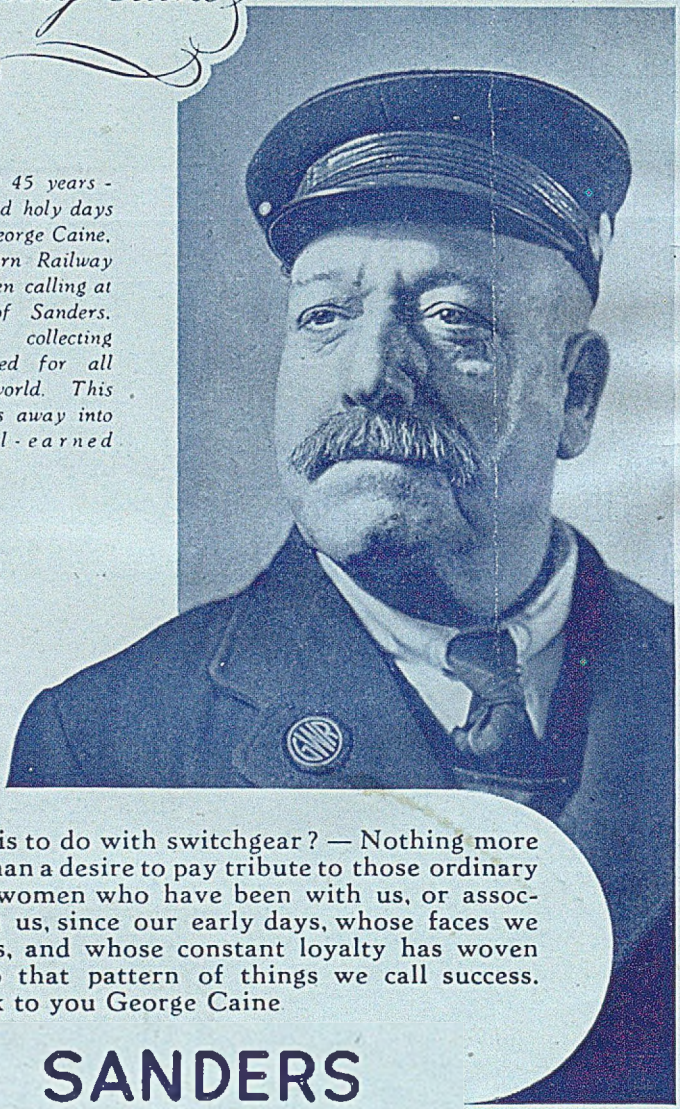
ELECTRICAL REVIEW

VOL. CXLII 6th FEBRUARY, 1948 NO. 3663

FOUNDED 1872 NINEPENCE WEEKLY

George Henry Caine



Every day for 45 years - high days and holy days excluded - George Caine, Great Western Railway carter has been calling at the works of Sanders, Wednesbury, collecting goods destined for all parts of the world. This year he slips away into quiet well-earned retirement.

What has this to do with switchgear? — Nothing more perhaps than a desire to pay tribute to those ordinary men and women who have been with us, or associated with us, since our early days, whose faces we shall miss, and whose constant loyalty has woven itself into that pattern of things we call success. Good luck to you George Caine

SANDERS
WEDNESBURY

MAKERS OF GOOD SWITCHGEAR FOR OVER FIFTY YEARS.

WM. SANDERS & CO. (WEDNESBURY) LTD., WEDNESBURY. STAFFS.

TEST IN SAFETY WITH *Certainty*

USE THE WATLIFF *Flash Tester*

Whatever the type of electrical equipment, in a few minutes an unskilled person can be taught to use the Watliff Flash Tester with speed, safety and certainty. In radio, line or medium voltage equipment it detects hidden faults in winding and insulation, so preventing failings in use which otherwise might prove costly.

Safety is assured by the (low tension) press button seen in the girl's left hand, the high tension lead is alive only while the operator is testing.

A notable feature is the visual coloured lamp indicator, which shows when the set is on and when the fault is located. The Flash Tester, portable weighing 40 lbs. rating ¼ k.v.a. will test any size of electrical apparatus within the testing range which is 1,000, 1,500 and 2,000 volts. It is suitable for operation at 210, 220, 230 and 240 volts A.C.

Further information gladly sent—State voltage.

DELIVERY EX STOCK

WATLIFF REGD TRADE MARK

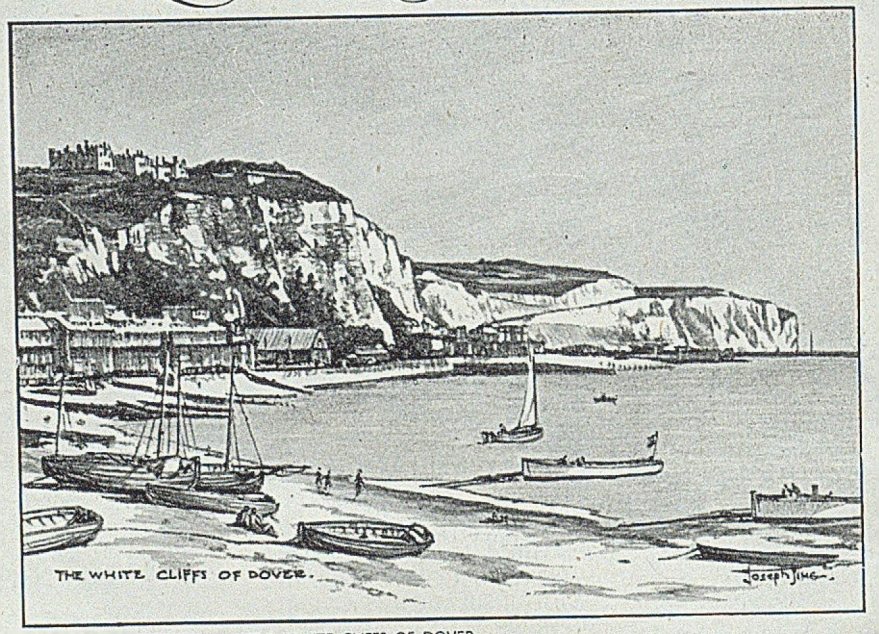
MANUFACTURERS OF COMMUTATORS FOR OVER 25 YEARS

TELEPHONE: LIBERTY 1181-1182 1183
TELEGRAMS: WATLIFF, PHONE, LONDON

CO. LTD. LOMBARD ROAD, MORDEN ROAD, SOUTH WIMBLEDON, LONDON, S.W.19

TAYLOR

Landmarks of Britain



THE WHITE CLIFFS OF DOVER

These ramparts of chalk rising to 375 feet are the first glimpses of England obtained by travellers from the Continent

CRYSELCO *Lamps*

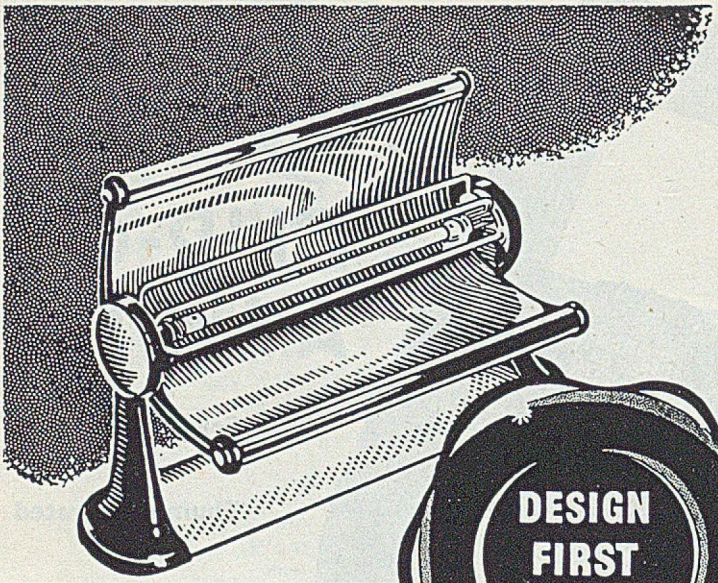
MADE IN ENGLAND

FIFTY YEARS OF QUALITY & SERVICE

Branches

BIRMINGHAM
BRIGHTON
BRISTOL
BURY ST EDMUNDS
CARDIFF
GLASGOW
LEEDS
LEICESTER
LIVERPOOL
LONDON
MANCHESTER
NEWCASTLE

CRYSELCO LIMITED, KEMPSTON WORKS, BEDFORD



The New Solray Fire

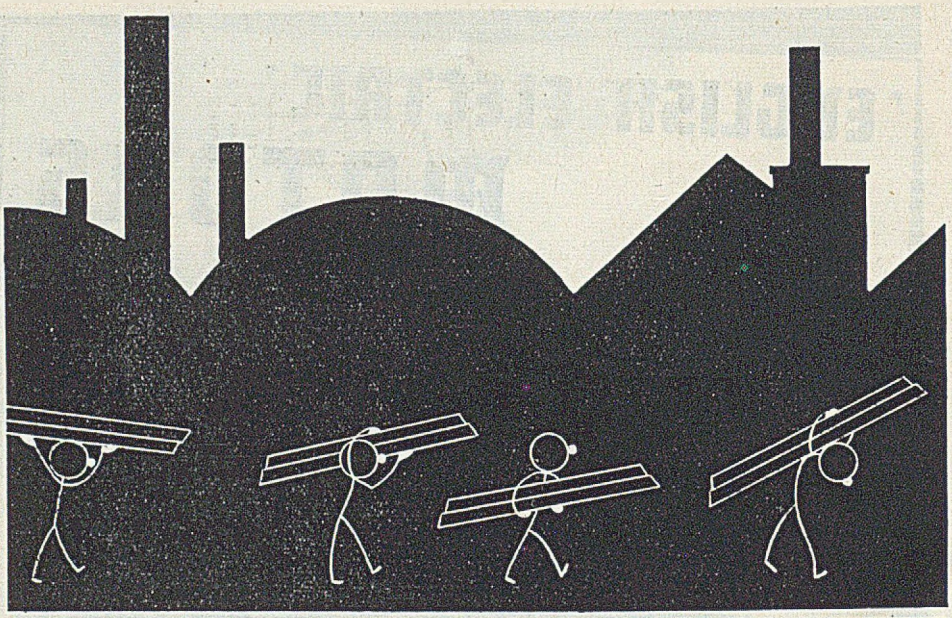
DESIGN FIRST CLASS

As output is still restricted priority will be given to orders for Fires and Cookers required for essential purposes . . . . . .

YOU CAN'T BEAT A Belling

BRIDGE WORKS: ENFIELD, MIDDLESEX — HOWARD 1212

C.R.C. 331



Fluroliers for essential factories

An increasing stream of Benjamin Flurolier Reflectors is coming from the factory—reflectors for single 5-foot lamps, for twin 5-foot and for twin 48-inch lamps. They are going to factories engaged on essential production and export. Their outstanding features such as easy connection, detachability, grip type holders and the porcelain enamelled reflector types are gaining lasting approval. Write for further details.

