½	63/-	-½	..	3 19 4	Strand Elec. (5/-)	10	12½	12/6	-6d.	4 18 1	
						Switchgear & Cows (5/-) ..	20	20	27/-	..	3 14 0	
						T.C.C. (10/-) ..	10	12½	31/9	..	3 18 8	

(Continued on next page)

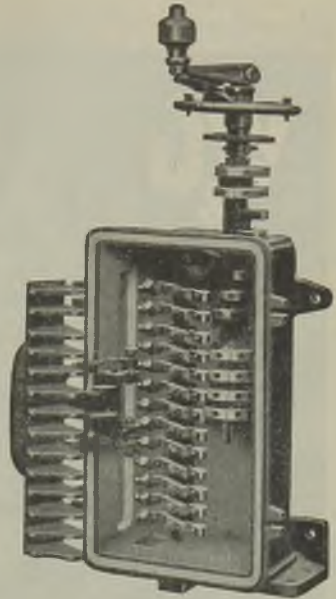
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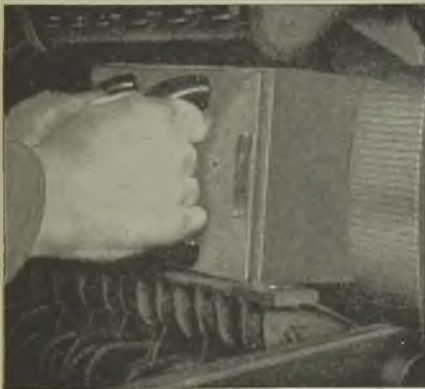
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Company	Dividend		Middle Price Sept. 20	Month's Rise or Fall	Yield p.c.
	Previous	Last			
Equipment and Manufacturing (Continued)					
T.C. & M.	10	10	55/6	-2/9	3 12 3
Telephone Mfg. (5/-)	9	9	13/9	-9d.	3 5 6
Thorn Elec. (5/-)	20	20	33/9	+½	2 19 3
Tube Investments	20	22½	6	-10	3 15 0
Vactric (5/-)	Nil	Nil	16/3	-½	—
Veritys (5/-)	7½	7½	3/-	-1/-	4 13 9
Walsall Conduits (4/-) 55	55	55/-	55/-	-6d.	4 0 0
Ward & Goldstone (5/-)	25	35	49/6	..	3 11 0
Watford (2/-)	15	15	7/9	-3d.	3 17 4
Westinghouse Brake	14	14	75/-	-3/-	3 14 9
West, Allen (5/-)	7½	7½	8/-	..	4 13 9
Traction and Transport					
Brit. Elec. Traction :					
Def. Ord.	45	45	1110	-15	4 1 1
Pref. Ord.	8	8	178	..	4 10 0
Calcutta Trams.	6½	7½	62/6	-¾	2 8 0
Cape Elec. Trams	5	6	32/-	..	3 15 0
Southern Rly. :					
5% Prefd.	5	5	71	-½	7 0 10
5% Pref.	5	5	109½	-1½	4 11 2

* Dividends are paid free of Income Tax.

Company	Dividend		Middle Price Sept. 20	Month's Rise or Fall	Yield p.c.
	Previous	Last			
T. Tilling	10	10	52/6	-1/6	3 16 2
West Riding	10	10	50/-	+6/3	4 0 0
Telegraph and Telephone					
Anglo-Am. Tel. :					
Pref.	6	6	140½	+4	4 5 6
Def.	1½	1½	32½	..	4 13 9
Anglo-Portuguese	8	8	31/-	-1/-	5 3 3
Cable & Wireless :					
5½ Pref.	5½	5½	116½	-1	4 14 5
Ord.	4	4	108	-5	3 14 1
Canadian Marconi	\$1 Nil	4 cts.	13/9	-½	—
Globe Tel. & Tel. :					
Ord.	8½*	5*	41/6	-1/-	2 6 2
Pref.	6	6	32/6	..	3 13 10
Great Northern Tel. (£10)					
20	18	32	..	5 12 6	
Inter. Tel. & Tel.	Nil	Nil	21	-6½	—
Marconi-Marine	7½	7½	35/-	-1/-	4 5 9
Oriental Tel. Ord.	4	4	56/-	-2/9	—
Telephone Props.	Nil	6	22/6	..	5 6 7
Tele. Rentals (5/-)	10	10	14/6	..	3 9 0

Stocks and Shares (Continued from p. 511)

of the prudence of pursuing a conservative dividend policy at a time when shortages and re-conversion difficulties are prominent. An increase in dividend is not intended without confidence that it can be maintained. At 34s., the 5s. shares are on a yield basis of just under 3 per cent. Against a capital of £150,000 (increased last July to £206,250), the last balance sheet showed the general reserve at £155,000 and net liquid assets of the group at £242,000.

De La Rue

Directors of companies not infrequently maintain that the price of their companies' shares in the market is no concern of theirs. In this connection it is of interest to notice that the chairman of Thomas De La Rue & Co. at the annual meeting, said that for many years the company had been handicapped in its dealings abroad by the low price of its shares on the London Stock Exchange, and that the company's prestige was affected thereby. To-day, he went on, circumstances were different, and the reputation of the company throughout the world was such that they could regard the possibility of sub-dividing their shares with a degree of complacency which was not possible a few years ago. This statement suggests that the price of a company's shares is a matter of practical value, to its business, and the proposal to split the shares has resulted in the rise of 17s. 6d. to 13½ in the price.

General Electric (N.Y.)

The General Electric Company (New York) is one of the mammoth American companies whose finance runs into many millions. The

issued capital, according to the last published figures, is nearly \$29 million in common shares of no par value. The company arranged in January this year with 112 banks in the United States, to borrow \$100 million, of which \$52 million is about to be called. The money is required for conversion purposes, and for the post-war expenditure upon which the company is embarking. The amount of the loan now being drawn is to run, the chairman of the company states, for one year, with interest at 1½ per cent, and the balance of the loan, \$48 million, may be required some time in the future. The price of the shares has fallen to 46½, in the Wall Street shake-out.

Natural Rubber in Cables

THE Cable Makers' Association announces that supplies of natural rubber are now available in such quantity that all restrictions on its use for the manufacture of electric cables can be abandoned. For some months deliveries of crude rubber have been coming forward in increasing quantities and the rubber content of the insulation of the "War Emergency" types of cable, which have been marketed since 1942, has recently been gradually enriched to an extent which already brings the cables very near to the pre-war grades. It has now been agreed with the Ministry of Supply that the compulsory use of substitutes for natural rubber shall cease, and the cable industry is satisfied that all manufacturers will be in a position to market cables from October 1st onwards in which no restriction whatever is placed on the use of natural rubber.

The Cable Makers' Association, therefore, assures its customers that they will now have at their service post-war types of rubber cables of the highest possible quality, embodying progressively all the results of its continuous large-scale research and development work.

NEW PATENTS

Electrical Specifications Recently Published

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

■ ALLDAY & Son (1922), Ltd., and R. Bain.—“Electric tumbler switches.” 12298. June 28th, 1944. (580301.) “Electric tumbler switches.” 12299. June 28th, 1944. (580302.)

Automatic Telephone & Electric Co., Ltd., and H. K. Heppell.—“Alternating current generators.” 12687. July 4th, 1944. (580342.)

Automatic Telephone & Electric Co., Ltd., W. Saville and P. N. Roseby.—“Electrical signalling systems.” 17915. September 20th, 1944. (580393.)

British Insulated Cables, Ltd., J. C. Quayle and P. Jones.—“Apparatus for heating by high-frequency electric energy.” 4886. March 16th, 1944. (580374.)

British Thomson-Houston Co., Ltd.—“Heat exchangers such as surface condensers.” 12080/44. June 26th, 1943. (580290.) “Synthetic resinous condensation products.” 4480/43. March 26th, 1942. (580405.) “Electric discharge lamps.” 4481/43. March 26th, 1942. (580406.) “Systems for magnetic field investigation.” 5199/44. March 19th, 1943. (580445.)

C. S. Bull.—“Circuit arrangements employing electron discharge devices utilizing velocity modulation.” 12424. September 2nd, 1942. (580402.)

Cinch Manufacturing Corporation.—“Holders for electric discharge valves or tubes.” 13327/44. July 27th, 1943. (580461.)

W. W. Constantine (General Motors Corporation).—“Electric switch control mechanisms.” 11347. June 14th, 1944. (580287.)

E. A. Derungs.—“Electromagnet.” 7908. April 27th, 1944. (Convention date not granted.) (580451.)

English Electric Co., Ltd., M. A. B. Landers and C. A. Wilson.—“Tripping or indicating devices for electric fuse links.” 15034. August 8th, 1944. (580462.)

C. E. Fenwick and C. S. Wright.—“Waveguides for wireless systems.” 5740. March 28th, 1944. (580377.) “Waveguides for wireless systems.” 5741. March 28th, 1944. (580378.)

L. Fuller and E. W. Sudlow.—“Electric secondary batteries.” 23254. November 22nd, 1944. (580396.)

General Electric Co., Ltd., and A. W. Highfield.—“Holders for arc-welding electrodes.” Cognate applications 9447/44 and 10758/44. May 17th, 1944. (580452.)

General Electric Co., Ltd., A. H. McKeag and P. W. Ranby.—“Luminescent materials.” 12766. August 6th, 1943. (580363.)

Ges. zur Forderung der Forschung auf dem Gebiete der Technischen Physik an der Eidgenossischen Technischen Hochschule.—“Cathode ray television apparatus.” 18069/43. June 5th, 1943. (580413.)

A. H. Gledhill.—“Electric master clocks.” 11153. June 10th, 1944. (580456.)

Johnson & Phillips, Ltd., D. Douet and F. W. Read.—“Microphones.” 24. January 1st, 1944. (580419.)

Landis & Gyr, Soc. Anon.—“Immersion temperature regulator for electrically controlled apparatus.” 12950/44. July 9th, 1943. (580387.) “Frequency electric relay.” 12951/44. July 9th, 1943. (580388.)

J. Lucas, Ltd., and W. Cooke.—“Electric lighting systems for cycles.” 1723. January 22nd, 1945. (580355.)

Magnetic Analysis Corporation.—“Demagnetizing apparatus.” 12425/44. November 1st, 1943. (580326.)

Marconi's Wireless Telegraph Co., Ltd.—“Variable permeability tuning circuits.” 12244/44. June 28th, 1943. (580297.)

M-O Valve Co., Ltd., and J. Bell.—“Electric discharge devices.” 6120. April 1st, 1944. (580424.)

M-O Valve Co., Ltd., R. L. Breadner, E. G. James, G. W. Warren and A. E. Widdowson.—“Construction of thermionic grid-controlled valves.” 8681. June 24th, 1942. (580401.)

Standard Telephones & Cables, Ltd.—“High frequency oscillator circuit for induction heating apparatus.” 7406/44. May 4th, 1943. (580448.)

Standard Telephones & Cables, Ltd. (International Standard Electric Corporation).—“Radio direction finders.” 10973. August 6th, 1942. (580361.)

Standard Telephones & Cables, Ltd., and H. P. Williams.—“Thermionic amplifier circuits.” 12239. June 27th, 1944. (580324.)

Standard Telephones & Cables, Ltd., E. Mills and E. C. J. Marsh.—“Treatment of a copper surface to prevent molten metal adhering thereto.” 7405. April 21st, 1944. (580379.)

Sulzer Freres, Soc. Anon.—“Pressing tools for manufacturing blades for turbo-machines.” 12801/44. August 9th, 1943. (580432.)

Svenska Turbinfabriks Aktiebolaget Ljungstrom.—“Gas turbine plant.” 6933/44. July 10th, 1943. (580447.)

W. S. Tandler and D. S. Walker.—“Photo-electric control mechanism for flame-cutting devices.” 903. January 17th, 1944. (580440.)

A. P. Thurston.—“Storage batteries.” 15804/44. December 20th, 1943. (580390.)

Tilley Bros., Ltd., and J. E. Dyson.—“Lamps for lighting.” 24991. December 13th, 1944. (580472.)

Welwyn Electrical Laboratories, Ltd., N. F. Robbie and H. C. Wheatley.—“Electrical resistances.” 16342. August 28th, 1944. (580317.)

Westinghouse Brake & Signal Co., Ltd., and A. H. B. Walker.—“Polyphase alternating electric current generators of the electronic type.” 18668. September 29th, 1944. (580467.)

H. Worsdall.—“Electrically operated gas lighters.” 4545. March 11th, 1944. (580371.)

Lyons International Fair

The next Lyons Fair takes place from April 12th to 21st, 1947, under the Presidency of M. Edouard Herriot. There will be space for more than 5,000 exhibitors.

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.

Atherton.—October 8th. Electricity Department. 11,000-V ring main switchgear. (September 13th.)

Bolton.—October 7th. Town Council. Motor tower wagon. (See this issue.)

Edinburgh.—October 1st. Electricity Department. P.i. cables for twelve months. (September 13th.)