BENJAMIN Regd

FLUROLIERS Regd

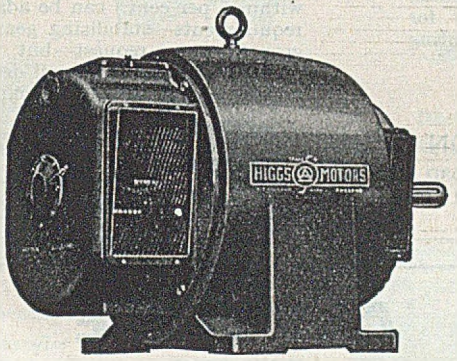
THE BENJAMIN ELECTRIC LTD · BRANTWOOD WORKS · TOTTENHAM · LONDON · N·17

Telegrams: "Benjalect, Southtot, London." Telephone: Tottenham 5252 (5 lines)

LOCAL SERVICE:

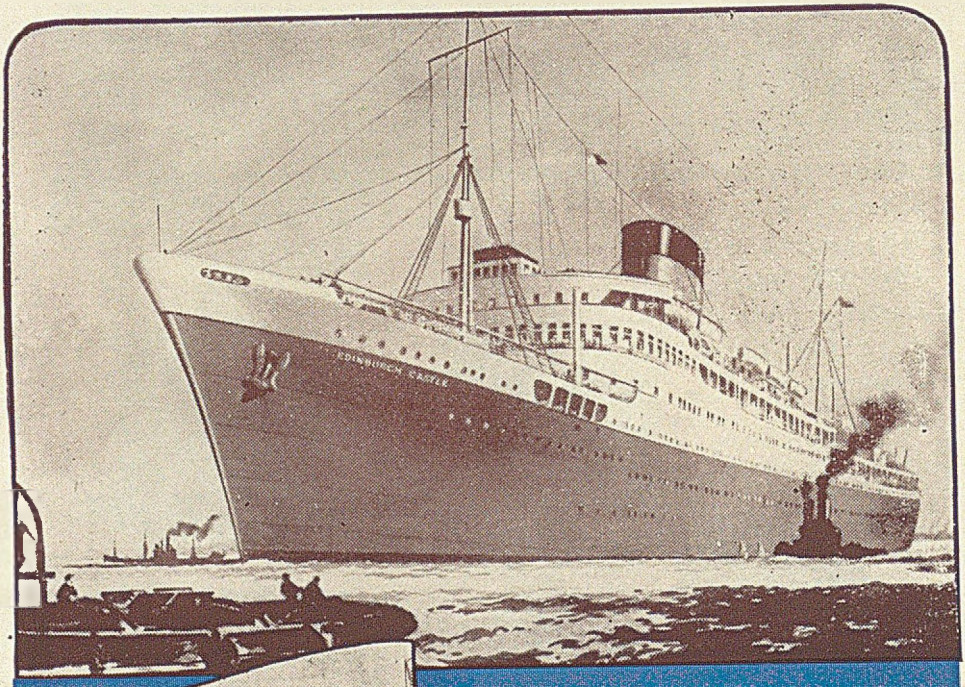
5, Corporation Street, Birmingham, 2. Telephone: Midland 5197

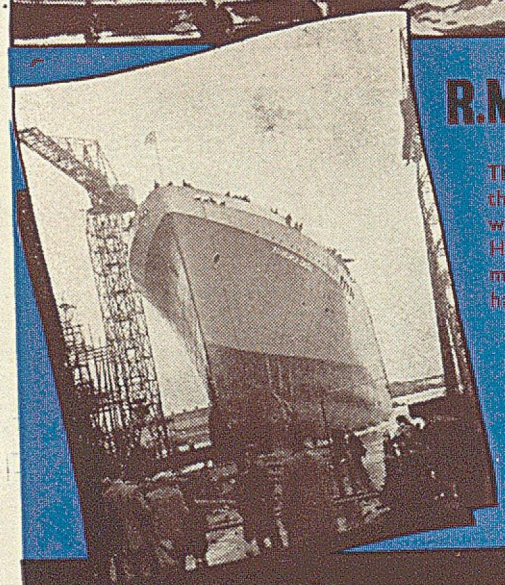
49, Basinghall Street, Leeds, 1. Telephone: Leeds 25579



Steel Poles and Interpoles
Laminated Pole-Shoes
Commutator of ample wearing depth
Dynamic balance on all machines
and
GUARANTEED FOR EVER !

A†





R.M.S. 'Edinburgh Castle'

This superb 28,500 ton passenger ship for the Union Castle Line's service to Capetown was launched by Princess Margaret at Messrs. Harland & Wolff's shipyard at Belfast. As in many other famous vessels HENLEY CABLES have been used for the electric installation.

HENLEY CABLES

Famous for over a Century

HENLEY'S for Shipwiring Cables

W.T. HENLEY'S TELEGRAPH WORKS CO. LTD. 51-53 HATTON GARDEN, LONDON. E.C.1

So simple . . . so quick . . . so safe

to detach and replace reflector complete with lamp

Ease of maintenance and cleaning is of primary importance when choosing industrial lighting equipment. REVO "SAFERLITE" can be removed and replaced with one hand without using tools. The simple patented mechanism is ingenious, foolproof, unfailing . . . and never wears out.

Available in dispersive, distributing, concentrating, elliptical and angle types.

Write for full particulars.

Revo

SAFERLITE

INDUSTRIAL REFLECTORS

REVO ELECTRIC CO. LTD., TIPTON, STAFFS.

GLOVERS

GAS-FILLED CABLES

BRIT. PAT. NO. 393,694 - FEBY. 1932

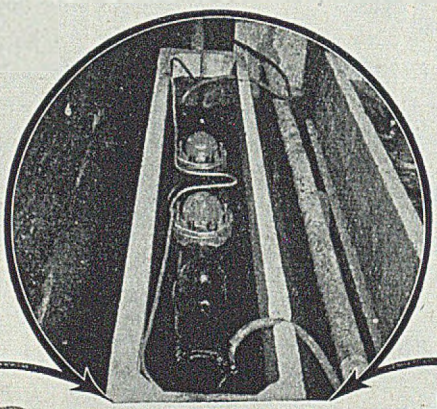
AVAILABLE IN 3-CORE FORM FOR 33 kV AND 66 kV AND IN SINGLE-CORE FORM FOR 132 kV

INSTALLATIONS

CENTRAL ELECTRICITY BOARD—

WIMBLEDON,
BRIMSDOWN,
WOKING, BEDFORD
LITTLE BARFORD,

N.W. ENGLAND—
MERSEY TUNNEL



INSTALLATIONS

LEICESTER & WARWICKSHIRE POWER CO.

DERBY & NOTTS POWER CO.

SHEFFIELD CORPORATION

SYDNEY CORPN. (AUSTRALIA)

CONDUCTOR TEMPERATURE 80° C.
NON DRAINING DIELECTRIC.

ELECTRIC STRESS
RATING UP TO 85 kV/cm

EXTREMELY LOW CHARGING kVA & DIELECTRIC LOSSES

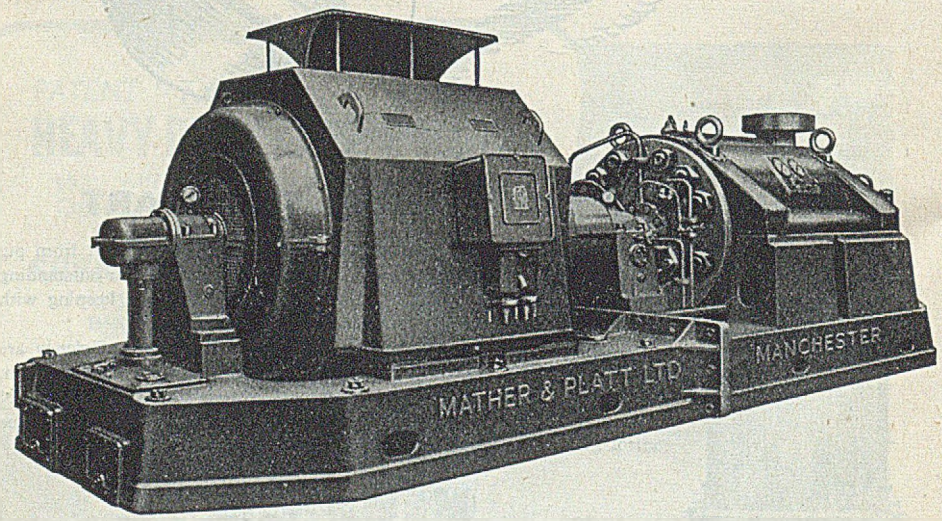
W. T. GLOVER & CO. LTD.

TRAFFORD PARK MANCHESTER 17

3,000

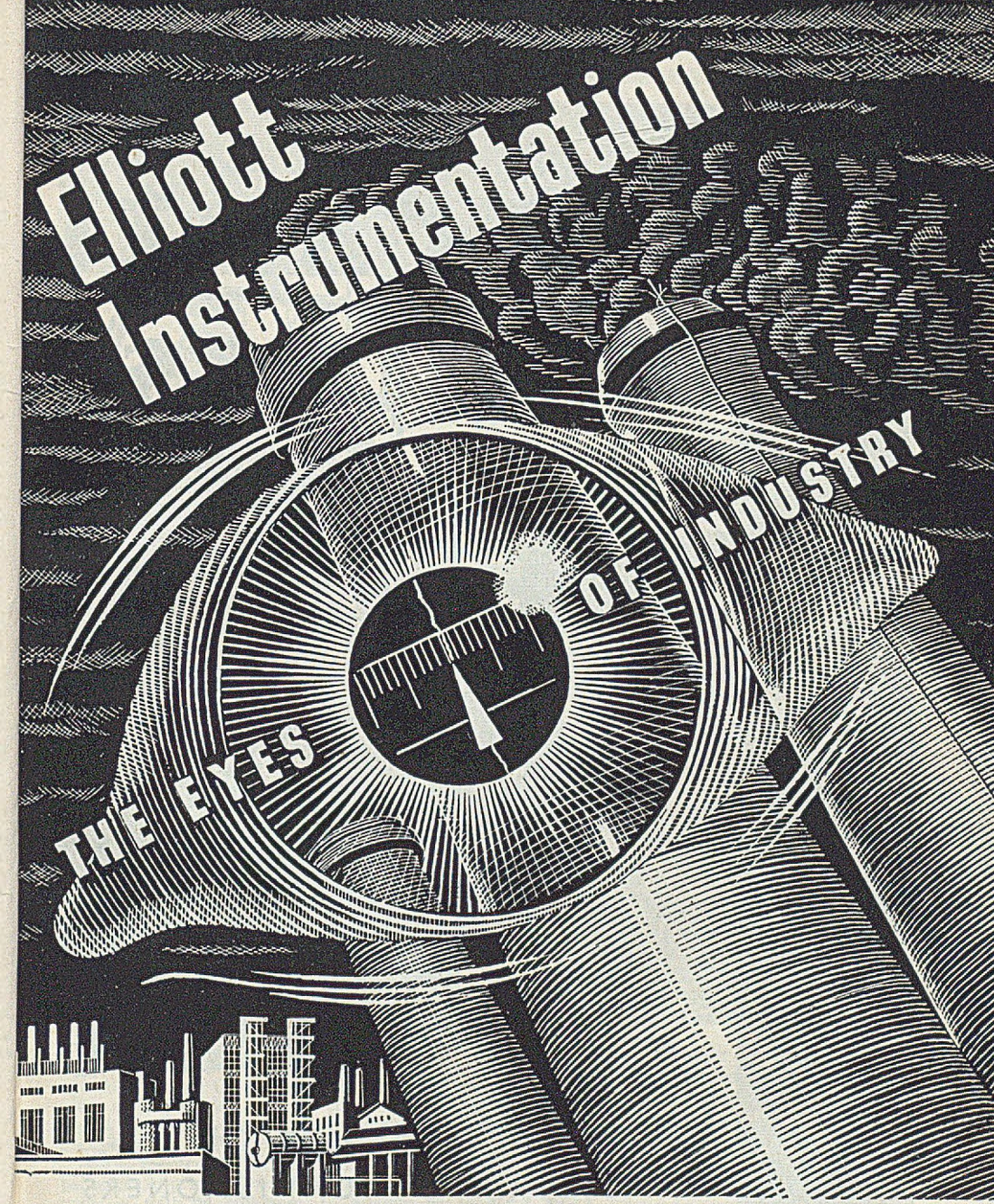
Horsepower
Volts
r. p. m.
lbs per sq. inch pressure.

TAKING NOT MORE THAN 4½ TIMES full load current when started by switching direct on to the supply mains, this Mather & Platt 3,000 H.P. 3,000 Volt, 3,000 r.p.m. Squirrel Cage Motor drives a Mather & Platt Boiler Feed Pump operating at a pressure of 3,000 lb. per sq. inch.



MATHER & PLATT LTD

PARK WORKS MANCHESTER 10



INSTRUMENT MAKERS SINCE 1800

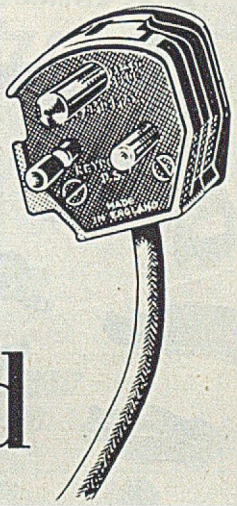
ELECTRICAL INDICATING, TESTING AND RECORDING • INSTRUMENTS FOR TEMPERATURE AND PROCESS MEASUREMENT AND CONTROL • FUEL ECONOMY, GAS ANALYSIS AND FLOW MEASUREMENT EQUIPMENT • SYSTEMS OF REMOTE INDICATION, INTEGRATION, RECORDING AND CONTROL

ELLIOTT BROTHERS (LONDON) LTD.

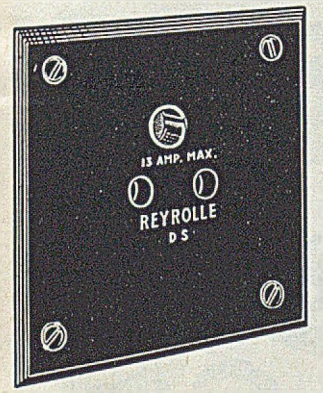
CENTURY WORKS, LEWISHAM, S.E.13. TELEPHONE: TIDeway 3232
AND AT ROCHESTER, KENT. RESEARCH LABORATORIES AT BOREHAMWOOD

Plugs & Sockets

3 kw 230 volts



fused



and shuttered

for domestic service

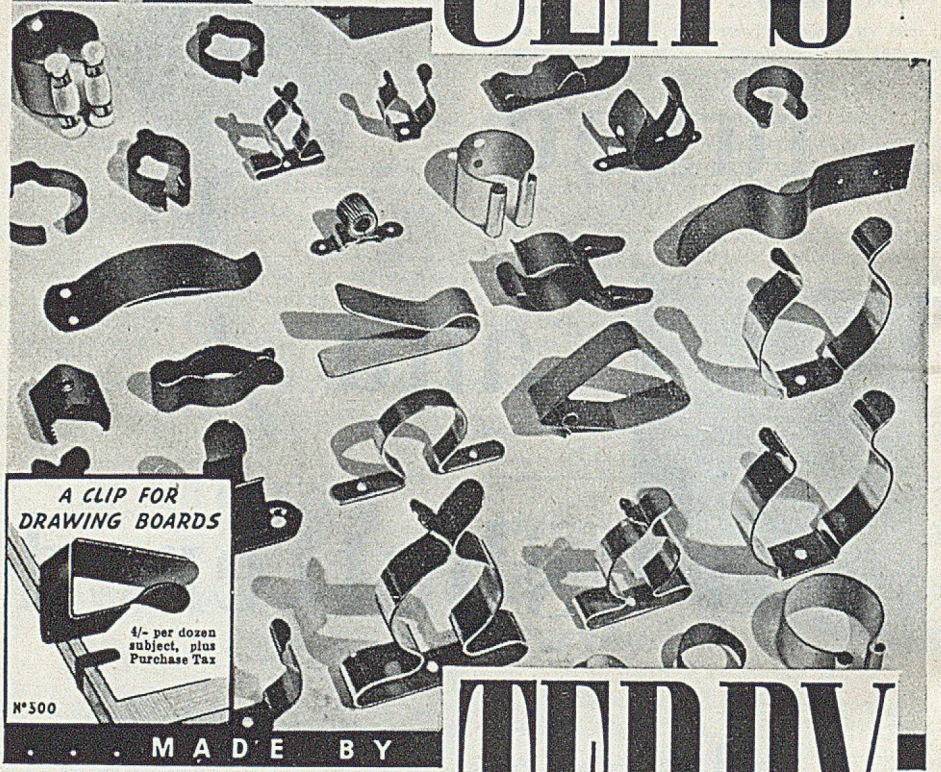
ASK FOR PAMPHLET No. 1203

REYROLLE

HEBBURN CO. DURHAM ENGLAND

"I never knew there were so many kinds of...

CLIPS"



TERRY

springs

People are amazed when they learn of the variety of CLIPS we make—steel clips, bronze clips, stainless clips, big clips, small clips . . . clips in every conceivable shape and pattern . . . clips for every possible use. We can make to print or specification or our Research Department can design a clip for that particular job of yours.
Over 92 years of clip-making is at your disposal.

Sole Makers

HERBERT TERRY & SONS LTD., REDDITCH

London, Birmingham, Manchester.

A14

FROST WARNING

Possible danger, eh? Shouldn't have thought there'd be frost at tree level tonight, whatever the radio says. Still—better switch on. Silly to take any risks, now that we've got the current . . .'

Not very far ahead of us now lies the Electric Age—with universal, unlimited supplies of electricity. When that age is established, peace will at last begin to count her victories. Farmers will find new weapons against the wasteful treachery of the weather. City dwellers will break free from smoke and dirt and disease. Better days for all. And for us, here in Alton, where we make the batteries for generating stations all over the world, busier days than ever. Hydro-electric, Atomic or what you will, the new generating stations will all need batteries. Good batteries. The kind we have always made at Alton.

ALTON

BATTERIES OF MERIT

THE ALTON BATTERY COMPANY LTD · ALTON · HANTS
Sole Suppliers of Fuller Stationary Batteries
Telephone: ALTON 2267 & 2268 Telegrams: 'BATTERY, ALTON'

Details that Distinguish . . .

In the product of the Specialist there are details of design that distinguish it from its contemporaries.

IGRANIC
SHEET STEEL HOUSING
. . . *designed and built for the job*

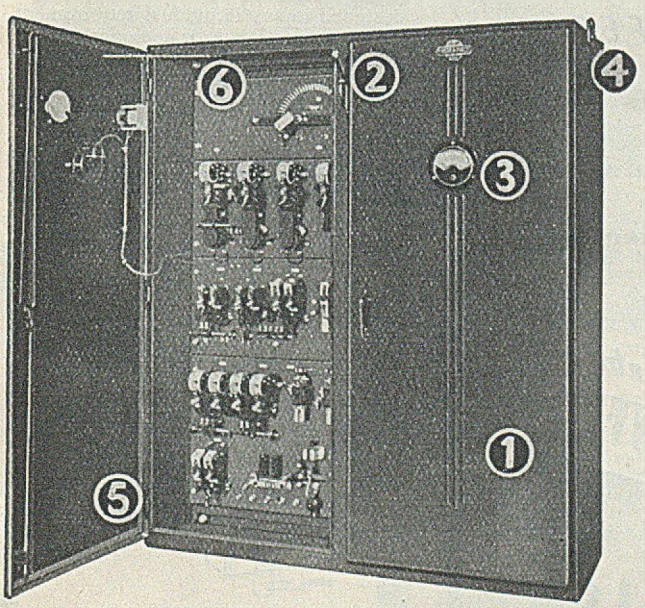


Illustration
Shows 3 Motor
Control Panel
for Boring Machine

1. High quality steel case of pleasing appearance combining strength with light weight.
2. Neat and conveniently placed Interlocked Isolator.
3. Instruments and Switches mounted in door at easily accessible heights.
4. Removable lifting lugs and flush sides facilitate handling and ganging.
5. Concealed hinges.
6. Equipment mounted on independent framework ensures rigidity and easy removal through front door.

ELECTRIC
IGRANIC
CO. LTD.
HEAD OFFICE AND WORKS BEDFORD

LONDON · BIRMINGHAM · BRISTOL · CARDIFF · GLASGOW · LEEDS · MANCHESTER · NEWCASTLE · SHEFFIELD

GETTING THE MOST OUT OF COAL

Tubs coming through airlock.

What did it matter—in '23?

The country had all the coal it would ever need. It was made of coal. Economy seemed pointless in 1923. • Yet in that year ICL, looking a little further than most, introduced Pulverised Fuel into this country. After that came a long series of fuel-saving developments by ICL, all of which are proving invaluable now. • Today's order-books, naturally, are full: but knowing as they do that fuel economy will always be important, ICL are working as hard as ever on the problems of getting the most out of coal.

YOUR PROBLEM IS 'DIFFERENT', and our answer will be different too. Almost everything we make is specially designed. We can accept very few orders at the moment; but, although we refuse to build down to a price most of our clients find that it saves them money to bring their problem to ICL.