Inverurie.—October 4th. Town Council. Electrical work for 16 four-apartment houses, George Square. Burgh surveyor, Town House.

Manchester.—October 8th. Electricity Department. Substations and switchboards. (September 20th.)

Middlesbrough.—October 2nd. Electricity Committee. Street lighting equipment. (September 20th.)

Pudsey.—October 15th. Electricity Department. Paper-insulated cables. (See this issue.)

Southport.—October 14th. Electricity Department. Eighty cast iron short street lighting standards. (See this issue.)

October 26th. Corporation. Electric lighting installation at the Floral Hall. (See this issue.)

Stalybridge.—October 14th. Town Council. Electric lighting equipment in Victoria Market Hall. Borough surveyor, Town Hall (deposit: 10s. 6d., returnable).

Walsall.—October 2nd. Electricity Supply Department. Electrical stores and materials for twelve months. (September 13th.)

Orders Placed

Bedford.—Electricity Committee. Accepted. Control equipment (£3,227).—Automatic Telephone & Electric Co. Switchboard extensions (£1,060).—Metropolitan-Vickers.

Dorchester.—Housing Committee. Accepted. Wiring Council houses on the Ackerman estate (£450).—Davis & Hadley.

Exeter.—Housing Committee. Accepted. Electrical installations at houses on the Pinhoe estate. 68 houses (£1,198).—C. Lye: 66 houses (£1,147).—G. W. Challice & Son.

Glasgow.—Electricity Committee. Accepted. Grit collecting and disposal plant at Dalmarnock power station (£46,085).—James Howden & Co. (Land), Ltd.

Housing Committee. Accepted. Electrical installations at 60 houses at Cowden Street.—Govan Electric Co.

Transport Committee. Accepted. Extension to switchgear (Coplawhill).—G.E.C.

Health Committee. Accepted. 200-mA generator to replace existing X-ray unit at Lennox Castle Hospital (£1,649, revised tender).—Victor X-ray Corporation.

Penrith.—General Purposes Committee. Accepted. Electrical installation at library.—Electricity House, Ltd.

Housing Committee. Accepted. Electrical installations at 80 houses, Scaws estate.—Grisenhwaite & Partners.

Rawtenstall.—Electricity Committee. Cables for three years.—Henley's.

Housing Committee. Recommended. Electrical installation in 128 houses on Council estates.—Newman & Watson.

Stretford.—Finance Committee. Accepted. Stage and hall lighting and amplifying equipment at public hall (£2,690).—Metropolitan-Vickers.

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.

Aberdeen.—Houses (52), various sites; County Architects' Office, County Buildings, 22, Union Terrace.

Bedford.—Houses (50), Aylesbury Road (£53,345); H. C. Janes, Ltd.

Bedworth.—Houses (30), Furnace Fields (£35,735); P. Shilton & Partners, builders, 13, King George's Avenue, Foleshill, Coventry.

Birkenhead.—Additions, Printing Machine Works, Laird Street; J. Jones (Woolton), Ltd., builders, Liverpool.

Bolton.—Houses (57), Blenheim Road (£57,511); W. Gornall & Sons, Ltd., 111, Ellesmere Street.

Bucklow.—Permanent houses (22); H. V. Shaw, surveyor, 26, Station Buildings, Altrincham.

Dagenham.—Bungalows (26), Dagenham Road estate; borough engineer and surveyor, Civic Centre.

Dartford.—Houses (138), Temple Hill housing estate; borough surveyor, Barclays Bank Chambers, High Street.

Esher.—Houses (16) and 24 flats, West Molesey, and twenty houses, Long Ditton; C. G. Alderton, engineer and surveyor, Council Offices.

Gateshead.—Ten houses, Harlow Green Lane; A. Holden, builder, Southend Terrace, Low Fell. Factory, Heaton Foundry Co., Ltd.; C. S. Errington, architect, 46, Grainger Street, Newcastle-on-Tyne.

Greenwich.—Houses (28), Cherry Orchard housing site, Charlton, S.E.7; borough engineer and surveyor, Town Hall, Greenwich High Road, S.E.10.

Holborn.—Flats (162); Hening & Chitty, architects, 20, Gower Street, London, W.1.

Holyhead.—Houses (32), Newry Fields (£37,879); O. Jones, builder, Gwelfor Valley, Anglesey.

Hornsey.—Flats (18), Crescent Road; J. H. Melville Richards, borough engineer and surveyor, Town Hall, Crouch End, N.8.

Islington.—Blocks of flats, Holly Park (£65,200); H. Monson, architect.

Jarrow.—Additions, Primrose Isolation Hospital (£1,000); H. W. T. Perkins, borough engineer.

Maidstone.—Houses (112), Shepway Farm housing estate; J. H. Hughes, borough surveyor, Palace Avenue.

Malvern.—Houses (68), Church Road site, Malvern Link; C. C. Judson, surveyor and water engineer, The Council House.

Morpeth.—Houses (66), at Stobhill; F. K. Perkins, borough engineer.

Newcastle-on-Tyne.—Factory additions, J. D. Roberts & Co.; Clarence Solomon, architects, 3, St. Mary's Place.

Oldham.—Houses (59), Strinesdale housing estate; A. Pursglove, surveyor, 88, Mosley Street, Manchester.

Ormskirk.—Houses (80), Manor Road, Burscough; E. J. Wright, surveyor, Burscough Street.

Pontypool.—Houses (36), Leigh Road, Trevethin; W. H. V. Bythway, clerk, Hanbury Road.

Prudhoe-on-Tyne.—Houses (48), at the Oaklands, for U.D.C.; P. L. Browne, Son & Garding, Pearl Buildings, Northumberland Street, Newcastle-on-Tyne.

Rugby.—Houses (38), for R.D.C. (£55,418); Hill & Beach, Ltd., builders, 38, Railway Terrace.

Runcorn.—Houses (94), Cobbs Quarry, off London Road, Appleton; A. J. King, surveyor, Castle Park, Frodsham, via Warrington.

Salford.—Houses (188), Wardleworth estate; city engineer, Town Hall.

Scarborough.—Canteens and kitchens, Hinderwell and Northstead schools; North Riding county architect.

Sedgley.—Houses (224), Gornal estate; McKewan & Filmore, architects, Birmingham. Houses (253), Ettymore estate; Lavender & Twentyman, architects, Wolverhampton.

Shipley.—Permanent houses (51), Crag estate, Windhill; H. Dawson, surveyor, Town Hall.

Smethwick.—Houses (106), Great Arthur Street extension; R. Fletcher, borough engineer and surveyor, Council House.

Stockton-on-Tees.—Houses (216), Newham Grange; F. P. Burrige, borough architect.

Swadlincote.—Houses (72), Meadow View Road, Newhall; A. H. Taylor, Ltd., builders, Attenborough, Nottingham.

Swinton and Pendlebury.—Houses, Beechfields estate (£19,673); Anderton's, builders, Farington.

Tarleton.—Houses (34), for West Lancs. R.D.C. (£34,173); P. Barron & Son, builders.

Tewkesbury.—Houses (34), Priors Park building estate; Pemberton & Bateman, Council's architects, 29, High Street, Evesham.

Thornaby-on-Tees.—Houses (50), Lanehouse estate; Stephen Coates, Ltd., builders, Middlesbrough.

Whithorn.—Permanent houses (30), and 24 temporary houses, public park site; R. G. S. Alexander, town clerk, Town Hall.

Whitworth.—Permanent houses (52), Wallbank estate; A. Brocklehurst, architect, St. James Chambers, Waterfoot.

Worthing.—Canteen kitchen and dining room, High School for Girls; F. R. Steele, county architect, County Hall, Chichester.

TRADE MARKS

THE following applications have been made for the registration of trade marks. Objections may be entered within a month from September 18th:—

EMELCA and TECADO. Nos. 638,674 and 638,677 respectively, Class 7. Electric motors (not for land vehicles), and parts thereof not included in other classes; magneto, dynamo and battery ignition apparatus; lighting generators, etc., for motor land vehicles and for aircraft; small electric current generators, electrically driven machines, included in Class 7, for domestic purposes, etc. Also Nos. 638,675 and 638,678 respectively, Class 11. Electric pocket lamps; head lamps, rear lamps and reflectors, all for vehicles, and glasses therefor, etc.—Magnetos Lucifer, 14, Route St. Julien, Geneva, Switzerland. Address for service: c/o George Ham & Co., 93-94, Chancery Lane, W.C.2.

1900 WHIRLPOOL (design). No. 639,079, Class 7. Washing machines, drying machines for laundry use and ironing machines.—Nineteen Hundred Corporation, 304-6, North State Street, St. Joseph, Michigan, U.S.A. Address for service: c/o Frank B. Dehn & Co., 103, Kingsway, London, W.C.2.

MONITOR. No. 635,624, Class 9. Flow meters; automatic alarm and safety devices for use in connection with power plant and machinery; and parts of such devices, not included in other classes.—"Monitor" Patent Safety Devices, Ltd., Monitor Works, Kings Road, Wallsend-on-Tyne.

GRAMPIAN. No. 637,910, Class 9. Sound-amplifying instruments and apparatus, and parts thereof not included in other classes, electric amplifiers, microphones, loudspeakers, transformers and radio apparatus.—Grampian Reproducers, Ltd., Hampton Road, Hanworth.

M (designs). Nos. 638,022 and B 638,041, Class 9. Apparatus for controlling electric motors.—Morecambe Electrical Equipment Co., Ltd., Westgate Works, Westgate, Morecambe.

CLECO. No. 639,658, Class 9. Electric control apparatus; electric arc welding apparatus and parts thereof not included in other classes, electric transformers, and battery charging apparatus.—Cleco Electric Industries, Ltd., 7, Frieschwood Lane, Leicester.

VIEWROD. No. 641,121, Class 9. Radio and television aeriels. Belling & Lee, Ltd., 540, Cambridge Arterial Road, Enfield.

BESCOL. No. 640,925, Class 11. Electric heating apparatus, lamps, toasters, fans and cooking utensils, included in Class 11.—Bescol (Electric), Ltd., 118 Parkfield Road, Saitley, Birmingham, 8.

LINORA. No. 641,811, Class 11. Lamp reflectors and mounts therefor, and lamp reflector fittings not included in other classes.—Linolite, Ltd., Burnivale, Malmesbury.

HEYBERD *Go abroad!*

Designed and manufactured expressly to meet the conditions where they will be installed, Heyberd Battery Chargers, Rectifying Equipment and Transformers are giving satisfaction in many countries. Here is part of a recent shipment to Cairo—a battery charger with metal rectification capable of charging from 1 to 36 cells from 1 1/2 to 12 amps, with 64 stages of control

F.C. HEYBERD & CO. LTD. 28, RUSSELL SQUARE, LONDON, W.C.1.

THE METAL OF UNIQUE QUALITY

Mallory 73 Beryllium Copper is a non-ferrous alloy having high tensile and fatigue strength, great hardness, good electrical conductivity, and resistance to wear and corrosion. These properties have led to the wide use of Mallory 73 in electrical and precision engineering and in the instrument and radio industries. Complete informative literature has been collated by Mallory metallurgists and this is available by request.



MALLORY
BERYLLIUM COPPER 73

Contact Blades. Helical Springs. Diaphragms and capsules. Instrument hairsprings. Fuse clips. Circuit breaker springs. Bourdon pressure tubes. Snap action switch blades.

JOHNSON, MATTHEY & CO. LIMITED

CONTROLLING

MALLORY METALLURGICAL PRODUCTS LIMITED
 73/83 HATTON GARDEN, LONDON, E.C.1

Osram

THE WONDERFUL LAMP

S.G.C. PATENT

A new era of brightness in the home, office and factory! Brightness, cheerfulness, cleanliness, fresh air, good health and good lighting are the order of the day. Good lighting is a tonic—especially with Osram!



Advt. of The General Electric Co. Ltd., 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; **ONLY OFFICIAL AND GOVERNMENT ANNOUNCEMENTS CAN NOW BE DISPLAYED**—30/- per inch. Where the advertisement includes a Box Number this counts as six words and 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.

Original testimonials should not be sent with applications for employment.

OFFICIAL NOTICES, TENDERS, ETC.

COUNTY BOROUGH OF SOUTHPORT ELECTRICITY DEPARTMENT

Electric Street Lighting Standards

THE Corporation invite tenders for the supply and delivery of 80 Cast Iron Short Street Lighting Standards. Specifications and forms of tender may be obtained from the Borough Electrical Engineer, 188, Lord Street, and should be returned to the undersigned, in a sealed envelope endorsed "Street Lighting Standards," not later than the first post on Monday, 14th October, 1946.

R. EDGAR PERRINS,

Town Hall, Southport. Town Clerk, 2699
21st September, 1946.

COUNTY BOROUGH OF BOLTON

TENDERS are invited for the supply and delivery of one Motor Tower Wagon, fitted with van-type body and hydraulic tower. Specification and form of tender may be obtained upon application to the Lighting Superintendent, Marsden Road, Bolton.