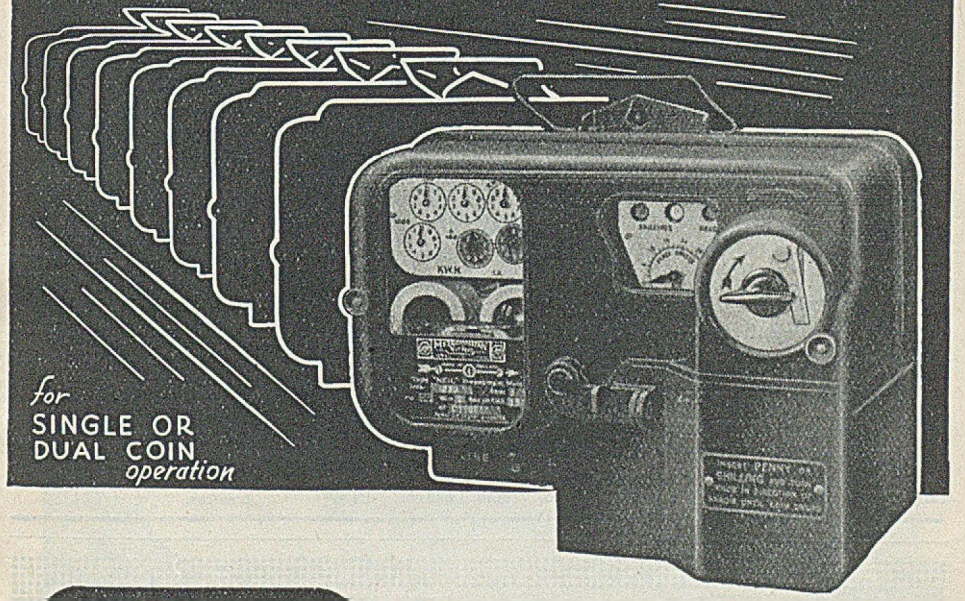
ICL

INTERNATIONAL COMBUSTION LTD

NINETEEN WOBURN PLACE · LONDON · W.C.1 · WORKS: DERBY

P.2

PREPAYMENT METERS *by* METROVICK

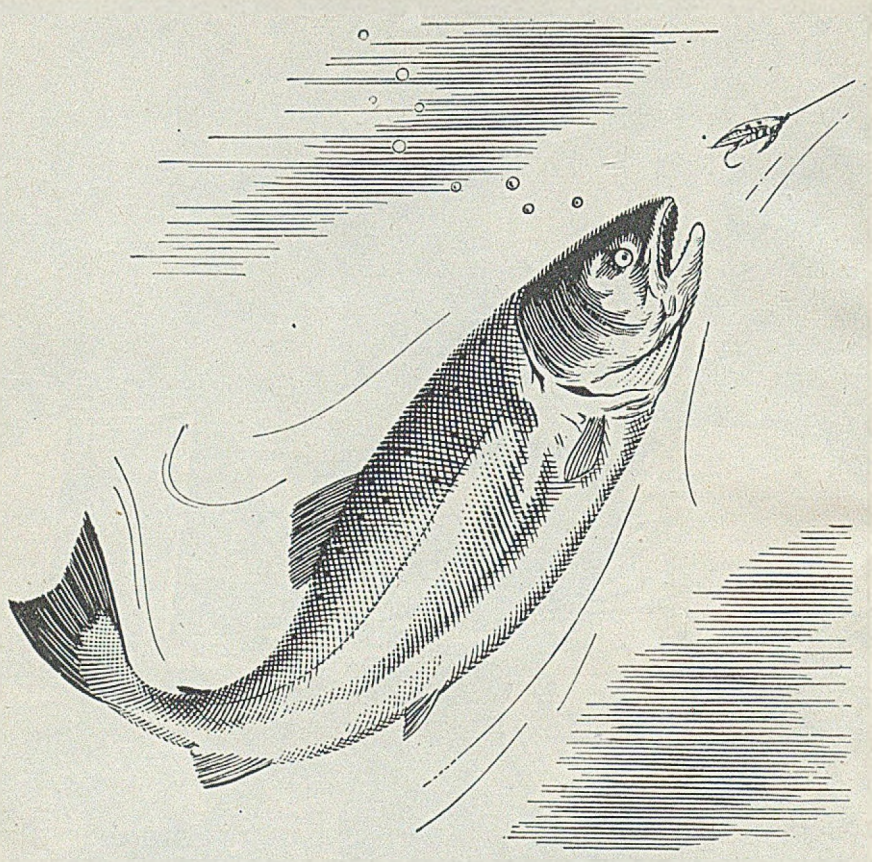


TYPE NEIL METER

- Complies fully with B.S.I. Spec. No. 37 and with all requirements of Electricity Supply (Meters) Act 1936.
- Trouble-free service and low maintenance costs ensured by absence of complicated mechanisms.
- Foolproof coin receiver prevents illegal practices, cannot be jammed, and protects mechanism from dust.
- Your interests separately safeguarded by independent sealing of terminal blocks, cover and coin box.
- A fully insulating cover and case house this 8¼ lb. lightweight meter.

METROPOLITAN Vickers
ELECTRICAL CO., LTD.
TRAFFORD PARK ··· MANCHESTER 17.

G/E 701



. . . but there's nothing more attractive than

"TICONAL" PERMANENT

REGD. TRADE MARK

MAGNETS MADE BY Mullard

Mullard

THE MULLARD WIRELESS SERVICE COMPANY LIMITED, MAGNET DIVISION, CENTURY HOUSE, SHAFTESBURY AVENUE, LONDON, W.C.2. (MT232)

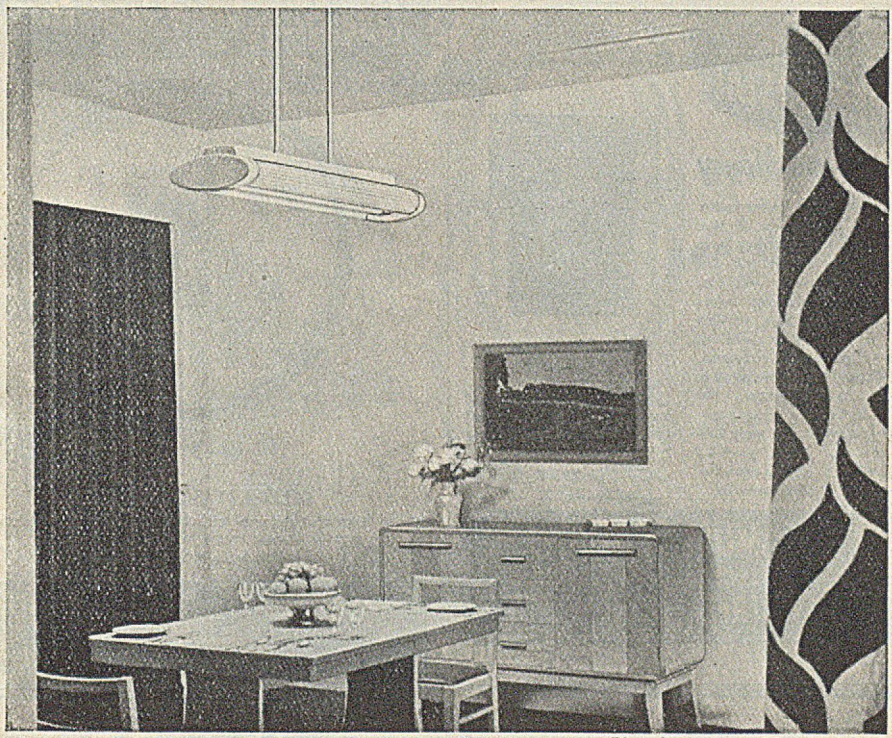


Photo by courtesy of Bowman Bros.

THE INTIMATE TOUCH

THE ATLAS FLUORESCENT LIGHTING UNIT shown above uses three of the new 3ft. 30-watt ATLAS fluorescent tubes. It has enclosed control gear and ribbed "Perspex" diffusing covers, is designed to combine direct downward lighting with adequate general illumination for a room of about 150 square feet. This unit is one of a range of handsome and efficient single, double and triple tube ATLAS fittings which is bringing modern fluorescent lighting into homes and hotels, offices and shops, restaurants, clubs and beauty parlours, etc. all over the country.

A BIG NEW SALES FIELD

A single 30-watt fluorescent tube gives as much light as one 100-watt incandescent lamp . . . soft, diffused shadowless light which does not distort colours and is free from glare . . . yet it uses less current and has twice the life. These fittings have only to appear in your showroom to bring a flood of new business.

ATLAS FLUORESCENT

for industrial & domestic lighting

THORN ELECTRICAL INDUSTRIES LTD., 105-109 JUDD STREET, LONDON, W.C.1
Phone: EUSton 1183

Northern Branch: Stevenson Square, Manchester 1. Phone: Central 3185

149

PICTURE OF OUR CABLE SALESMAN NOW THAT RESTRICTIONS ARE OFF

Yes! He really has something to sing about—J. & P. are supplying standard V.I.R. Cables FROM STOCK.

The service for which we were famous before the war is being restored rapidly—a point worth remembering when next he skips into your office.

★ *The one cloud in his sky—lead-covered cables are still in short supply. Fortunately, we do hold stocks of alternative types.*

JOHNSON & PHILLIPS LTD.
CHARLTON LONDON S.E.7
The mark that means that "little more" in quality

ELECTRICAL REVIEW

Managing Editor: HUGH S. POCOCK, M.I.E.E.
Technical Editor: C. O. BRETTELLE, M.I.E.E.
Industrial Editor: J. H. COSENS

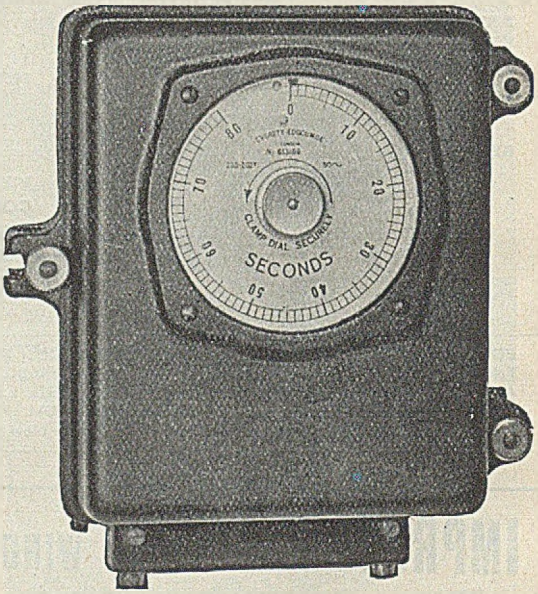
6th February, 1948

Contents

EDITORIAL ADVERTISING & PUBLISHING OFFICES: Dorset House, Stamford St., London, S.E.1
Telegraphic Address: "Elecrev, Sedist, London." Code: ABC. Telephone No.: Waterloo 3333 (60 lines).
Annual Subscription, Post free: Great Britain and elsewhere £2 9s. 6d. Cheques and Postal Orders (on Chief Office, London) to be made payable to ELECTRICAL REVIEW LTD., and crossed "Lloyds Bank."
Entered as Second Class Matter at the New York, U.S.A., Post Office.

SYNCLOCK PROCESS TIMERS AND CONTACTORS

for accurate timing of industrial and scientific processes.



- The Synclock Synchronous Self-Starting motor ensures accurate timing and repetition when connected to a time controlled alternating current supply.
- Wide range of full scale settings are available in Seconds, Minutes or Hours.
- Unelapsed time is always visible.
- External time adjustments can be provided when required.
- Contacts (normally open or closed) reset automatically for next operation.

Write for Catalogue Sheet 611

EVERETT EDGCUMBE

COLINDALE WORKS
LONDON, N.W.9
Telephone : COLINDALE 6045

Manufacturers of all kinds of indicating and recording electrical instruments. Photometry experts

ELECTRICAL REVIEW
THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXLII. No. 3663 6th FEBRUARY, 1948 9d. WEEKLY

Training Technical Staffs

Scottish Board's Scheme

BY its decision to set up a residential staff college at Pitlochry, the North of Scotland Hydro-Electric Board has shown its appreciation of the need to secure an adequate supply of engineers and craftsmen for operating its widely spread undertaking. Evidence of the importance attached to this move is that Professor S. Parker Smith is relinquishing the Chair of Electrical Engineering he has held for so long at the Royal Technical College, Glasgow, in order to arrange and superintend the scheme. Mr. J. A. Cowan, who was associated with him until recently as senior lecturer at the same establishment and also, during the war, in the training of over 10,000 persons for the three Services and industry, has been appointed master of the College. Plans for its opening are said to be well advanced, and staff recruiting will begin this year.

College Site Well Chosen

The site of the staff college near the loch that will be formed by a new dam between Clunie and Pitlochry power stations appears to be well chosen. Residential and workshop accommodation is available there, and the proximity of important centres of generation and transmission will be a useful adjunct to more academic activities.

The intention is that new members of the staff shall spend a brief period at the college before being posted to operational duties, and that they shall have, as may be necessary, opportunities of receiving further instruction or taking refresher courses. Practical aspects of training, we are informed, will be prominent, and instruction generally will be made as informal as possible on "round table" or tutorial lines. This ought to prove an effectual method of finding out engineering potentialities, which do not always make themselves obvious under more set conditions.

Economic and Social Background

In addition to providing experience in the operation of steam and diesel stations as well as of hydro-electric stations (some of the last automatic) and of transmission systems, an important feature of the syllabus will be lectures relating to the economic and social life of the area served. Newcomers will thus receive the stimulus of seeing their prospective work against the background of the Board's whole activities, and this should enable them more readily to make up their minds as to the section for which they are best fitted. This desirable end is likely to be fostered by visits to work under construction, both in the undertaking's areas and in the factory stage.

Entry to the college is conditional on the prior attainment of certain qualifications: For engineers, a degree, diploma or Higher National Certificate with approved practical training; for craftsmen, an Ordinary National Certificate with trade apprenticeship. In our opinion the practical experience should be obtained in a manufacturing works and we think that at least two years is necessary for obtaining an insight into the possibilities and limitations of factory production and acquiring

a cost sense, together with an understanding of the outlook of manual workers. Moreover, in making recommendations to industrial consumers regarding electrification, a knowledge of production methods is most desirable.

The present scheme is not without its bearing on the larger problem presented by recruitment of staffs for the British Electricity Authority. Under the Act of 1947, the Central Authority and Area Boards are enjoined to make provision for advancing the skill of their employees. Training at common centres, with its collegiate advantages, has much to recommend it. The *esprit de corps* it would encourage should also be valuable.