Tenders are to be delivered to the undersigned not later than Monday, 7th October, 1946, and no tender shall be received except in a plain sealed envelope which shall bear the words "Tender for Tower Wagon," but shall not bear any name or mark indicating the sender.

PHILIP S. RENNISON, Town Clerk,

Town Hall, Bolton. 2627

COUNTY BOROUGH OF SOUTHPORT

Floral Hall Lighting

THE Corporation invite tenders for a scheme of lighting and the supply of fittings and equipment to be installed at the Floral Hall, Southport. Specification and tender forms can be obtained on application to the Borough Electrical Engineer, 188, Lord Street, Southport. Tenders, endorsed "Floral Hall Lighting," should be forwarded to the undersigned, to be received not later than Saturday, 26th October, 1946.

R. EDGAR PERRINS,

Town Hall, Southport. Town Clerk, 2718
21st September, 1946.

BOROUGH OF PUDSEY ELECTRICITY DEPT.

TENDERS are invited for the supply and delivery of Paper Insulated Cables. Specification and form of tender may be obtained from the Borough Electrical Engineer, 14, Church Lane, Pudsey, Leeds, Yorkshire.

Tenders must be received by the undersigned not later than Tuesday, 15th October, 1946, in a plain sealed envelope, which shall be endorsed "Cables—Electricity Dept." but shall not bear any name or mark indicating the sender. The Corporation do not bind themselves to accept the lowest or any tender.

W. R. CRUSE, Town Clerk,

Town Hall, Pudsey. 2686

SITUATIONS VACANT

AM.I.E.E. or equivalent required, with industrial experience, to prepare layouts, specifications, etc., for electrical work in connection with existing large modern factory. Up-to-date knowledge of power distribution, switchgear and lighting essential. Excellent prospects for man of ability. State age, experience and salary required to—Box 2573, c/o The Electrical Review.

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.

CORPORATION OF BRISTOL ELECTRICITY DEPT.

Assistant Chemist

APPPLICATIONS are invited for the position of Assistant Chemist at the Portishead Generating Station. Applicants should, preferably, have technical qualifications equivalent to A.R.I.C. graduate I.E.E. or I.M.E., and must have had a good training in general chemistry with experience in testing coal, oil and boiler water.

The salary will be in accordance with the National Joint Board Schedule for the Electricity (Supply) Industry, Class L, Grade 10, at present £408 per annum, rising after four years to £424. 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.

Written applications, stating age and full details of training and experience, must reach the undersigned by not later than Monday, 14th October, 1946.

E. C. WILLIS,

Dorset House, General Manager.

Clifton Down, Bristol, 8.
14th September, 1946.

2631

COUNTY BOROUGH OF BLACKPOOL ELECTRICITY DEPARTMENT

Appointment of Lady Demonstrator

APPPLICATIONS are invited for the above appointment at a salary of £300 per annum rising by annual increments to £336, inclusive of war bonus. Candidates must have had a good general education and hold a recognised diploma in domestic science and/or the E.A.W. Electrical Housecraft Diploma. They must be competent to take lectures and demonstrations and to advise consumers on the selection and use of electrical appliances of all types. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination. Applications, stating age, qualifications and full details of experience, accompanied by copies of not more than two recent testimonials, should be addressed to the Borough Electrical Engineer, Shannon Street, Blackpool, not later than 7th October, 1946.

TREVOR T. JONES, Town Clerk,

2575

COUNTY BOROUGH OF STOCKPORT ELECTRICITY DEPARTMENT

Two E.H.T. Plumber-Joiners

APPPLICATIONS are invited for the position of Plumber-Joiner with the above Authority from qualified persons having a wide experience in the jointing of E.H.T. and L.T. cables, network boxes, services and switch-gear, etc.

Conditions of service and rate will be in accordance with the D.J.I.C. Schedule No. 3, North-Western Area, at present 28.45 pence per hour. The selected applicants will be required to undergo a medical examination and, if approved, will be required to join the Corporation's Superannuation Scheme.

Applications, stating age, details of experience and present employment, with two testimonials, should be sent to the undersigned not later than 14th October, 1946.

W. R. ALLCOCK, M.I.E.E., M.I.Mech.E.,
Electricity Officer, Borough Electrical Engineer.

23, Tiviot Dale, Stockport.
17th September, 1946.

2665

BOROUGH OF SUTTON COLDFIELD**Appointment of Electrical Engineer and Manager**

A PPLICATIONS are invited for the above appointment from persons suitably qualified. The full salary at the rate of £1,035 per annum (which is in accordance with the Agreement dated 9th July, 1941, between the National Joint Council for Local Authorities and Chief Electrical Engineers and is based on the present unit assessment) will be paid from the date of commencing duties. The cost of living bonus, at present £59 16s., will also be paid, together with a suitable car allowance.

Recent experience in the management of Electricity Supply Undertakings is essential, and applicants must have a sound knowledge of design and operation of 33-kV, 11-kV and 6.6-kV and L.T. underground and overhead distribution, networks and substations.

The appointment will be terminable by three months' notice in writing on either side, and will be subject to the Local Government Superannuation Act, 1937, the Scheme of Conditions of Service made by the National Joint Council, and to a satisfactory medical examination.

Forms of application may be obtained from the undersigned, to whom applications shall be sent so as to be received not later than Saturday, the 12th day of October, 1946, in envelopes marked "Electrical Engineer." Canvassing, directly or indirectly, will disqualify.

R. WALSH,

Town Clerk.

Council House, Sutton Coldfield.

September, 1946.

BOROUGH OF BARKING ELECTRICITY DEPT.

A PPLICATIONS are invited for the following positions:
(1) ASSISTANT INSTALLATION AND METER SUPERINTENDENT. Salary in accordance with N.J.B. Schedule, Class F, Grade 7, commencing at £503 per annum. Candidates should have passed the Associate Membership Examination of the Institution of Electrical Engineers, or its equivalent, and have had sound experience in the preparation of wiring schemes, competitive estimating and supervision of the installation of lighting, heating and power systems and the calibration and maintenance of all types of A.C. and D.C. meters and instruments.

(2) SHOWROOM MANAGER. Salary £380-£425, plus a cost of living bonus at present £59 16s. Candidates should have had a sound education, experience in electricity showrooms, and should be familiar with tariffs and the operation of hire and hire purchase schemes.

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

Applications must be submitted in the appropriate form, which may be obtained from the undersigned, and should be returned, together with three recent testimonials, by Thursday, the 3rd October, 1946, suitably endorsed. Canvassing, either directly or indirectly, will be deemed a disqualification.

E. R. FARR.

Town Clerk.

Town Hall, Barking, Essex.

9th September, 1946.

LONG EATON U.D.C. ELECTRICITY UNDERTAKING**Appointment of Electrical Engineer and Manager**

THE Urban District Council of Long Eaton invite applications for the position of Electrical Engineer and Manager of their Undertaking. Applicants must be Corporate Members of the Institution of Electrical Engineers, and prepared to satisfy the Council as to their organising ability and business capacity.

The salary will be in accordance with the Scale of Salaries fixed by the National Joint Committee of Local Authorities and Chief Electrical Engineers for the Electricity Supply Industry, dated July, 1941, based on the output from time to time of the Undertaking. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the person appointed will be required to pass a medical examination.

Copies of the terms and conditions of appointment and form of application may be obtained from me. Applications on the prescribed form, duly completed, accompanied by three recent testimonials, must be delivered to the undersigned in a sealed envelope endorsed "Electrical Engineer and Manager" not later than October 19th, 1946. Canvassing members of the Council, either directly or indirectly, will be a disqualification.

WM. E. STANLEY,

Clerk to the Council.

Town Hall, Long Eaton.
19th September, 1946.

2669

**COUNTY BOROUGH OF BIRKENHEAD
ELECTRICITY DEPARTMENT****Assistant Mains and Distribution Engineer**

A PPLICATIONS are invited for the position of Assistant Mains and Distribution Engineer with charge of substations, at a salary in accordance with Class H, Grade 6, of the National Joint Board Schedule of Salaries, commencing at £571 per annum, and subject to a deduction in respect of the Local Government Superannuation Act, 1937. The person appointed would be required to assist generally the Mains and Distribution Engineer and to deputise for him in his absence.

Applicants, who should preferably be Corporate Members of the Institute of Electrical Engineers, must have had a thorough training and experience in the design, layout, protection and operation of modern substation equipment, including static, automatic rectifier and rotary converter types. They must also have had a wide experience of E.H.T. and L.T., O.H. line and underground mains work, including fault localisation, change-over from D.C. to A.C. and the keeping of the necessary plans and records. Members of H.M. Forces are eligible to apply for the position. The successful applicant will be required to pass a medical examination and reside within the Borough.

Applications, stating age, whether married or single, present appointment and salary, experience and qualifications, accompanied by copies of not more than three recent testimonials, are to be delivered to the Borough Electrical Engineer, Craven Street, Birkenhead, not later than 2 p.m. on Tuesday, the 8th October, 1946. Canvassing, directly or indirectly, will disqualify.

E. W. TAME,

Town Clerk.

Town Hall, Birkenhead.
12th September, 1946.

2714

**BOROUGH OF LOUGHBOROUGH ELECTRICITY
DEPARTMENT****Appointment of Lady Demonstrator**

A PPLICATIONS are invited for the position of Lady Demonstrator at a commencing salary of £252 per annum, rising by annual increments of £12 to £288 per annum. In addition, a cost-of-living bonus will be paid which is at present £48 2s. Candidates must have a good general education, and must be able to conduct lecture-demonstrations in the showroom and on consumers' premises. They must have a wide knowledge of domestic electrical appliances, and be able to advise customers on their selection and uses, and should possess a Diploma in Domestic Science and/or the E.A.W. Electrical Housecraft Diploma.

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

Applications, endorsed "Lady Demonstrator," stating age, whether married or single, and giving details of qualifications, experience and appointments held (including present position), to be submitted to the undersigned not later than Monday, 14th October, 1946.

J. P. TUCKER, M.I.E.E.,

Engineer and Manager.

Baxter Gate, Loughborough.
21st September, 1946.

2713

**COUNTY COUNCIL OF THE STWARTRY OF
KIRKCUDBRIGHT ELECTRICITY DEPT.****Appointment of Clerk of Works**

A PPLICATIONS are invited for the above post from persons who are suitably qualified and who are 26 years of age or over. The person appointed will be required to supervise all work in connection with the erection of overhead 11-kV wood pole lines, the erection of substations, and the laying of H.T. and L.T. cables, which is to be carried out under contract. Previous field experience is essential, and a knowledge of surveying will be an added qualification.

The salary is in accordance with Grade 8b, Class D, of the National Joint Board Schedule (£340-£354), and a car allowance will be provided. The appointment is subject to the Local Government Superannuation (Scotland) Act, 1937, and the selected candidate will be required to pass a medical examination.

Applications, giving full details of previous experience etc., and accompanied by not more than three testimonials, must reach the undersigned not later than October 7, 1946.

ROBT. C. MONTEATH,

County Clerk.

County Offices,
Kirkcudbright.

281

CITY OF PETERBOROUGH CORPORATION

Lady Demonstrator

A PPLICATIONS are invited for the position of Lady Demonstrator in the Electricity Undertaking. Candidates must have had a good general education, hold the E.A.W. diploma or certificate, or other approved qualifications, and have a thorough knowledge of domestic electric appliances; they must be competent to conduct lectures, cookery demonstrations and advise on the selection and use of electrical apparatus.

Salary in accordance with the National Joint Council Scale (£252-£288 per annum), plus cost of living bonus, at present £48 2s. per annum.

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

Applications, giving full particulars of training and experience, and accompanied by copies of recent testimonials, to be sent to the City Electrical Engineer and Manager, Albert Meadow, Peterborough, in a sealed envelope endorsed "Demonstrator," not later than the first post on Wednesday, 2nd October, 1946.

A. J. REEVES,

Town Clerk.
2611

Town Hall, Peterborough.
13th September, 1946.

HALIFAX EDUCATION COMMITTEE

Municipal Technical College

Principal: E. R. Heasman, M.Sc., A.R.I.C.

R EQUIRED, a Senior Assistant for Electrical Engineering, to commence duties on 1st December or as soon as possible thereafter. Candidates should possess a good Honours Degree of a British University or hold equivalent qualifications, and have had good professional and/or industrial experience in electrical engineering. Previous teaching experience an advantage. The work of this post includes supervision of the electrical engineering laboratories, teaching up to the standards of an Honours Degree and Ordinary and Higher National Certificates in Electrical Engineering.

Salary scale £600 x £25—£750 with addition for training as applicable under the Burnham Report for Technical Teachers. Applications from members of His Majesty's Forces considered by letter in the first instance. Further particulars from the Principal. Applications to be returned to the Chief Education Officer, West House, Halifax, by Monday, October 14th, 1946. 2701

COUNTY BOROUGH OF WALSALL ELECTRICITY SUPPLY DEPARTMENT

A PPLICATIONS are invited for the position of Junior Mains Draughtsman. Candidates must have had a good general training in mains work, experience in mains records and the preparation of drawings for mains extensions and substations.

The appointment will be subject to the salary and conditions of employment of the N.J.B. Agreement, Class G, Grade 9a (at present £343-£351-£358), and the provisions of the Local Government and Other Officers' Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with copies of testimonials, must reach the undersigned not later than Saturday, 12th October, 1946, in envelope endorsed "Junior Mains Draughtsman." Canvassing, directly or indirectly, will disqualify.

D. HOLT,

Electricity Supply Dept., Engineer and Manager.
Upper Bridge Street, Walsall. 2702

COUNTY COUNCIL OF DURHAM EDUCATION DEPARTMENT

Stockton Technical School and Evening Institute

A PPLICATIONS are invited for the post of Principal of the above Technical School and Evening Institute. Candidates must be graduates of a British University and should have had experience in the work of a similar institution.

Salary £650, rising by annual increments of £20 to a maximum of £900 per annum. For further particulars and forms of application (which must be completed and returned as soon as possible) apply, enclosing stamped, addressed foolscap envelope, to the Director of Education, Shire Hall, Durham.

THOS. B. TILLEY,

Director of Education.
18th September, 1946. 2694

COUNTY BOROUGH OF WEST BROMWICH ELECTRICITY DEPARTMENT

Commercial Assistant

A PPLICATIONS are invited for the above appointment from persons who have a thorough knowledge and experience of the electricity supply industry. The successful applicant will be required to be responsible to me for the business organisation of the department, including the administration of the showrooms, purchasing organisation and stores. A comprehensive reorganisation of the costing and statistical records is in progress, and the handling of this reorganisation and consequent operation of the scheme will be the responsibility of the person appointed.

The position will be graded as Administrative Grade 6 in the N.A.L.G.O. Scale, viz., £353 per annum to £600 per annum, plus bonus. A medical examination and contributions to the superannuation scheme will be necessary. Qualified cost accountants or persons possessing equivalent qualifications should apply in writing, giving full details of age, experience, qualifications, and copies of testimonials, to the undersigned. Such applications should be in my hands by noon on Saturday, October 12th, 1946.

G. O. EDWARDS, A.M.I.E.E.,

Electric House, Borough Electrical Engineer
West Bromwich, Staffs. and Manager. 2674

STALYBRIDGE, HYDE, MOSSLEY AND DUKINFIELD TRANSPORT AND ELECTRICITY BOARD

Appointment of Assistant Station Superintendent

A PPLICATIONS are invited for the above-mentioned position from persons who have had technical and practical training and experience in the operation and maintenance of a modern power station operated under the direction of the Central Electricity Board. Preference will be given to applicants under 40 years of age and who are Corporate Members of either the Institute of Electrical or Mechanical Engineers.

The salary and conditions of service will be in accordance with Grade 5, Class H, of the N.J.B. Schedule. The successful candidate will be required to pass a medical examination and the appointment will be subject to the Local Government Superannuation Act, 1937.

Applications, giving age, details of training and experience, accompanied by copies of two recent testimonials, must be delivered not later than Wednesday, the 16th October, 1946, to the undersigned.

J. HARWOOD LUMSDEN, M.I.Mech.E.,
A.M.I.F.E.E., Chief Engineer.

Electricity Offices and Showrooms, Tame Valley, Stalybridge. 2688

BOROUGH OF BRIDLINGTON

Appointment of E.H.T. Plumber-Jointer

A PPLICATIONS are invited for the position of Plumber-Jointer in the Electricity Department. Applicants must have had experience in jointing high and low tension paper-insulated lead-covered 11-kV cables.

Conditions of service and rates of pay will be in accordance with the Joint Industrial Council Schedule (No. 2 Area), of which the present rate of pay is 2s. 4½d. per hour.

Applications, stating age, previous experience (if any), present and past appointments, and accompanied by copies of two recent testimonials, must be delivered to the Commercial Manager, Electricity Offices, Brett Street, Bridlington, not later than 2 p.m. on Monday, 7th October, 1946.

S. BRIGGS,

Town Hall, Bridlington, Town Clerk.
20th September, 1946. 2684

CITY OF GLOUCESTER ELECTRICITY DEPT.

Rotary Substation Attendant

A PPLICATIONS for the above position are invited from Engineers having a sound experience in the operation of rotary substations. The salary will be in accordance with the N.J.B. Schedule, Class E, Grade 8b (at present £360-£377 per annum). The post is subject to the provisions of the Local Government Superannuation Act, 1937, and the selected candidate will be required to pass a medical examination.

Applications, stating age, and giving full particulars of qualifications and experience, accompanied by not more than three recent testimonials, should be received by the undersigned not later than Monday, October 7th, 1946.

EMIL BRAATHEN,

Commercial Road, Chief Engineer and
Gloucester. General Manager. 2709

THE MUNICIPAL COMMISSIONERS OF GEORGE TOWN, PENANG

One Mains Engineer and Two Assistant Mains Engineers

A PPLICATIONS are invited for the posts of (a) one Mains Engineer; (b) two Assistant Mains Engineers. Candidates for (a) should be Corporate Members of the Institution of Electrical Engineers and for (b) should be qualified up to the Higher National or equivalent in Electrical Engineering, or Graduate of the Institution of Electrical Engineers.

Salary scale for (a) and (b) is \$450-25A-\$750 with Efficiency Bar at \$600. Advancement beyond the bar requires Corporate Membership of the Institution of Electrical Engineers. Commencing salary for (a) will be \$675 and for (b) will be \$450. Age limits for (a) 25-40 and for (b) 25-35.

The persons appointed will be required to devote their whole time to the department and to perform such duties as may be allotted to them by the Municipal Electrical Engineer and Transport Manager. It will be necessary for them to enter into an agreement with the Commissioners and to pass a medical examination and contribute to the Provident Fund.

Candidates must have a sound technical and practical training and experience in E.H.T. (11,000 v.) and L.T. overhead and underground mains, switchgear transformers and protection equipment.

Applications, endorsed either "Mains Engineer" or "Assistant Mains Engineer," should be posted to Messrs. Preece, Cardew & Rider, 8, Queen Anne's Gate, Westminster, London, S.W.1, by Friday, October 11th, 1946.

2700

CITY AND COUNTY OF LICHFIELD ELECTRICITY DEPARTMENT

E.H.T. Plumber Cable Jointer

A PPLICATIONS are invited for the position of Plumber Cable Jointer. Applicants must have had experience in extra high tension and low tension jointing to feeder pillars, network boxes and substation E.H.T. and L.T. switchboards. Conditions of service and rates of pay will be generally in accordance with the D.J.I.C. Schedule (No. 5 Area), at present 2s. 5½d. per hour.

A house on the Corporation's new housing estate will be allocated to the successful applicant. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Applications, stating age, present employment and previous experience, and accompanied by recent testimonials, to be addressed to the undersigned not later than 5th October, 1946.

W. F. RUSSELL,

City Electrical Engineer.
Market Square, Lichfield. 2707

METROPOLITAN BOROUGH OF BETHNAL GREEN ELECTRICITY DEPARTMENT

Appointment of Meter Mechanic

THE Council invites applications for the appointment of a Meter Mechanic, qualified in the repair and calibration of A.C. meters, single-phase and polyphase, and demand indicators. The rate of pay to be that prescribed by the Electricity Supply Industry (District Council No. 10) Greater London Area, at present 2s. 6.3d. per hour.

The appointment will be subject to the Council's Superannuation Acts and By-laws and the successful candidate must pass a medical examination.

Applications, in writing, must be made to the Town Clerk at the Town Hall, Bethnal Green, E.2, and must reach him by 10 a.m. on Friday, 4th October, 1946. Canvassing will disqualify.

S. P. FERDINANDO, Town Clerk. 2653

BOROUGH POLYTECHNIC

Department of Electrical Engineering and Physics

A PPLICATIONS are invited for: (a) A Laboratory Steward; (b) Two Laboratory Assistants or Laboratory Monitors. Commencing salary: Rates will vary from 40s. per week for a boy of 16 years to £268 per annum for a Laboratory Steward, and will depend upon age and qualifications. Applications should be made immediately to the Principal, Borough Polytechnic, Borough Road, London, S.E.1. 2693

CITY OF MANCHESTER ELECTRICITY DEPT.

A PPLICATIONS are invited for the position of Mechanical Maintenance Engineer, at a salary in accordance with Class J, Grade 7 (commencing £563 p.a.) of the N.J.B. Schedule.

The candidate appointed will be required to take charge of mechanical maintenance in a selected power station, must be capable of controlling and supervising the repair workshop, and have had experience of machine shop practice and the maintenance of large turbo-alternators and their auxiliaries, together with cranes and conveyor equipment. Applicants should be Graduates of the Institution of Mechanical Engineers, and below the age of 45. The appointment will be subject to the City Council Superannuation Scheme, and the successful candidate will be required to pass a medical examination.

Applications, stating age and full particulars of technical training and experience, together with copies of recent testimonials, must be endorsed "Mechanical Maintenance Engineer," and addressed to the Chairman of the Electricity Committee, Town Hall, Manchester, 2, not later than 10 a.m. on Monday, 7th October, 1946. Canvassing, directly or indirectly, will disqualify.

PHILIP B. DINGLE.

Town Hall, Manchester, 2. Town Clerk. 2615
September, 1946.

CENTRAL ELECTRICITY BOARD (CENTRAL AND SOUTH SCOTLAND AREAS)

General Assistant Engineer (Meter Department)

THE Central Electricity Board have a vacancy for a General Assistant Engineer in the Technical Department of the Central and South Scotland Areas.

Commencing basic salary £800 to £755 per annum, depending upon experience and qualifications, plus a temporary adjustment which at present amounts to £62 8s.

Requisite qualifications are technical attainments up to I.E.E. Graduate standard and experience in the testing and calibration of integrating wattmeters. The selected candidate will be required to join the Board's superannuation scheme, for which purpose it is necessary to undergo a medical examination.

Forms of application may be obtained from the District Manager, Central Electricity Board, Grid House, 168, Broomhill Drive, Glasgow, W.1, to whom all applications should be delivered not later than 26th October, 1946. 2677

MIDDLESBROUGH EDUCATION COMMITTEE

Constantine Technical College

Principal: H. V. Field, B.Sc., Wh.Sch., M.I.E.E.

A PPLICATIONS are invited for the post of full-time Lecturer in Electrical Engineering, to commence duties on 1st January, 1947. Candidates should have a good honours degree or its equivalent, and preferably have had some industrial experience or service experience in an appropriate technical unit. Burnham Technical Scale salary.

Application forms and further information obtainable from the undersigned, to whom the completed forms should be returned within two weeks of the date of this advertisement.

STANLEY HIRST,

Director of Education.

Education Offices, Middlesbrough. 2635
14th September, 1946.

A RMATURE Winder or good Improver required, used to all types of motors. Knowledge of dismantling and assembly of motors a good advantage. Apply to—Messrs. Charles H. Harwood & Co. Ltd., 32, Meyrick Road, Willensden, N.W.10. 114

A RMATURE Winders and Improvers urgently required. Top rates and good conditions.—Box 113, c/o The Electrical Review.

A SSISTANT Electrical Engineer for planning and development of new installations in iron and steel works. Age 28/35, with sound technical qualifications and good practical engineering and maintenance experience, preferably gained in iron and steel works.—Box 2457, c/o The Electrical Review.

A SSISTANT Mains Engineer. Applicants must have sound knowledge and experience of mains development, construction and maintenance in an extensive rural area. The salary will be in accordance with the N.J.B. Schedule, at present Class F, Grade 8, commencing at £442 per annum. Applications, with full details of education, training, experience and qualifications, to be sent, by October 8th, to—Buckrose Light & Power Company Limited, Central House, Kingsway, London, W.C.2. 2676

ASSISTANT Foreman for winding department. A.C. D.C. Motors, fractional to 500 h.p. Permanent progressive position to suitable applicant.—Higgs Motors, Witton, Birmingham. 106

ASSISTANT, Male, required in inspection dept. of light electrical engineers, W.4 area. State age, experience and salary expected.—Box 2632, c/o The Electrical Review.

AUTOMOBILE Dynamo and Starter Armature Winder, able to undertake fr. h.p. motor rewinds. Fully experienced and able to take charge of any established department. Permanency and good prospects. Write, stating age, experience and salary required, to—Box 2463, c/o The Electrical Review.

BUYER, experienced, required by electrical contractors in Midlands. Good connections with suppliers essential. Capable of stock and store control. Full details of experience, salary, etc., to—Box 9609, c/o The Electrical Review.

BUYER required by Manchester electrical engineering firm of medium size. Must have full experience in electro-mechanical engineering purchasing. Commencing salary £520 with considerable scope. Please give fullest particulars to—Box 2708, c/o The Electrical Review.