Wind Power

SINCE the largest rating of wind-driven generator to be put into experimental operation, according to our information, is 1,000 kW (in Central Vermont, U.S.A.), the term "large-scale generation," used by the Electrical Research Association to describe the new line of study referred to on page 208, no doubt has a relatively limited sense. That is, the implicit comparison is with units of a few kilowatts installed in isolated areas, usually with outputs stabilized by batteries, which formed the subject of an earlier report. The class now under consideration might be regarded as composed of machines (of which the induction generator would furnish a good example) with outputs big enough for running in parallel with public supply systems, which would help to damp down the effects of varying wind velocities.

Export Quotations

IN a world of rapidly changing values it has been impossible for British manufacturers to quote firm prices for some classes of exports which may not be delivered for two or three years. The same consideration, of course, affects the manufacturers of other countries and yet some American concerns have taken the risk of putting forward definite unalterable quotations for long-term contracts. Naturally this has sometimes proved a further handicap to British exporters. Towards the end of last year, however, the leading American electrical manufacturing concern decided that it was no longer possible to maintain a firm-price policy and it is to revert to the "escalator" principle of price adjustment.

Safety in Mines

THE second report on intrinsically safe circuits which is referred to on page 195 should be useful to manufacturers as indicating broadly the type of tests that should be applied to various circuits having regard to the characteristics of each. No single test condition can, however, be prescribed in the light of present knowledge, and this does not preclude the possibility of sparking from so-far unascertained causes which might ignite firedamp. Subject to the above, the tests advised for supply voltages of 24 V d.c. or 15 V a.c. in relation to circuit impedances give a more definite basis than that hitherto available.

Squirrel-Cage Motors

ONE of three or four outstanding advantages of a.c. distribution lies in the use of the simple and robust squirrel-cage motor. Part of this advantage has often been thrown away in the past by restrictions on starting conditions, which have discouraged its adoption and, varying from area to area, have made tendering difficult. A somewhat rough and ready remedy was provided by S.R. & O. 207 (1946), which made obligatory the direct starting of motors of up to 5 h.p. and the use of squirrel-cage machines only up to 30 h.p. A more logical basis is now forthcoming in the recommendations of a Joint Committee of the electrical industry, reported on page 207, which should supersede the present statutory requirements.

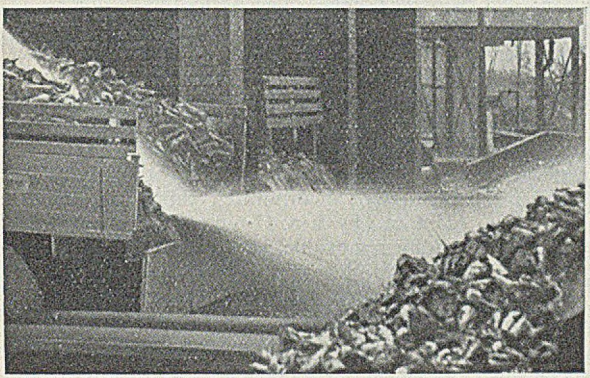
Not Enough Control?

ONE of the criticisms of the new electricity supply organization made by Mr. F. Foulkes, president of the Electrical Trades Union, in a speech last week was that the British Electricity Authority would have insufficient control over the Area Boards in distribution matters. That, to our way of thinking, is to be desired, not regretted. It is the aim of the B.E.A., publicly expressed by its chairman, Lord Citrine, to secure that the Boards shall have the greatest possible autonomy. They will have to study and adapt themselves to local needs and predilections. Central control would force them to run on rigid lines and endeavour to "standardize" their consumers. Mr. Foulkes should give the matter further consideration.

Sugar Production

Private Generating Plant for Electrical Conversion Scheme

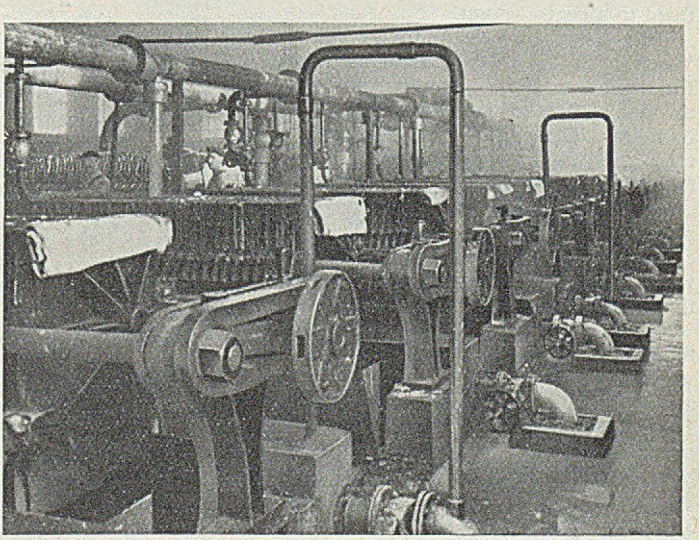
THE extraction and refining of sugar from sugar beet is one of those industries in which the large amount of process steam required makes it essential to produce power on the premises rather than rely on public supplies. In some of the older factories steam engines have been employed very largely for operating the plant. With the growing appreciation of the advantages of electrical methods and the need for heat economies, the British Sugar Corporation, Ltd., has been gradually replacing the old-fashioned steam engines in its factories by back pressure turbo-alternators.



Discharging beet by means of water jet

The electrical requirements of the factories are very unusual. During the "campaign" from about October until January, February, or March according to the size of the crop (this season it finished at the beginning of January) the factories operate twenty-four hours a day for seven days a week. For the remainder of the year they are shut down except for maintenance and repair work, though seven of the factories carry out refining operations, dealing either with raw sugar produced by the factories, or imported raw cane or beet sugar. During the "off" season, when not refining, it is uneconomical to keep the generating plant running so that stand-by public supplies are taken.

An opportunity of seeing the latest electrical methods employed in sugar production was given us recently when we visited one of the company's largest factories at Cantley, near Norwich. Actually this was the first to be established; it was opened in 1912. For the past two years very extensive alterations have been carried out and are still proceeding to house new plant and make more room within the existing buildings. After further large-scale reconstruction which is being completed during the "off" season just started, it will be one of the most up-to-date works in operation. At present it deals with 3,000 tons of beet every twenty-four hours. From this



Filter presses remove precipitated calcium carbonate in the juice

quantity about 425 tons of sugar is extracted.

Electricity plays its part even before the beet enters the factory for processing. Supplies are drawn from each consignment before unloading, the amount of dirt and tops is ascertained by weighing, washing, re-topping and again weighing. Ten average-sized beet are selected from each sample, and fine pulp is secured from each beet, and after mixing this pulp is analysed for sugar content. The factory buys clean beet on the basis of 15½ per cent sugar content, the grower receiving 6d. per ton in respect of each 0·1 per cent above or below this figure. Power required for the above operation is solely electric and the operations are all part of the beet contract conditions, and are supervised by representatives appointed by the National Farmers' Union.

Unloading by Water Jet

To keep the factory operating at 3,000 tons per day, sufficient beet have to be delivered during the daylight hours from Monday to Saturday, either by road, rail or river. The bulk is unloaded from the lorries and railway trucks by water monitors, supplied by an electrically operated Rees Roturbo pump. Unloading from the barges and trucks is done by means of four 2½-ton Babcock & Wilcox, and Chatteris grab cranes. The beet are either stored in silos until required or washed out straight into concrete canals or flumes, whence streams of water produced by a 120-h.p. electrically driven pump carry them to a central point.

From here a Harland pump driven through V-belting by a 200-h.p. Laurence, Scott & Electromotors slip-ring motor, lifts the beet through a 20-in. (51 cm) pipe to the top of the building. The pump is of the unchokeable type and can deal with solids up to 15 in. (38 cm) in diameter. Ellison switchgear and an English Electric regulator control the pump. An electrically operated "trash catcher" in the pump delivery flume removes weeds, etc., mixed up with the beet which are then gravity fed to the washers.

After the preliminary washing in the warm fluming water the beet pass into the main washers where revolving paddles thoroughly agitate them in troughs of warm water. Earth, etc., removed during the washing is pumped away and deposited on the neighbouring marshes and an idea of the quantity involved can be gathered from the fact that 30 acres (12·1 hectares) of land has been built up to 14 ft (4·27 m) during the past twelve years.

After the washing process the roots are taken by means of a shaker conveyor and bucket elevator to a hopper at the top of the building. They are then gravity fed into an electric weighing machine, the final adjustment of which is effected by means of a photo-electric cell device controlling an electro-magnetic vibrator feeder. The weigher holds about 1¼ tons and the counting dials are provided both adjacent to the weigher and also in the laboratory.

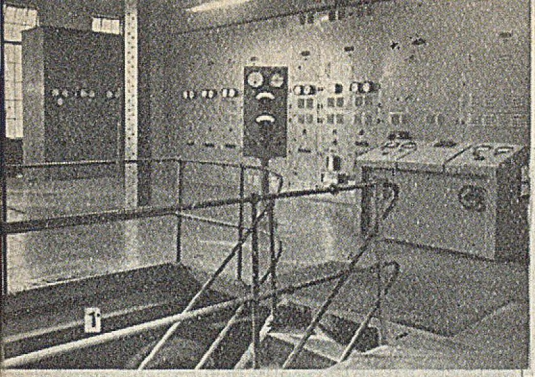
Discharged from the bottom of the beet scale, the beet is fed into the cutting mills where serrated blades mounted on a horizontally revolving circular plate slice the roots into thin fingers or "cossettes" about ⅛ in. (0·317 cm) wide by $\frac{1}{16}$ in. (0·159 cm) thick. Each mill incorporates thirty-two 10 in. (25·4 cm) by 3 in. (7·6 cm) blades which are readily removable for cleaning and sharpening. Another elevator carries the cossettes to a scalder to prepare them for squeezing in a "Steffen" press. The juice thus extracted by this means represents about 50 per cent of the total weight of the beet and contains about one-half of the sugar available.

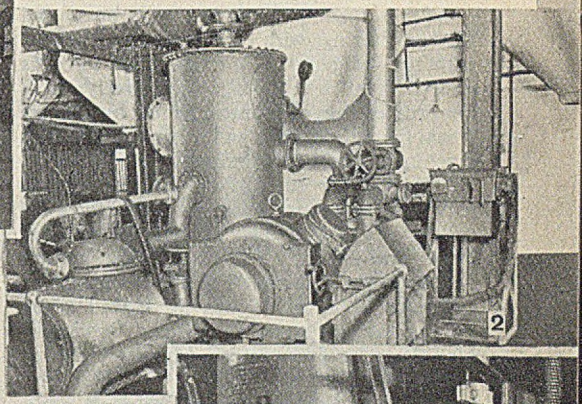
The remainder of the sugar is extracted by means of the "diffusion" process. The pulp is passed through five batteries of eleven vertical cylinders or "diffusing cells" each holding about 4 tons of cossettes, the pulp actually passing through nine vessels, one always being emptied of exhausted coussettes and one always being filled with fresh cossettes. Hot water admitted to the top of the first of these cylinders takes up a certain amount of sugar and is removed from the bottom of the cylinder. It then passes on to the next cylinder and collects further sugar and so on until it has travelled through all nine cylinders. Chains are incorporated in the diffusing cells to prevent the beet from packing together solidly in the bottom. The exhausted cossettes after removal from the bottom of the diffusing cells are pumped to vertical presses to remove surplus moisture and then treated in large rotary dryers. The resulting product finds a ready sale as a cattle food equal in feeding value to oats.