CHIEF Electrician required for progressive firm manufacturing electric lamps. Applicants must have sound theoretical knowledge (B.Sc., A.M.I.E.E. or equivalent), capable of taking over electrical maintenance and problems of entire factory, also control small staff. Full particulars to—Box 2650, c/o The Electrical Review.

CLERICAL Assistant required for stores office. Must have good knowledge of electrical material.—London Electrical Co., 92, Blackfriars Road, S.E.1. 104

COMPETENT Mechanical Draughtsman required, preferably with some experience of electrical work also. Starting salary according to experience. Good prospects.—Bastian & Allen Ltd., 11, Bedford Square, London, W.C.1 (Telephone, Museum 7316). 2651

CRAFTSMEN in Industrial Power urgently required. Apply to—Premier Electric Services, Friar Works, Willow Street, Leicester. 2630

DESIGNER-Draughtsman for supervisory position for developing lift control gear. Only fully experienced men need apply. Permanent position with good salary and prospects for the right man. Northern district. State age, experience and salary required.—Box 2602, c/o The Electrical Review.

DOMESTIC appliance manufacturers require Commission Representatives for the areas of Kent, Surrey, Sussex and Hampshire. Full particulars to—Box 2565, c/o The Electrical Review.

DRAUGHTSMAN required for power transformer work. Apply in writing, stating age and experience, to South Wales Switchgear Ltd., Treforest, Glam. 2515

DRAUGHTSMAN (Junior) required on switchgear development. Apply, giving full particulars of training, experience and salary required, to—Long & Crawford Ltd., Manchester, 12. 2583

DRAUGHTSMAN required, must be experienced in all types of transformers up to 1,000 kVA. Apply, stating age, experience, salary required, to—Brentford Transformers Ltd., Windmill Road, Brentford, Middx. 2691

DRAUGHTSMEN, British Insulated Callender's Cables Ltd. require a number of Draughtsmen for steel structural work, factory plant development and cable accessories. Positions permanent, with superannuation scheme. Salary according to age and experience. Apply, giving full particulars, to—Staff Officer, British Insulated Callender's Cables Ltd., Prescot, Lancs. 2629

DRAUGHTSMEN, preferably with telecommunications experience, required by large firm in the Midlands. Maximum salary £350 plus 10% of living bonus. Write, giving details of experience, age, and salary required.—Box 11, c/o The Electrical Review.

DRAUGHTSMEN required by switchgear engineers. Experienced in contract work, protective gear diagrams or design. Applications in writing, with full particulars, to—Ferguson, Pailin Ltd., Manchester, 11. 86

DRAUGHTSMEN (Senior) required for large A.C. and D.C. machines, including turbo and waterwheel alternators, also for medium type A.C. and D.C. machines. Applications from men with suitable technical qualifications and good general mechanical drawing office experience will be considered. Salary dependent upon qualifications and experience. Apply, giving full details of the qualifications, experience, age and salary required, to—Chief Draughtsman, Engineering Drawing Office, The General Electric Co. Ltd., Witton, Birmingham. 6. 2661

ELECTRICAL Contractor requires Working Manager to take charge of and develop Home Counties Branch. Flat available over showroom and office. Apply, giving details of experience and salary required, to—Box 8650, c/o The Electrical Review.

ELECTRICAL Lamps. Foreman for sealing-in and pumping section required.—Box 9604, c/o The Electrical Review.

ELECTRICAL Accessory Designer required by company with excellent programme and resources. Must be capable of basic design on electrical lighting fittings, electrical appliances, and accessories. Reply, stating previous experience, salary required, and include testimonials.—Box 2619, c/o The Electrical Review.

ELECTRICAL Draughtsman required immediately at industrial works in Kent. It is desirable that the applicants should possess the Higher National Certificate in Electrical Engineering or its equivalent. Work involves technical knowledge of surveys and estimating schedules. Apply, stating age, to—Box 2663, c/o The Electrical Review.

ELECTRICAL Engineer required to assist in technical and administrative work in a test room engaged in the production and finishing of instruments of precision. Applicants must have had previous experience in testing all types of accurate moving coil instruments. Degree man preferred. Factory situated in Home Counties. Progressive post for the right man. State age, experience and salary required.—Box 2545, c/o The Electrical Review.

ELECTRICAL Remote Control Engineer required with first-rate knowledge of relays and timers, capable of preparing estimates and dealing with correspondence, by electrical manufacturers South-East London area. State age, experience and salary required.—Box 2652, c/o The Electrical Review.

ELECTRICAL Wholesalers (London). The under-mentioned personnel are required for progressive positions: (i) Assistant with some experience for general duties in the stores, order office and trade counter; (ii) Assistant (Junior) for electrical and radio repair dept.; person with radio knowledge important; (iii) Telephone Operator, key switchboard, knowledge of general office routine an advantage.—Box 2658, c/o The Electrical Review.

ELECTRICIAN for general installation work, permanent position for good man with 3-phase motor experience.—Ive, 29, Clarendon Road, Watford. 8638

ELECTRICIAN, thoroughly experienced in motor car and radio work.—Edwards & Co. (Bournemouth) Ltd., 189-193, Old Christchurch Road, Bournemouth. 2636

ENGINEERS and Draughtsmen are invited to apply to a large electrical engineering firm in the Midlands which has vacancies in the switchgear department for Technical Sales, Contract, Costing and Design Engineers; also experienced Technical Engineers capable of handling large projects for generation, transmission and distribution. Vacancies also exist for Draughtsmen for circuit diagram and general work.—Box 69, c/o The Electrical Review.

ENGINEERS, small switchgear, West London area, require live Production Manager with sound knowledge modern production methods. State age, experience and salary required.—Box 2633, c/o The Electrical Review.

ESTIMATING Electrical Engineer required by leading London firm of electrical contractors. Write, stating age, experience in detail and salary expected.—Box D 63, Scripps's, South Milton Street, W.1. 2716

ESTIMATOR required, fully accustomed to preparing quotations for all types of power transformers up to 1,000 kVA. Permanent progressive position. Apply—London Transformer Products Ltd., Cobbold Estate, Cobbold Road, Willesden, N.W.10. 2555

FERGUSON, Pailin Ltd., Higher Openshaw, Manchester, 11, require experienced Inside Senior Switchgear Sales Engineers able to handle enquiries and orders for power station and substation switchgear. 2546

FOREMAN required for Winding Shop. Should be experienced in quantity production of A.C. motors up to 75 h.p. Must be familiar with all types of A.C. windings and able to determine coil former sizes. Good prospects with expanding firm for man capable of controlling and training mixed labour. Apply—Hopkinson Motors & Electric Co. Ltd., 119/125, Carlton Vale, N.W.6. 2621

INDEPENDENT electric lamp manufacturers need Technician capable of starting the manufacture of fluorescent tubes from scratch. Applications should state experience and salary required.—Box 9603, c/o The Electrical Review.

JUNIOR Engineer required for the laboratory of a London firm of radio component makers. Degree or equivalent essential. Salary £400 upwards according to qualifications.—Box 2711, c/o The Electrical Review.

LAMPSHADE Manufacturers, South Coast, require Works Manager. Must have extensive experience of high-class production and be a first-class organizer. Designing ability an advantage. Good salary and prospects to really capable man. Full details.—Box 8653, c/o The Electrical Review.

LABORATORY Assistant for experimental and development work in connection with watt-hour meters and instruments of a like nature. Salary £350 per annum. Write stating age and experience.—Box 2594, c/o The Electrical Review.

LARGE light electrical engineering concern (West Middlesex) requires degree student Electro-Mechanical Engineer for design work on acoustic apparatus. Write, giving full details and stating salary required, to—Box 2647, c/o The Electrical Review.

LONDON Transport Draughtsman for work in the office of the electrical engineer (generation). Applicants should have served an apprenticeship, should possess the Higher National Certificate, and should have had experience of generating station layouts. Some electrical knowledge would be an advantage. Salary, according to experience and ability, from £235 to £325 per annum, plus war increase, at present £72 16s. per annum. Applications, with full particulars of age (which should not exceed 35 years), qualifications and experience, should be addressed to—Assistant Staff Officer (ER/E.259), London Transport, 55, Broadway, S.W.1. 2648

MANAGER or Managers of good appearance and personality required for high-class electrical and radio retail and art goods business. 30 miles from London. Must be thoroughly capable and able to take full control. Write with particulars, stating age, experience and salary required.—Box 115, c/o The Electrical Review.

MANAGING Director. Applications are invited from qualified Electrical Engineers for the position of Managing Director of an electrical manufacturing company. High executive experience and an established position in the industry essential. Remuneration £5,000 per annum, with good prospects. Pension scheme. State age, qualifications, experience.—Box 2675, c/o The Electrical Review.

PUMBER-Jointer required for L.T. and H.T. mains. N.J.L.C. rates paid (Area No. 9). Farnham Gas & Electricity Co., East Street, Farnham, Surrey. 2659

POWER Cable Contract Engineer required to supervise contracts. It is essential that applicants have experience in super-tension cable installation work and the operation of high-voltage portable testing equipment. Write, stating age, experience and salary required, to—Personnel Manager, Standard Telephones & Cables Ltd., North Woolwich, E.16. 2657

PRODUCTION Engineer, thoroughly experienced in all stages of production and assembly of ironclad switchgear, switchboards, etc., for factory in S.W. Lancashire. Permanent position to right man. State age, experience, salary, etc.—Box 2660, c/o The Electrical Review.

PRODUCTION Manager required by electrical and general engineering firm in Lancashire manufacturing domestic appliances. Must be qualified technically and practically in modern production methods and processes, be thoroughly experienced in all stages of production, capable of operating factory at highest efficiency on mass production lines. Good salary and prospects offered. Full details of experience, posts held and work done, together with remuneration required, to—Box 2567, c/o The Electrical Review.

QUALIFIED Electrical Engineer possessing a comprehensive knowledge of electrical installation work in all types of buildings, including factories, hospitals, schools, cinemas, etc., and fully conversant with the recognised wiring systems and all relevant regulations governing this type of work. Must possess knowledge of building construction and be capable of reading architects' and engineers' drawings. Able to prepare complete electrical specifications and illumination schemes. Previous experience in a consulting engineer's office or with a leading wiring contractor an advantage. Write, stating age, experience and salary required, to—Box 2835, c/o White's Ltd., 72, Fleet Street, E.C.4. 2435

QUALIFIED Electrical Engineer possessing good personality and initiative. Capable of giving advice in the designing of electrical installations in buildings and fully conversant with all recognised wiring systems and the I.E.E. wiring regulations. Knowledge of building construction an advantage. Write, stating age, experience and salary required, to—Box 2832, c/o White's Ltd., 72, Fleet Street, E.C.4. 2434

SENIOR Engineer required for the laboratory of a London firm of radio component makers. Degree or equivalent with industrial experience essential. Salary £500 upwards according to qualifications.—Box 2712, c/o The Electrical Review.

SKILLED Armature Winder required for India. £45 per month plus ten per cent. share of Bombay concern's profit. Fare paid out and home after four-year period. Must be single man with full tradesman apprenticeship.—Box 2524, c/o The Electrical Review.

SHORTHAND-Typist required for electrical contractors' office, filing and telephone. Good prospects for smart young lady.—Rogers, 7/8, Bloomsbury St., W.C.1. 2634

SPEEDY & Eynon Ltd. offer an attractive proposition to a first-class Representative with electrical experience, and with own car, to obtain contracts for all types of electrical installations in Brighton, Bournemouth and South Coast areas. Liberal commission will be paid, and the representative appointed will receive the maximum technical and commercial support from a highly efficient organisation. Applications, giving full details of experience, etc., should be addressed to—Speedy & Eynon Ltd., 163a, Strand, W.C.2. 9605

SUPERINTENDENT of Test Gear Section required by London firm of radio component makers. The responsibility involves design and maintenance of electronic test equipment. Degree or equivalent with industrial experience essential. Salary £300 upwards according to qualifications.—Box 2710, c/o The Electrical Review.

SUPERVISING Electrical Engineer with experience in preparation of specifications and estimates for industrial electrical installations. Write in first instance, giving full details of qualifications, training and experience, to—Manager, Installation Dept., Electricity House Ltd., Bramhope, Leeds. 2657

TRANSFORMER manufacturers in N. Midlands require the services of an expert Transformer Designer up to 40 kVA. Commercial experience and wide knowledge of application and markets for all types of transformers and chokes also desired. Ability to introduce profitable business an advantage. Salary and bonus worth £1,000 per year, with further prospects. Full particulars in first instance will be treated with strictest confidence.—Box 2550, c/o The Electrical Review.

TWO Assistant District Engineers required by electricity supply undertaking in North Scotland. Salary £350/£400 per annum according to experience. Reply giving full particulars of education, experience, age, etc., and enclosing references.—Box 2673, c/o The Electrical Review.

WE have a few vacancies for Testers with electricity meter polyphase testing experience. Applications should be made to—The Labour Manager, Landis & Gyr, Victoria Road, North Acton. 2603

WELL-known Electrical Engineering Company have vacancies for suitable lads, over 16 years of age, with matriculation or general school certificate, for apprenticeship in the above industry. Good rates of pay and living accommodation provided.—Box 101, c/o The Electrical Review.

WELL-known engineering trading concern has a vacancy for well-educated gentleman sufficiently familiar with electrical machinery and engineering plant to take over correspondence in connection with sale and purchase and to generally assist in the organisation. Applicants considered only if similar position previously held.—Box 2678, c/o The Electrical Review.

WINDING Shop Foreman required for firm in Eastern Counties. Must have sound practical experience in connection with A.C. and D.C. industrial type motors. State age, experience and salary required.—Box 2656, c/o The Electrical Review.

WORKING Charge Hand for switchgear assembly, S.W. London. State experience, age, wages required.—Box 2525, c/o The Electrical Review.

WORKS Manager (British) of established electric cable factory in the East requires an Assistant possessing practical experience and theoretical knowledge of V.I.R. and P.V.C. cable manufacture, embracing wire drawing, turning, stranding, rubber compounding, tape spreading, longitudinal covering, armouring and testing. Knowledge of wire enamelling an advantage but not essential. Excellent opportunity for the right man. Free furnished quarters, free medical attendance and participation in provident fund. Three years' agreement (with probationary clause) and option of renewal. Passage paid out and home to selected applicant. Apply giving following particulars: (1) Qualifications; (2) Position held past ten years; (3) Age; (4) Married or single; (5) If married, state if desirous of family accompanying; (6) Names of two references as to ability; (7) Salary required.—Box 2655, c/o The Electrical Review.

WORKS Manager required for light electrical engineering factory in South London area. Should be qualified engineer able to take complete control of factory. Experience in improving production methods, institution and control of progress, planning and rate-fixing systems, etc., essential. Experience in electric motor production and ancillary apparatus, although not essential, would be an advantage. Reply stating age, qualifications, experience and salary required.—Box 2572, c/o The Electrical Review.

YOUNG Electrical Engineer required by Electrical Motor Manufacturers, to assist in the Estimating and Design Department, S.E. London area. Write, stating age, experience, and salary required.—Box 2692, c/o The Electrical Review.

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.

BOX 2126—Purchasing Assistant; **Box 2327**—Purchasing Assistant; **Central Sussex Electricity Ltd.**—Clerical Assistant; **County Borough of West Ham**—Distribution Assistant; **East Dereham U.D.C.**—Maintenance Electrician. All applicants are thanked.

SITUATIONS WANTED

A good allround Electrician, power and lighting installations, or maintenance A.C. and D.C. Sound knowledge of refrigeration service work.—**H. M. Harrison**, 120, Abbeville Rd., Clapham, S.W.4. Phone, Macaulay 1645. 8584

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CHIEF Designer-Draftsman desires position London. **17 years'** experience on research and production design of radio equipment and measuring instruments, domestic appliances, light mechanisms, etc.—**Box 9608**, c/o The Electrical Review.

CHIEF Electrical Engineer of large steelworks, successful and wide experience, previously 18 years with electrical plant manufacturers, giving satisfaction to present principals but desires change to South or S.W. England. Technical representation required where executive ability is called for.—**Box 8661**, c/o The Electrical Review.

CONTRACTORS. Qualified Manager, N.R.E.I.C. seeks opening, 25 yrs. exp. London and provinces. Any proposition considered.—**Box 9561**, c/o The Electrical Review.

COOKERY Sales Demonstration. Young man (33), with E.D.S. certificate, offers services to a go-ahead Electricity Showroom or Manufacturer.—**Box 8651**, c/o The Electrical Review.

D.F.H. (Hons.), A.M.I.E.E. (30), 4 years industry, 6 years engineer officer R.N., requires appointment with prospects.—**Box 8632**, c/o The Electrical Review.

ELECTRICAL Engineer, A.M.I.E.E., aged 34, released R.A.F. Class A, desires senior appointment with scope and first-class opportunities to attain managerial position. 15 years' experience electrical and mechanical plant inspection, maintenance, repair and installation work. Has ideas for planned maintenance of plant. Considerable technical and business ability. Highest references.—**Box 9619**, c/o The Electrical Review.

ELECTRICAL Engineer, A.M.I.E.E., aged 34, released R.A.F. Class A, desires appointment (preferably with consulting engineers), 15 years' experience electrical plant inspection and maintenance. Qualified to advise on maintenance planning and efficient plant operation, including compliance with regulations. Considerable technical and business ability and able to prepare reports and schemes. Must be position with scope for increased responsibility with resulting remuneration.—**Box 9620**, c/o The Electrical Review.

ELECTRICAL Engineer, age 40, seeking change of position, requires post in supervisory capacity where wide experience in installation and maintenance could be used to advantage.—**Box 9614**, c/o The Electrical Review.

ELECTRICAL Engineer (39), thoroughly conversant electric motors and allied equipment, managerial experience, seeks post as manager or equivalent responsibility, London area.—**Box 8649**, c/o The Electrical Review.

ELECTRICAL Engineer (41), active and versatile, with practical, technical and commercial experience motors, control gear, transformers and instruments, seeks position with scope in commerce or industry, at home or abroad.—**Box 9622**, c/o The Electrical Review.

ELECTRO Plater and Polisher seeks responsible post. Age 42, extensive experience Sheffield trade shops as foreman from **go** chrome and **hard chrome**. Residing **Middlesex**—**Box 9562**, c/o The Electrical Review.

EX-R.E.M.E. officer (26), Grad. I.E.E., Higher National Diploma Electrical Power Engineering, seeks progressive appointment in electrical industry. Experience in manufacture and testing of generators, motors and power transformers, also maintenance and repair of many types radar and communications equipment: responsible workshop and staff appointments held.—**Box 9613**, c/o The Electrical Review.

EX-Branch Manager of electrical wholesalers seeks post, buying, managing, orders: 4 years with Superlamp Ltd., age 37, married, ex-R.A.F. Commence at once. Office, or travelling considered. Over 20 years' experience. **J. Banks**, 63, Confield Ave., New Malden, Surrey, 8635

EX-Major, R. Signals (29), B.Eng. (Hons.) (Heavy Elec.), A.M.I.E.E.; Met-Vick, apprenticed; experience D.C. and A.C. machines, traction, supply; four years Instructor and Principal Instructor in Radio Engineering to advanced courses, War Office School; wide experience Telecoms, Electronics design and operation, all freas.; recent Research experience; able technical writer; seeks responsible post requiring initiative, admin. ability and good technical and practical knowledge of both heavy and light current elec. eng. Available Dec.—**Box 8658**, c/o The Electrical Review.

EXPORT Engineer (35), conversant with foreign specifications, Continental Engineering Degree (British national), A.M.I.E.E., excellent linguist, ex-Admiralty Interpreter, registered Disabled Person (no visible disability) after R.N.V.R. service (Electrical Branch), seeks responsible position with Technical Export organization.—**Box 8662**, c/o The Electrical Review.

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INSTRUMENT Maker, 20 yrs. experience, experimental maintenance, repair, electrical testing, seeks situation, London area. Other districts if housing accommodation can be provided.—**Box 9555**, c/o The Electrical Review.

LADY Clerk, experienced in copy printing of plans, works orders, service record cards, filing, checking time sheets, statutory advices and all routine work in Mains Department office.—**Box 8656**, c/o The Electrical Review.

MAN with 30 years' experience London wholesale trade, dealing with orders and assisting buying, would be glad to hear from interested houses in London and Home Counties area.—**Box 9556**, c/o The Electrical Review.

PLANNING Engineer seeks situation. First-class engineer, used to f.h.p. motor production. Would consider any position with responsibility.—**Box 8645**, c/o The Electrical Review.

PLUMBER Joiner wants work; 20 years' experience stations, subs, 22-kV live, L.V., change-over, etc. South preferred.—**T. Millar**, 27, Barncroft Gardens, Benchill, Manchester. 8628

PRODUCTION Control Engineer, electrical apparatus, instruments, etc., wide technical knowledge, experienced design, proved ability locating and rectifying faults, age 41, keen, adaptable, South London.—**Box 9577**, c/o The Electrical Review.

PRODUCTION Manager for progressive firm making G.L.S. lamps. Experienced young man looks for opportunity where conscientiousness, fidelity and ability will be recognised.—**Box 8630**, c/o The Electrical Review.

REPRESENTATIVE, part or full-time, 25 years' construction builders, architects, the electrical trade, supply companies in the London and Home Counties area.—**Box 9561**, c/o The Electrical Review.

SALES Executive (36), Manchester, desires represent London co. of repute; in the North; would manage branch office or depot.—**Box 8633**, c/o The Electrical Review.

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SUPERVISING Installations Engineer desires change, London area or South America. Supervision of installations, contracting, estimating, inquiries, planning. Age 35. At present holding executive position. Efficient organiser and administrator.—**Box 9573**, c/o The Electrical Review.

SUPERVISING and Estimating Engineer, 22 years' experience, used to control of labour, drawings, etc., requires position with London firm. Further particulars—**Box 9590**, c/o The Electrical Review.

SUPERVISOR, age 36, twenty-two years' experience of the industry, installation and maintenance, also used to drawing, planning and office routine, seeks post London, Home Counties or South.—**Box 9580**, c/o The Electrical Review.

FOR SALE

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

CENTRAL ELECTRICITY BOARD

Civil Defence Act, 1939, Cl. 42

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TRANSFORMERS, 3-phase, 50 cycle, complete in all respects with oil.

MVA.	Ratio kV.	Connection Cooling	No. available.
20	132/33	Star/Delta OFB	1
20	33/11-6.6	Delta/Star ..	10
20	33/22	.. ..	3
10	22/11-6.6	.. .. ON	5
10	11/6.6-3.3	.. ..	5
*15	6.6/8.15-7.5-7.15	Star Auto ..	3
	6.1-5.8-5.35		
15	33/10.7-7.7	Scott OFB	2
10	33/2.25	Scott ON	1

All transformers except * have off-load tap switches for $\pm 2\frac{1}{2}$ and 7½%.

All transformers are available for immediate service. SWITCHGEAR, 11 kV, 500 MVA rupturing capacity, outdoor type, 48 bays, each comprising 1 set busbars, 1 3-phase isolator, 1 spring operated O.C.B., outgoing circuit arrangements, etc., etc.

CABLE, 11 kV, 0.5 sq. ins., single-core P.I.L.C., 205 drums of 200 yards each.

CABLE SEALING ENDS, 66-kV, 135; 33-kV, 477; 11-kV, 1,300.

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ESSEX COUNTY COUNCIL

ONE Ruston Hornsby 50-kW Mobile Diesel Oil Engine direct coupled to single-phase Alternator, complete with exciter, 50 kW, wound for 250 volts, 50 cycles. The set comprises air receiver single-stage compressor combined with petrol-paraffin engine and air piping connections, radiator with fan and drive. The set is mounted on low-loading trailer, road wheels, pneumatic tyres and complete with hinged covers. The plant was purchased early in 1940 at a cost of £1,034, and has only been in commission a few times on light load.

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H. CONOLLY, F.R.I.B.A.

County Hall, Chelmsford. County Architect. 2643

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A.C. and D.C. Motors, all sizes, large stocks, fully guaranteed.—Milo Engineering Works, Milo Road, East Dulwich, S.E.22 (Forest Hill 2278-9). 102

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A.C. Motors, 1/75th h.p. to 5 h.p., all voltages. Also D.C.—The Johnson Engineering Co., 319, Kennington Road, London, S.E.11. Telephones, Reliance 1412/3. 57

ALTERNATING Diesel Set, 350 kW, 400/3/50, direct coupled; excellent condition; can be seen running. Complete.—Box 2682, c/o The Electrical Review.