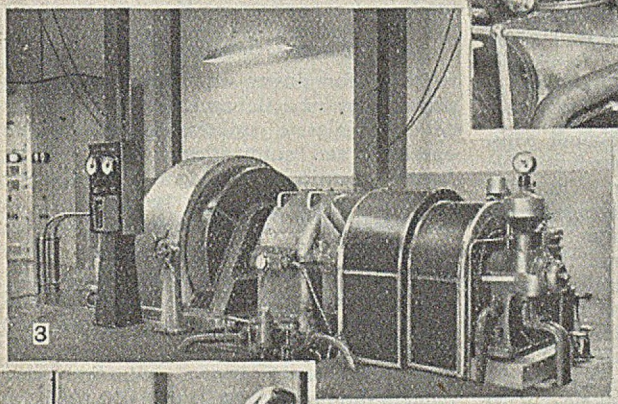
Cleaning and Filtering

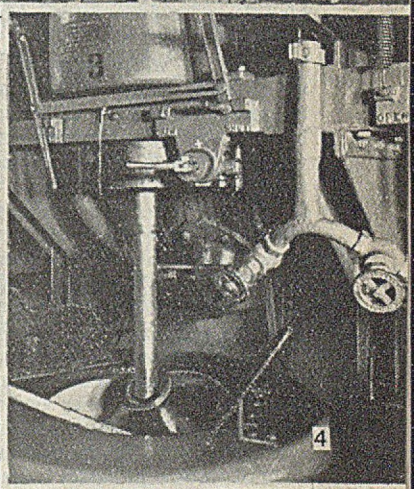
Unslaked lime is added to the juice containing the sugar to facilitate the removal of impurities. Having served its purpose the lime itself is precipitated by blowing CO_2 gas generated in the lime kiln through the juice and lime in large tanks, and removing it in hydraulically operated filtering presses. The lime is watered and pumped to a settling pit

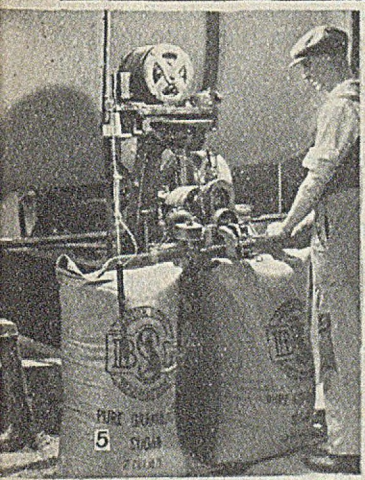
1.—Part of the 25-panel main switchboard. 2.—This 90-h.p. pump supplies CO_2 for precipitating calcium carbonate. 3.—One of the 2,250-kW turbo-alternators. 4.—Centrifugal separators, for dealing with molasses and sugar crystals, are being converted to electricity

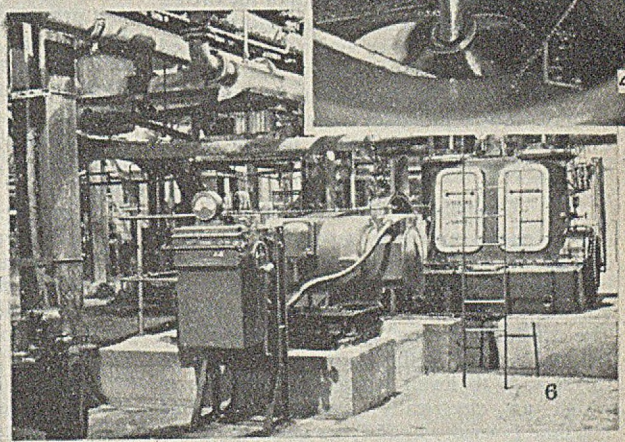


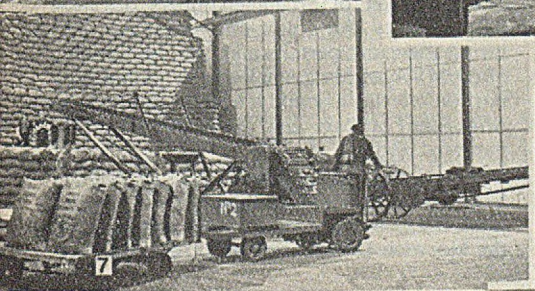


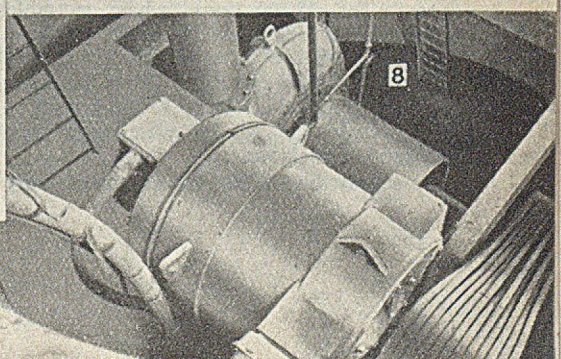












5.—Electric stitching machine for sacks. 6.—An 83-h.p. vacuum pump used in the boiling process. 7.—Transportable conveyors and electric vehicles assist in stacking the sugar. 8.—200-h.p. slipring motor driving beet pump

near the factory for use eventually for agricultural purposes.

After a second carbonization process and further filtering, with the addition, if it is too alkaline, of sulphur dioxide, the juice is concentrated by boiling successively in a quadruple-effect evaporator heated by exhaust steam from the turbos and other steam driven machines. This is admitted at 30 lb per sq in. (2·1 kg per cm^2) in the first vessel and leaves at 19 lb per sq in. (1·3 kg per cm^2) pressure, which is then applied to the next vessel and so on. The last vessel operates under a slight vacuum. From the evaporators the juice is taken to heavily lagged sugar boiling vacuum pans, also heated by vapour bled from the evaporators, where crystallization takes place.

Inspection windows in the vacuum pans, which are of the vertical type, make it possible to watch the process of boiling. The thick brown viscous liquid which emerges from the vacuum pans is called massecuite. This is stored in heated crystallizers until required. It then goes to centrifugal separators incorporating a steel perforated basket lined with a finely perforated copper screen, revolving at 1,000 r.p.m. The molasses (non-crystalline sugar) passes through the screens, leaving the sugar crystals behind. The introduction of hot water removes the last traces of the brown molasses, leaving the white crystalline sugar in the basket. Further sugar is eliminated by repeating the boiling process and the final molasses is sold for the making of yeast and alcohol. Some molasses is also added to the exhausted pulp before drying to add to the feeding value for cattle.

Granulation and Packing

Leaving the centrifugal separators the sugar crystals are taken to a large revolving-drum machine " granulator " which dries the sugar and, by means of blades, breaks up lumps. The finished product, granulated sugar (the only type made in this factory) goes to silos for storage to await bagging or sacking, in which an electrically operated stitching machine is used. Conveyors carry the sacks to the bonded stores (which have a total capacity of 35,400 tons, where portable conveyors, hoists, stackers, and a 15-cwt Ransome battery electric truck greatly facilitate the arrangement. From the entry of the beet into the factory to the arrival of the sugar to the bonded warehouse, only eighteen hours elapse.

To supply the 37,000 kWh consumed daily during the campaign just concluded, two 2,250-kW (0·8 p.f.), 400-V, three-phase, 50-cycle English Electric turbo-alternator sets of the back-pressure type have been installed. Hitherto these have been run alternately but next year both will be needed to carry the increased load reaching 2,500 kW which will result from the conversion to electricity of the remaining 1,300 h.p. of steam drives covering the main shaft, wash-house and pulp dryers. To meet further extensions space has been left in the centre of the engine room for the installation of a third set when required.

Steam-Generating Plant

Steam for power and process work is provided by nine Babcock & Wilcox boilers with chain-grate stokers, forced draught operated, and automatically controlled by James Gordon's " Hagan " automatic controls. Four of these boilers work at 215 lb per sq in. (15 kg per cm^2) and provide steam for the turbo-alternators. The remainder supply steam to other steam plant and for processes at 150 lb per sq in. and 100 lb per sq in. (10·5 and 7 kg per cm^2) respectively.

A 4:1 David Brown reduction gear reduces the turbine speeds of 6,000 r.p.m. to 1,500 r.p.m. to drive the alternators, which are provided with an enclosed air cooling system, high temperature alarms operating on both air inlet and outlet. A 120-kVA English Electric transformer gives a 230-V supply for lighting.

Controlling the distribution throughout the factory is a 25-panel English Electric switchboard 11 ft high and 90 ft long (3·3 m and 27·4 m) including 10 ft (3 m) right-angle sections at each end. The main switch is an " OB5 " unit taking 5,000 A, the largest English Electric air-break switch made. The other switches with capacities of 600 A and 850 A are of the " OB3 " types. All these cubicles are very compact, a point of some importance in a large installation of this kind. The provision of arcing chambers obviates the necessity for blow-out coils for arc suppression and permits a rupturing capacity of 30 MVA within a small space. The lower portion of the assembly houses the switch, while the busbars and isolating link are mounted above.

A sectional arrangement of the switchboard has been adopted with three panels for the generators, one for a stand-by supply from the Norwich Corporation Electricity Depart-

ment, and the remainder for the various sections of the factory distribution scheme. Bus-section switches are provided with Castell interlocking to ensure correct operation of the isolating links and to prevent cubicles being opened before the switches themselves have been opened. The supply from Norwich is stepped down from 11 kV to 400 V by a 500-kVA Johnson & Phillips outdoor type transformer.

The switchboard is remote controlled from a desk in the centre of the power house, a hand-wheel regulator controlling the fields of the generators. Synchronizing is carried out at a separate board. For the distribution of the heavy current (about 8,000 A) 6 in. by ¼ in. (15·2 by 0·63 cm) copper bars, four per phase, are mounted on heavy wooden supports underneath the switchboard. All feeders from the main board are fitted with Merz-Price earth-leakage protection and all the cables for the motors of up to 60 h.p. are Pyrotenax mineral insulated.

Standard English Electric combination switch-fusegear has been employed to make up a number of panels for local distribution centres throughout the factory. Most of the 350 electric motors already installed have been supplied by Laurence, Scott & Electromotors, Ltd. Some of the motors are of considerable size, 100- and 200-h.p. units being common, and there are several "Trislot" high-torque low-current machines which have several advantages, particularly with regard to starting, accelerating torque, efficiency and low cost.

We thank the British Sugar Corporation, the English Electric Co., and Laurence, Scott & Electromotors, Ltd., for help in preparing this article.

Electricity Supply Salaries

Attack on New Scales

CRITICISM is made in the February *Electrical Power Engineer* of the salaries offered to senior engineers in the new electricity supply organization. The position of chief engineer to the British Electricity Authority, described as "the biggest technical job ever created in British electricity supply," carries a salary of £4,750; it is contended that the amount should be at least £7,000.

The *Electrical Power Engineer* also considers that the salaries of between £2,000 and £3,250 to be paid to the chief engineers of Area Boards are "ridiculous," having regard to the vast geographical extent of the areas. There has also been "meanness" in the fixing of the salaries of engineers in the divisional organisation.

It is thought that there are two possible explanations of the reluctance to pay what are considered to be adequate salaries. One is that the salaries may be related to those of the chairman (£8,500) and deputy-chairman (£5,000) but this approach is wrong in principle. There is considerable public honour attaching to such positions and it should not be necessary to attract people to them by paying salaries well above those of the chief executive officers.

The other possible explanation is that the Minister has deliberately discouraged the payment of salaries above those laid down for the higher Civil Service. It is contended that the idea that this should be used as a guide for fixing salaries in a commercial and trading undertaking should not be tolerated. If it is, it demonstrates that the "independence" of public corporations from Treasury supervision is more theoretical than real.

The *Electrical Power Engineer* concludes with an injunction to Lord Citrine and his colleagues "to tell the Minister—if he is the difficulty—that they are determined to have in charge of British electricity supply the best men obtainable and that they are going to reward them according to the standards set up already by the industry."

In view of the opinions expressed by the *Electrical Power Engineer* it is significant that the Government has now appointed a committee "to advise Ministers as to the general level of remuneration of the higher posts of the Civil Service—administrative, professional, scientific and technical."