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BATTERY Chargers for home and export, 4 models, 2-6-12 v., 1, 2 or 4 amp. D.C., any mains voltage. Generous trade terms. Write for catalogue.—The Banner Electric Co. Ltd., Hoddesdon, Herts. Tel.: Hoddesdon 2659. 97

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ELECTRIC Motors, 1/3 h.p., 3,000 r.p.m., D.C. 110 V. Also 220 volts. Stock delivery, 56 each.—John Steel, Clyde Mills, Bingley, Yorks. 84

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HEWITT Rectifier and Transformer, input 6,300/3/50, output 50 kW, 230/460, new 1940. Hackbridge Pole Type Transformer, input 6,300/3/50, output 230/400, new 1942. National Diesel Set, 50 kW, 800 r.p.m., 460 volts, new 1934. Switchboard, 16-panel, D.C., by G.E.C., new 1932.—Borth & Ynyclas Electric Supply Co. Ltd., Borth, Cardiganshire. 2641

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LADDERS, single and extension, from—Ramsay & Sons (Forfar) Ltd., Forfar. 9004

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LEAD-Covered Cable, 1/.044 single, var. cam. insulated. App. 4,000 yds., various lengths, not been used, 4d. yd.—Wilkes, Derby Rd., Stapleford, Nottingham. 8660

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

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NEW or Secondhand A.C./D.C. Motors can be supplied from stock or at short notice. Specialists in rewinds and repairs. Send your requirements to—John Phillips & Co. (Electrics), 31 Fortune Green Rd. N.W.6 (Park 4772). 2538

NEW 18-c. Gold Chronographe Wrist Stop Watch, split second timekeeper, calibrated 1/1,000 sec. flyback, etc., etc. (cost 125 guineas), superb looks and performance, guaranteed, 56s; Eversharg (U.S.A.) 14-c. Gold Streamline Model Fountain Pen, £12 10s.; ditto Pencil, £8 10s.—B. W. Thomas, 40, Kensington Park Gardens, London, W.11. 8646

NUITS, 700 gross surplus for disposal, 3/16" Whit. Simmonds No. 2BA/T/MS.—H. Frost & Co. Ltd., Fieldgate, Walsall. Tel. Walsall 2218. 2705

ONE English Electric Co. Precipitation H.T. Generator Set, 15-45 kV up to 200 milli-amps., complete with A.C. 18-h.p. driving motor, regulator, etc., for immediate delivery. Can be seen working. Box 2646, c/o The Electrical Review.

ONE 1,850-kVA Transformer, new 1940, by Transformers & Welders Ltd., 33,000/400/230 volts, 3-phase, 50 cycles. Newman Industries Limited, Yate, Bristol. 2623

PETROL Electric Generating Sets, from 120 v. to 1.5 kV. new designs, good deliveries.—Arthur Lyon & Co. (Eng.) Ltd., Africa House, Kingsway, W.C.2. 70

PHONE 98 Staines. 90-kW Ruston Diesel Set, 110 v. D.C. 25-kW Miralles ditto, 110 v.; 7.9-kW Ruston ditto, 110 v.; 5-kVA Ruston ditto, 400/1/50; Weir Feed Pump, 8½" × 6" × 13".—Hary H. Gardam & Co. Ltd., Staines. 60

PLATING Generators, unused, several ranging from 350 to 700 amps. 6 to 12 volt, plain or with A.C. or D.C. motor drive. Particulars from—Stewart Thomson (Liverpool) Ltd., Fort Road, Seaforth, Liverpool, 21 (Bootele 2697); or 28, Victoria Street, London, S.W.1 (Abbey 2101). 63

P.V.C. and Cotton-covered Bell Wire, single, twin, triple and four core, in beautiful assorted colours, from 6s. 6d. per 100 yds.; send 6d. for samples and lists. We also have in stock irons, fires, extension speakers, etc.—Northern Industries, Dept. 8, 199, Broughton Lane, Salford. 7. 2217

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

ROTARY Converters, 200-kW, 6,600/3/50 input, 230 volts, 2-wire D.C. output, complete with Transformer and switchgear, seen running in Liverpool, 2,000-kW, 6,600/3/50 input, 418/462 volts, three-wire D.C. output, complete with transformers, starting panels, D.C. machine panels. First-class condition. Two sets available.—Stewart Thomson & Sons (Liverpool) Ltd., Fort Road, Seaforth, Liverpool, 21 (Bootele 2697); or 28, Victoria Street, London, S.W.1 (Abbey 2101). 72

SACKS and Bags in excellent condition for all commodities, as low as 4d. each. Write—John Traydon Ltd., 230, Tottenham Court Road, W.1. Tel. No. Museum 6972. 79

SPIRAL Elements for electric fires, boiling rings, and other appliances, supplied to order.—Electrothermal Engineering Ltd., 270, Neville Road, London, E.7. 54

SPIRALS, first quality, 500, 600, 750 and 1,000 watt, all voltages, for immediate delivery.—Box 59, c/o The Electrical Review. 31

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SUPERIOR Type Builders' Ladders now in production: also Steps, Trestles and Extension Ladders. Phone—Shafesbury Ladders Ltd., 453, Katherine Road, E.7, Cranewood 3363/4. 15

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VACUUM Cleaners. Two industrial type Sturtevant Cleaners, Model Nos. 2 and 4, complete with all accessories.—Ilford Electrical Co. (1945) Ltd., 4, High Road, Ilford, Essex (Phone Nos. Ilford 0683 and 0976). 8642

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5 kW, 220 v. Automatic Kohler Set, rebuilt; 800 and 1,500 w. 110 v. ditto; two 20-kW, 120-v. Steam Turbo Sets and Panels; 5-h.p. Petter Diesel Set, 200 v. A.C.; Dynamo, 10 kW, 100/140 v., Sh/Comp., 850 r.p.m.; Dynamo, 7.8 kW, 250 v., 550 r.p.m.—E. Binns, 156a, Falsgrave Road, Scarborough. 8652

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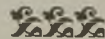
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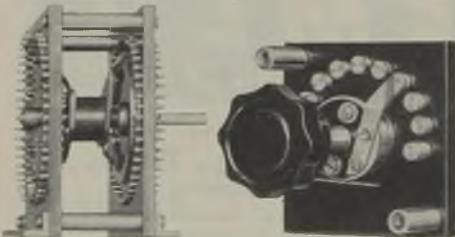
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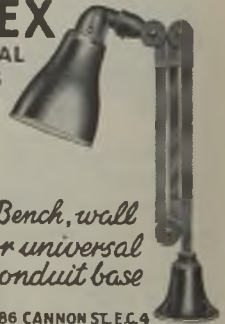
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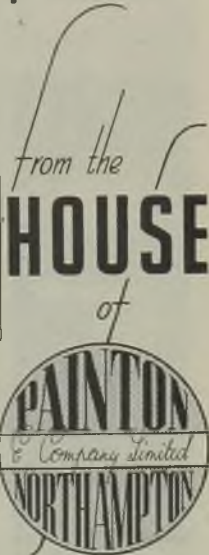
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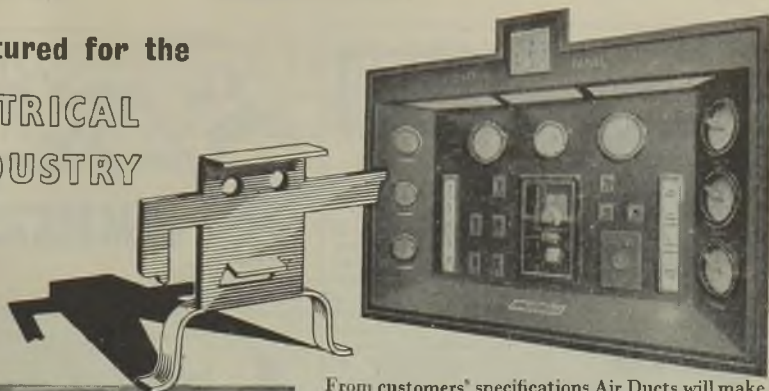
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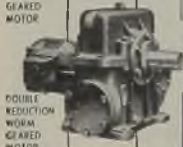
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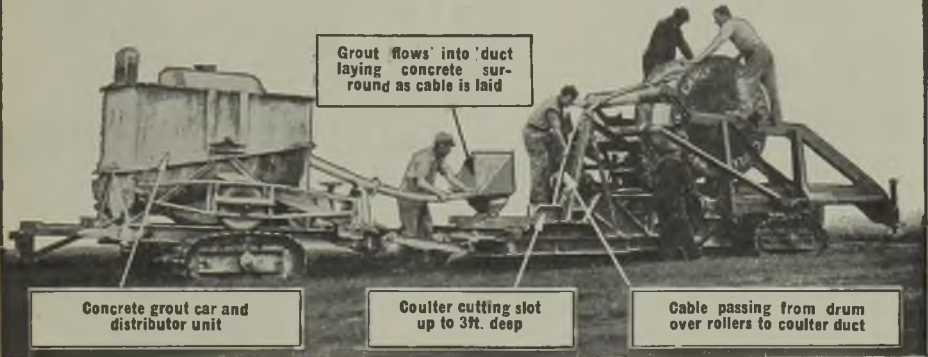
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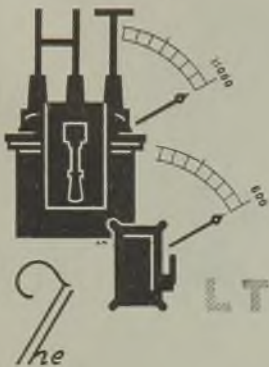
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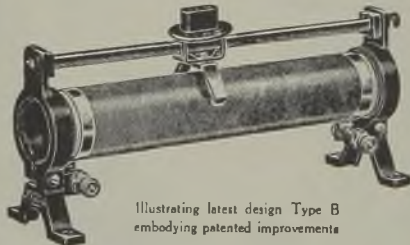
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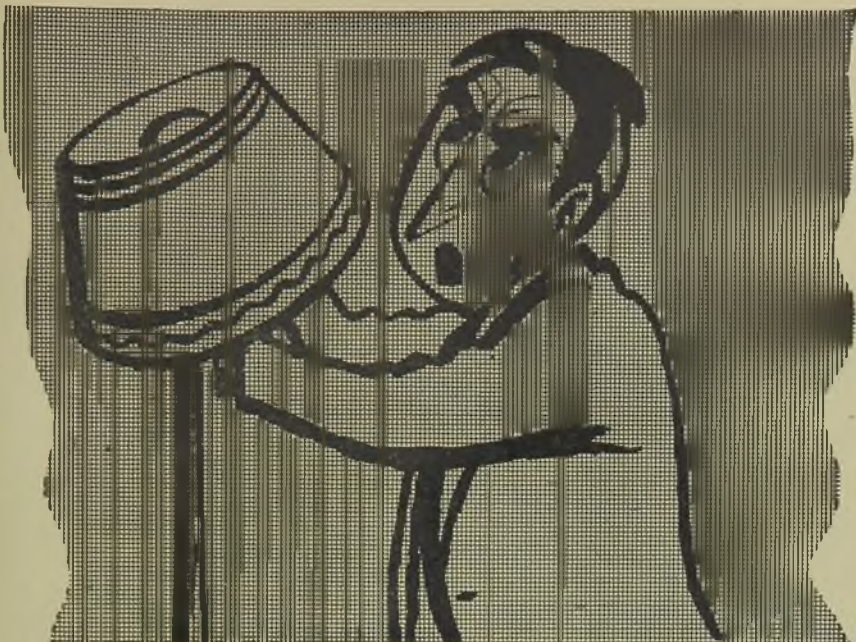
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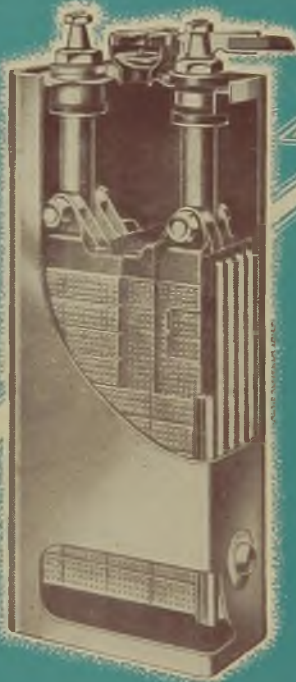
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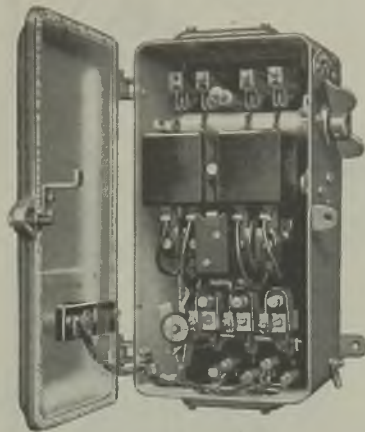
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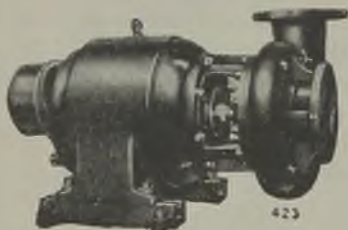


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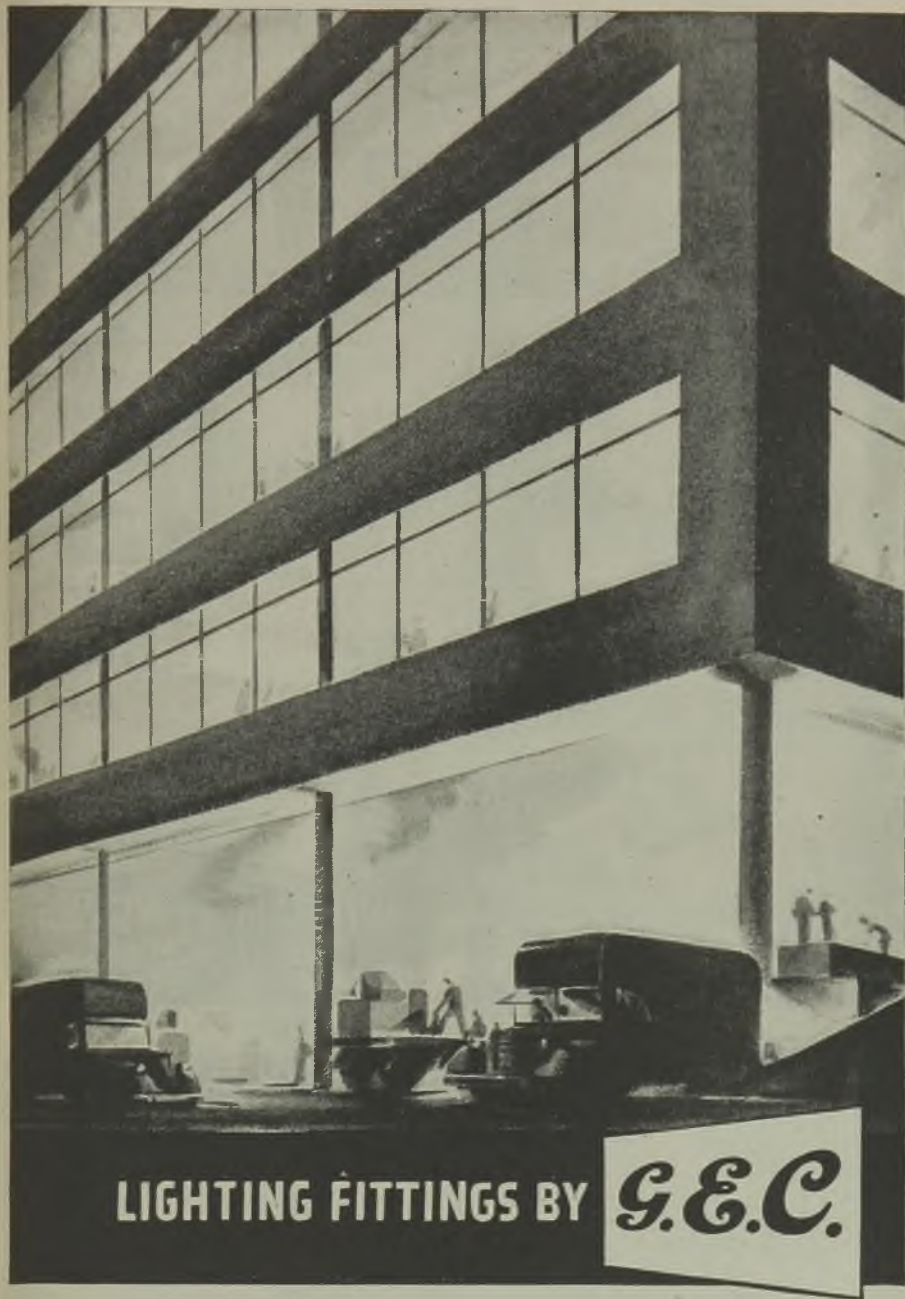


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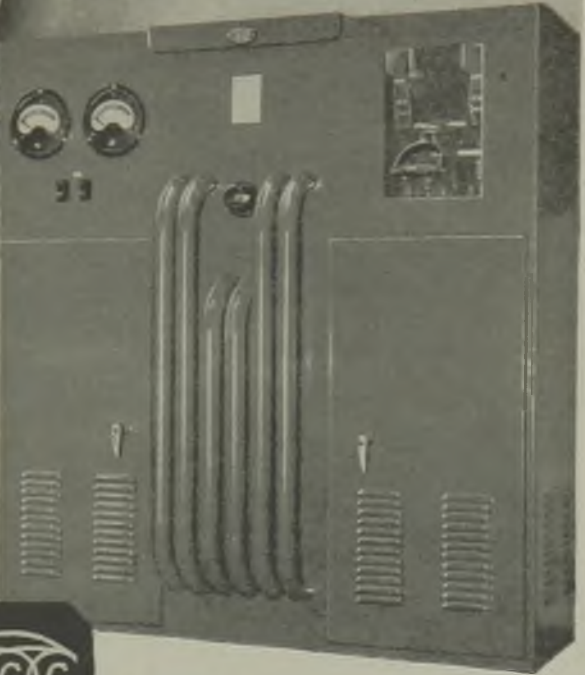
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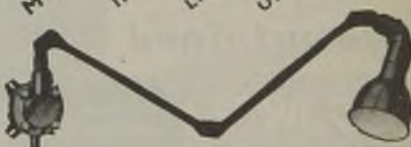
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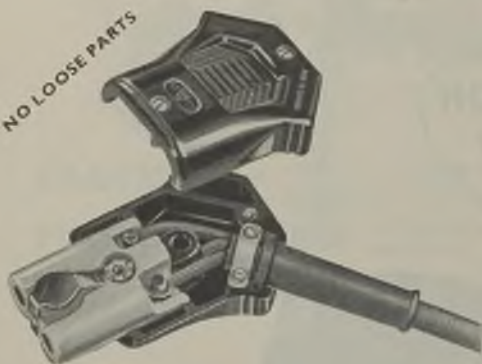


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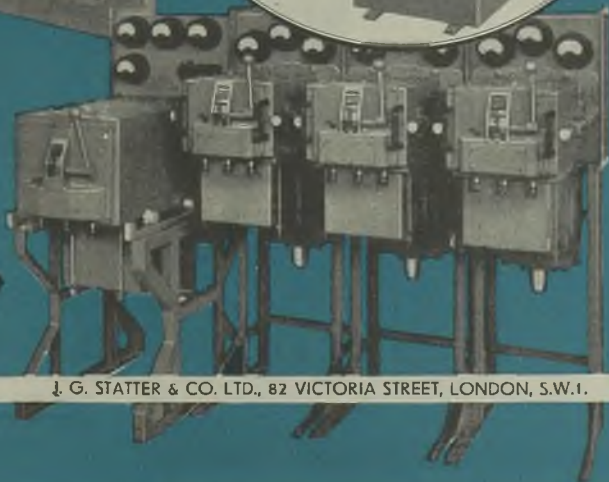
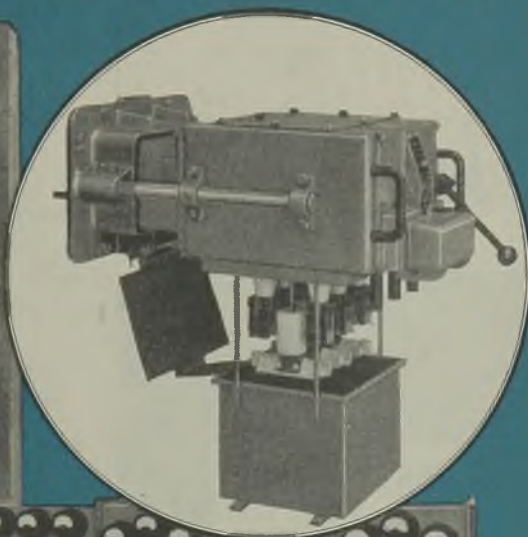
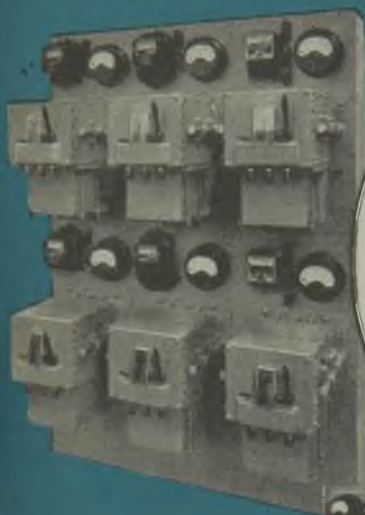
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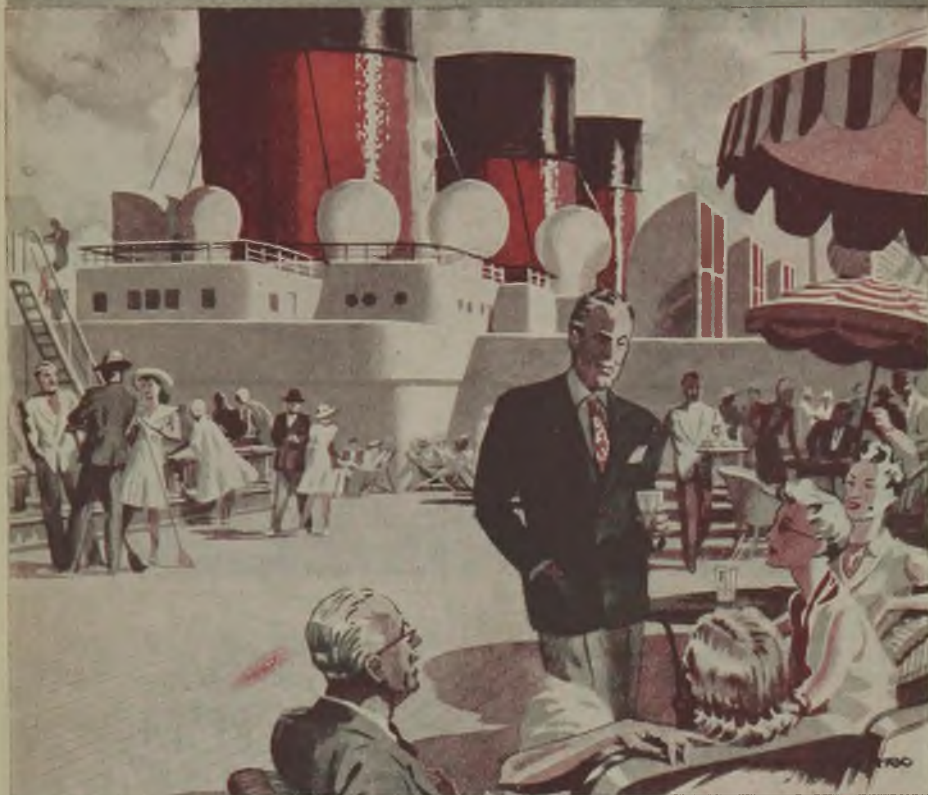
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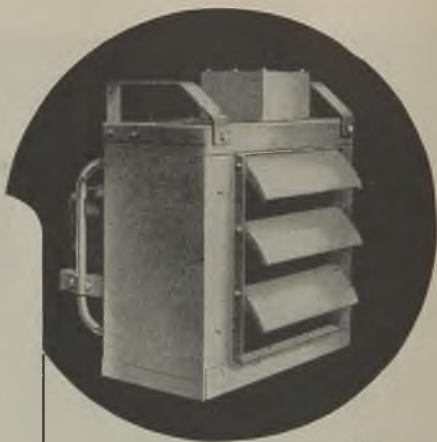
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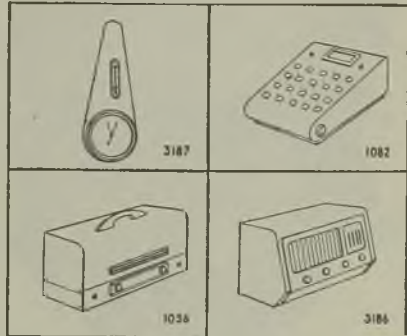
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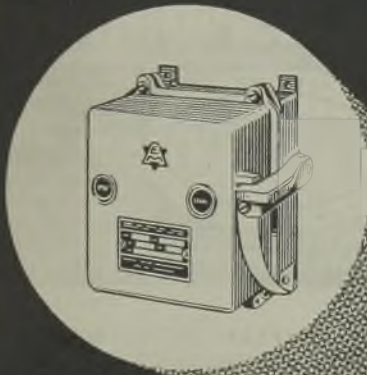
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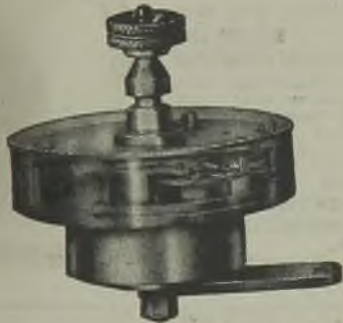
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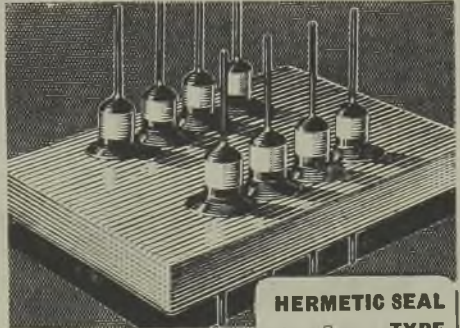
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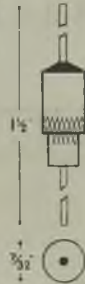
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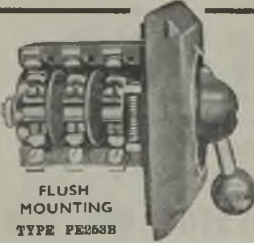
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