Safety of Mining Apparatus

A REPORT on methods for making low-power electrical apparatus safe for mines, by rendering any open sparking which may occur incapable of igniting firedamp, has been issued by the Ministry of Fuel and Power as Safety in Mines Research Paper No. 106 (Stationery Office; 32 pages, 9d. net). This Paper, in continuation of S.M.R.B. Paper No. 104, published in 1946, confirms and extends the correlation between minimum igniting current and circuit inductance, but shows that the form of the correlation varies with the character of the break-flash, the influence, in that respect, of circuit voltage and of the rate of separation of the sparking electrodes is examined.

Experimental results are summarized in twelve tables and are shown graphically in four figures. The findings touching the influence of circuit voltage in relation to current, inductance, rate of break and spark-suppressing device have direct application to the design of intrinsically safe circuits, such as those for remote control and communication.

Views on the News

Reflections on Current Topics

AS effective earth connections are not easily maintained in all circumstances, the I.E.E. Regulations strongly recommend the use of all-insulated electrical apparatus wherever practicable. The object is defeated, however, if the insulating material cannot stand up to careless usage. A non-electrical friend of mine, acting on the advice of two electricians, recently spent £15 in replacing his brass-covered power socket-outlets by those of the plastic type and now regrets his decision. The first time the vacuum cleaner was used, a slight bump caused a cover to disintegrate. The cleaner, I suspect, was clumsily handled (they often are), but surely all electrical appliances should by now be proof against the kind of rough usage to be met with in the ordinary household.

* * *

Cinema addicts will derive great satisfaction to find some justification for their, perhaps, too-frequent visits to the " movies." It is always comforting to have a plausible excuse for one's weaknesses. A cutting from the *Retford Times* has reached one in which is displayed the dictum:—" You will help in the saving of fuel if you go to the pictures regularly." The text explains that a home with an average of three in family uses 1½ kWh an hour. Fifty such homes would use about 225 kWh in three hours. If these fifty families go to a cinema they will "use" only 5·4 kWh, for the hourly consumption there is about 0·01 kWh per head. And, of course, the Exchequer benefits from fifty contributions of entertainment tax. The *Retford Times* seems to have hit on a way out of much of our trouble.

* * *

If overseas visitors are to be encouraged to come to this country something might well be done in the matter of hotel lighting. I am not referring to decorative illumination (though if the fuel situation permits, this would be a great attraction) but to the more utilitarian applications. Soft lights are perhaps very restful and appropriate in such places as lounges but there are still too many hotels where it is difficult to find a place to read comfortably. Reading in bed may be a bad habit but visitors ought to be able to please themselves about that. Recently at one of the largest hotels in Birmingham, although there were no fewer than five pendant lamps I found it impossible to read in either of the two beds in the room. Not only were the lamps (or beds) badly placed but the heavy opaque shades obscured what little light there was. Incidentally, although it hasn't anything to do with it unless it was an omen, when I opened the window a pigeon *and* a starling flew in !

* * *

The rationing of newsprint has resulted in an unexpected and perturbing electrical complication, the Editors tell me. Owing to publishers having virtually no stocks and having to live, so to speak, from hand to mouth, the paper coming from the mills has nowadays to be used practically at once. As a result the static charge of electricity produced during manufacture has not had time to be dissipated and the paper is attracted to the steel cylinders of the printing presses. The printer overcomes this difficulty by earthing the frames of the presses, the periodic treatment of the cylinder overlays with glycerine to provide insulation and arranging a series of earthed trailer wires which lightly contact the printing paper as it passes through the machine and dissipate a considerable proportion of the charge.

* * *

In the *Manchester Guardian* " Miscellany " comment is made on the strange modern treatment of " targets." Targets to-day are not hit; they are " obtained," " achieved," " reached " or " beaten." " An electricity engineer talks of reducing load to ' the target level.' " I agree that the word seems to have got into strange company lately but as compensation we do not hear quite so much about people " drawing up blue prints."

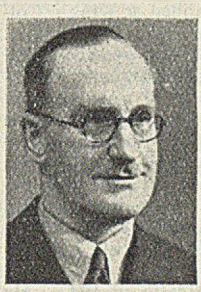
* * *

Referring to peculiar trades combined with that of electrical contractor, a correspondent to the *Electrical Review* last week mentioned a shop sign bearing the wording: " Electrical, Radio and Television Engineer. Pianos Tuned." This reminded me of another company registered recently with an even stranger combination of objects— " Electrical Engineer and Florist ! " Customers are no doubt in the happy position of being able to " say it with flowers " as well as with music.—**REFLECTOR.**

PERSONAL and SOCIAL

News of Men and Women of the Industry

IN our last issue we briefly recorded the appointments of **Mr. T. R. Warren**, M.A., B.Sc., M.I.E.E., as chief engineer to the South-East Scotland Electricity Board, and **Mr. T. J. Mullan**, M.A., LL.B., as secretary. Mr. Warren, who is a graduate of Cambridge and London Universities, received his training at Faraday House.



Electricity Board chief engineers. Left to right : Mr. T. R. Warren (S.E. Scotland), Mr. P. d'E. Stowell (Merseyside and North Wales), Mr. H. Willott Taylor (Southern) and Mr. J. W. G. Bird (South Wales)

He was appointed technical engineer for the Scottish Areas of the Central Electricity Board in 1944, having previously held a similar appointment in the North-East England Area.

Mr. Mullan, a graduate of Edinburgh University, joined the staff of Balfour Beatty & Co., in 1927, and for some time has held the appointment of joint secretary to the Grampian Electricity Supply Co. and associated companies.

Mr. P. d'Eyncourt Stowell, B.Sc., A.M.I.E.E., deputy engineer and manager with the Edinburgh Electricity Department since 1944, has been appointed chief engineer to the Merseyside and North Wales Electricity Board. Mr. Stowell was educated at Downside School, Somerset, and at Faraday House, and gained his B.Sc. degree in engineering with honours at the University of London. Before going to Edinburgh in 1937 as technical engineer, he was technical assistant in the L.M.S. Electrical Engineer's Department.

Mr. J. W. G. Bird, M.B.E., D.L., A.M.I.E.E., who has been appointed chief engineer to the South Wales Electricity Board, is assistant general manager to the South Wales Electric Power Co. He served his apprenticeship with Vickers, Ltd., and, apart from war service, was with the Shropshire, Worcestershire & Staffordshire Electric Power Co., from 1911 until 1935, when he joined the South Wales Company.

The Southern Electricity Board has appointed as chief engineer, **Mr. H. Willott Taylor**, A.M.C.T., M.I.E.E.; as chief commercial officer **Mr. W. B. Poulter**, who has been for nine years been commercial manager, Metropolitan Electric Supply Co.; and as chief accountant **Mr. G. Hicks**, chief accountant to Edmundsons Electricity Corporation for the past six years.

Mr. Taylor is chief distribution engineer with Edmundsons Electricity Corporation and has held the position since the Corporation acquired the Wessex Electricity Co. about eighteen years ago. He gained experience at Stalybridge and in Scotland before joining the Wessex Co.

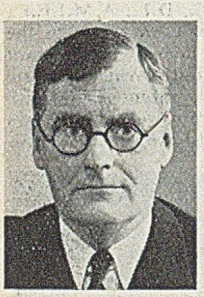
The Eastern Electricity Board has appointed **Mr. A. Bond**, town clerk of Stockport and formerly deputy town clerk of Luton as its secretary. **Mr. J. E. Blair**, chief accountant, Northmet Power Co., has been appointed chief

The Midland Electricity Board in session

From left to right : Mr. S. F. Burman, Mr. D. H. Kendon (deputy chairman), Alderman W. Lewis (chairman), Councillor A. E. Bennett and Capt. L. H. Green

accountant, and Mr. G. E. Barrett, commercial manager, Northmet Power Co., is to be chief commercial officer.

Mr. P. Pringle, LL.B., M.R.C.S., L.R.C.P., D.I.H., Barrister-at-Law, whose appointment as chief medical officer to the British Electricity Authority we announced last week, was a scholar at Felsted School and King's College, University of London. He qualified at King's College Hospital in 1931. He was gynæcological house surgeon at this Hospital and resident medical officer to the Royal Waterloo Hospital and was for three years in general practice. He was appointed whole-time medical officer to Standard Telephones & Cables, Ltd., in 1937. Dr. Pringle, who was called to the Bar of the Middle Temple in 1944, obtained the Diploma in Industrial Health in 1947. He is the son of Sir James Pringle, K.C.B., O.B.E., late Director of Electrical Engineering, Admiralty.



Dr. P. Pringle

Mr. H. W. H. Richards, M.Inst.C.E., M.I.Mech.E., M.I.E.E., chief electrical engineer of the London and North Eastern Railway, who has retired, was born at Clifton, Bristol, in 1886, and educated at Bradfield College, Berks, and Faraday House Electrical Engineering College, London, after which he spent four years as an assistant engineer with consulting engineers at Westminster, and with contractors for railway work. In 1913 he entered the service of the L.B.S.C.R. as electric traction engineer, and was responsible for electric rolling stock, etc. on the suburban lines electrified on the 6,600-V a.c. overhead system. Upon the grouping of railways he became assistant electrical engineer to the Southern Railway in 1923 until his appointment in 1924 as electrical engineer, L.N.E.R.

In 1941 the responsibilities of the electrical engineer were separated from those of the chief mechanical engineer, and Mr. Richards was appointed chief electrical engineer. For papers submitted to the Institution of Civil Engineers he was awarded the Telford Gold Medal and the George Stephenson Gold Medal and Watt Prize.

Mr. N. E. Kearley, A.M.I.E.E., deputy Director of the Council of Industrial Design, resumed duty on 1st February with the Ministry of Supply, in the Electrical Plant Division, having completed his period of "loan" to the Council from the Civil Service.

The Secretary of State for Scotland has appointed **Mr. H. H. Partington**, former general manager of the Grampian Electricity Supply Co., to be an additional member of the Fisheries Committee under the Hydro-Electric Development Act.

In our leading article to-day we refer to the establishment of a residential staff college for the training of technical staff of the North of Scotland Hydro-Electric Board. **Prof. S. Parker Smith**, C.B.E., D.Sc., M.I.E.E., A.M.Inst.C.E., who is relinquishing the Chair of Electrical Engineering at the Royal Technical College, Glasgow, at the end of the current session to arrange and superintend the training scheme, has held the position of professor of electrical engineering at Glasgow Technical College since 1923, and was formerly assistant professor under Prof. T. Mather at the City and Guilds (Engineering College), South Kensington. He has been particularly interested in the domestic application of electricity and in 1924 built an all-electric house; the results of this experiment were published in an I.E.E. paper and has also written on the same subject for the *Electrical Review*. He has been awarded premiums for many papers read before the I.E.E. and was a member of the Council from 1926 to 1929 and chairman of the Scottish Centre of the Institution for the 1939-40 session.

Mr. J. A. Cowan, A.R.T.C., M.I.E.E., senior lecturer at the Royal Technical College, Glasgow, who has been appointed master of the Board's staff college, was one of Prof. Parker Smith's first students. After taking the diploma course he remained for the Associateship Year, and on completing his apprenticeship gained experience with the British Thomson-Houston Co., Ltd., and the Yorkshire Electric Power Co. He returned to the College as a member of the staff of the Electrical Engineering Department in 1930 and has risen to the post of senior lecturer. During the war Mr. Cowan was Prof. Parker Smith's deputy in operating a scheme in which over 5,000 airmen, 4,000 soldiers and 1,000 civilians were trained for the Government. He was also responsible for drawing up reports for the Scottish Economic Committee on Electrical Industries in Scotland.

Prof. S. Parker Smith

Mr. J. A. Cowan

Mr. N. Shackleton, A.M.I.E.E., who is now at Middlesbrough, has been appointed consumers' engineer with the West Hartlepool Corporation Electricity Department.

Mr. H. Eagles, B.Sc., electrical engineer and manager of the Adwick-le-Street electricity undertaking, has been appointed electrical engineer and manager of the Mexborough Urban District Council's electricity undertaking.

Following the retirement of **Mr. H. Roberts**, due to ill-health, **Mr. F. H. Maiden**, A.M.I.E.E., A.M.I.Mech.E., has been appointed contracts manager of the Turbine Contracts Department of the Brush Electrical Engineering Co., Ltd. Mr. Maiden is also responsible for all electrical contracts. He gained his early training with the Metropolitan-Vickers Electrical Co., Ltd., at Trafford Park, with whom he subsequently served in the turbo-alternator section of the Plant Department and later in the Contracts Department, where he was responsible for handling large power station equipments both for this country and abroad.

Mr. F. H. Maiden

Mr. E. A. Logan, former borough electrical engineer of Erith, who is now chief electrical engineer and manager to the Burmese Government, informs us that his address now is Electricity Supply Department, Government of the Union of Burma, 166, Phayre Street, Rangoon.

The Richard Crittall group announces that **Mr. A. E. Hinds**, joint managing director, has been appointed managing director of Richard Crittall & Co., Ltd. **Mr. J. L. Musgrave** is retiring, at his own request, from the joint managing directorship, but will continue to serve as chairman. Two joint assistant managing directorships have been created to assist the managing director in the general administration of the group and **Mr. C. J. Hyde-Trutch** and **Mr. W. A. McPhail** have been appointed, Mr. Hyde-Trutch to control sales and technical administration and Mr. McPhail to control financial, secretarial and general administration. A number of other appointments have been announced by the group.

Hoover, Ltd., has appointed the following as working directors of the company:—**Mr. S. T. Matthews**, manager of the Export and Contract Department since 1934; **Mr. W. C. Bell**, chief engineer since 1934; and **Mr. P. Attwood**, purchasing manager since 1934. In addition **Mr. T. E. Groutage**, general manager of the Scottish factory becomes a director of the subsidiary company Hoover (Electric Motors), Ltd.

Mr. H. J. Ball has resigned from the board of Kerry's (Gt. Britain), Ltd., with which he has been associated for more than sixty years.

Mr. E. R. Shropshire has been appointed assistant mains engineer to Nuneaton Electricity Department. He was formerly with the Stoke-on-Trent Corporation and the English Electric Co., Ltd.

Mr. W. C. Knowles, who completes thirty-six years as electrical engineer to Elland Urban District Council next month and is due to retire on superannuation in April, is to serve a further year.

Mr. J. A. Kendle, who has represented T.M.C.-Harwell (Sales), Ltd., in London and the South of England for the last fourteen years, with the exception of the war period when he was in the R.A.F., has been appointed sales manager.

The name of **Mr. P. J. Grose**, appointed sales manager of the Agro Electrical Co., Ltd., was mis-spelt in our last issue.

Mr. J. W. Ridgeway (Edison Swan Electric Co., Ltd.), has been elected chairman of the Radio Industry Council in succession to Mr. G. Darnley Smith (Bush Radio, Ltd). **Mr. C. O. Stanley** (Pye, Ltd.) has been appointed vice-chairman.

Mr. F. Lumby, M.I.E.E., has succeeded Mr. G. O. James, A.M.I.E.E., as president of the Electrical Power Engineers' Association. Mr. Lumby, who is meter superintendent to the Woolwich Electricity Department, has been a member of the E.P.E.A. for twenty-four years and has been on the National Executive Committee since 1942.

Mr. F. Lumby

He is a native of Birkenhead and after technical training at the Liverpool Central Technical College and the Manchester College of Technology and practical training in the electrical department of Tate & Lyle, Ltd., he was with Ferranti, Ltd., and the Metropolitan-Vickers Co. for about five years. Mr. Lumby joined the Crewe Electricity Department in 1930 and went to Woolwich in 1937.

In recognition of having served twenty-five years or more with **Crompton Parkinson, Ltd.**, and one of the parent companies, thirty-nine of the staff at Guiseley Works were presented with gold watches by Mr. Albert Parkinson, M.B.E., chairman of the company, at a social gathering held on 17th January.

Obituary

Mr. David Fulton, M.I.E.E., died suddenly at his residence at Sketty, Swansea, on 23rd January. Mr. Fulton served his apprenticeship with Messrs. Robinsons in Liverpool and was subsequently with Bruce Peebles & Co., Ltd., in Edinburgh. In 1909 he was appointed

electrical engineer to the Swansea Harbour and Improvement Trust and was responsible for the electrification of the Swansea Docks. When the Harbour Trust was taken over by the Great Western Railway Co. he became divisional engineer for the Docks at Swansea, Port Talbot and Fishguard, from which position he retired about twelve months ago.

Mr. C. D. Taite.—We regret to learn of the death at Bowdon, Cheshire, on 1st February, of Mr. Charles Davis Taite, M.I.E.E., who in March, 1946, retired from the position of managing director of the Lancashire Electric Power Co. with which he had been associated for nearly forty years. He was well known throughout the supply industry, having served in many offices, including those of chairman of the Council of the British Electrical Development Association, chairman of the National Consultative Committee of the Central Electricity Board, and president of the Incorporated Association of Electric Power Companies.

The late Mr. C. D. Taite

Mr. Taite, who was seventy-five, was born at Wootton Bassett, Wilts, and educated at Norwich Grammar School and Faraday House. After an apprenticeship with Ronald A. Scott, Acton, he joined Ferranti, Ltd., and subsequently held the positions of electrical engineer to the Southport Corporation (1895-1900) and at Salford (1901-6) before becoming chief engineer and manager to the L.E.P. Co. in 1907. He was responsible for extending the company's activities by securing Special Orders for many areas, and negotiating agreements to supply other local authorities in bulk. During the 1914-18 war he served in the 8th Lancashire Fusiliers, attaining the rank of captain. In 1931 he was appointed a director of the L.E.P. Co. (he also served on the boards of the Lancashire Electric Light & Power Co., Ltd., and the Ormskirk Electric Supply Co., Ltd.) and in 1941 he became managing director.

Mr. Ivan Vlasto, a founder and director of Vlasto, Clark & Watson, Ltd., electrical engineers, Stockton Heath, Warrington, died recently. He formed the company with the late Messrs. T. Clarke and W. Watson more than forty years ago. He was born in Liverpool in 1884.

Mr. C. P. Taylor.—The death occurred at Bexhill on 27th January, at the age of seventy-four, of Mr. Charles Percy Taylor, F.C.G.I., who, until his retirement in 1946, had been chief engineer of Associated Portland Cement Manufacturers, Ltd., for many years. Mr. Taylor was a member of the three senior engineering institutions.

Wills.—**Mr. T. C. Christianson**, M.I.E.E., of the Switchgear Sales Department of the Metropolitan-Vickers Electrical Co., Ltd., left £8,539 gross, with net personalty £8,507.

Mr. R. W. Thornton, a former chairman of Crabtree Electrical Industries Ltd., who died on 27th July last, left £56,118 gross (net personalty £54,320).

Mr. C. A. Baker, M.I.E.E., late of the L.C.C. Engineers' Department (Electrical Division), left £31,748 (net personalty £29,465).

Mr. W. C. Weaver, chairman and late managing director of Waygood-Otis, Ltd., left £20,950 (net personalty £20,812).

Mr. Karl Heinrich Gyr, of Zug, Switzerland, chairman of Landis & Gyr, Ltd., since 1912, left £78,469.

Mr. E. W. Hill, M.I.E.E., general sales manager of Aron Electricity Meter, Ltd., who died on 27th November last, left £12,641 gross (net personalty £12,159).

Oil Pipe-Line Communications

IN competition with American and other British concerns the General Electric Co., Ltd., has secured a contract valued at £300,000 for an elaborate system of communications for the new 800-mile (1,288-km) oil pipe-line which is to be laid between the Persian Gulf and a Mediterranean port.

The equipment will include main very-high-frequency beamed transmitting and receiving stations; high, medium and low power high-frequency transmitting and receiving stations; unattended automatic radio repeater stations; telephone exchanges; mobile h.f. transmitting and receiving stations and "walkie-talkies." Transmitting stations will use both amplitude and frequency systems of modulation. The whole of the equipment will be made in the G.E.C. works.

During the construction of the pipe-line, radio will provide communication between working parties and base camps which will be used as supervision points. The working parties will be provided with mobile wireless trucks and "walkie-talkies." After the constructional period the entire system will be used for administrative and maintenance purposes, the operation of the pipe-line being entirely dependent upon its communication channels. Radio transmitters and receivers will be placed at both ends of the route and at intermediate stations to provide a relay system for communicating between stations. An operator at any one of the stations will be able to dial a number and speak to operators at other stations. A teleprinter service will also be operated between the stations over similar radio links. In addition, radio communication will be possible between stations along the pipe-line and aircraft flying along the route, and other stations will keep in touch with ships approaching port.

CORRESPONDENCE

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

A.C. Motors—Starting Currents

PUBLICATION of "A.C. Motors on Public Supply Mains—Starting Conditions" is very timely as it will still further increase the use of squirrel-cage motors in industry.

The recommendation that electricity supply for power purposes should be classified according to the starting current permitted by the supply authority is a sensible contribution to the problem of which starting method to use. It will encourage the use of direct starting, with greater benefit to all concerned in simpler and less expensive control gear. Ease of starting without shock to the driven equipment—as is inevitable with two-position starters changing from "Start" to "Run" positions—will be a further advantage.

One further recommendation is, however, still needed to make the scheme a complete success and that is to classify motors as well. If motors were classified according to their locked-rotor current at full voltage (which corresponds to direct switching) and if the same code letters were used for the same permissible currents as are now to be applicable, then it would become easy to decide on the method of starting appropriate to each installation.

The use of such code letters on new motors would lead eventually to their being incorporated in existing machines, where necessary, on the grounds of utility and uniform classification. So it is to be hoped that this additional proposal will meet with the approval of the authorities concerned.

*London, S.W.*1. A. N. D. KERR.

Large Transformers

YOU published in your issue of 23rd January a note regarding the large Swedish transformer supplied to the Stockholm city power station. It may be of interest to your readers that at the end of 1947 the erection of a bank of three single-phase oil-filled power transformers manufactured by the Swiss Brown Boveri works was completed in the Sege transformer station, near Malmoe, Sweden. The transformers are built for an output of 120 MVA three-phase and each has three windings for 200/135/10·5 kV with on-load tap changing on the 135-kV side. Each single-phase transformer was dispatched from Switzerland completely mounted in its tank but without oil and external accessories. Because of the employment of radial laminated transformer cores and a new technique of insulation of the windings to earth the weight-to-power ratio is remarkably low. The total weight of each single-phase transformer is only 83 tons including oil, separate cooler unit and all accessories.

A similar group of transformers but for "only" 100 MVA had already been successfully commissioned in 1946 in the Poste de Chevilly near Paris, which now belongs to the Electricité de France. For further particulars I refer you to the article by Mr. Danz to be published in the "Brown Boveri Review."

Zürich. G. A. MEIER, A.M.I.E.E.

Continuity of Employment

YOUR editorial of 23rd January raises more controversial points than can be dealt with in a single letter under present space restrictions, but I would like to comment on some of those which bear on the questions as to whether long-period employment is good for employer, employee or industry in general.

I suggest that the employer who considers that the long-service man becomes more and more valuable is deceiving himself. The man may, in the firm's judgment, do his job well, but necessarily—though both would like to deny this—he lacks the width of vision and knowledge which can come only from more varied experience and the firm may quite unconsciously become outpaced by its younger, though less experienced, competitors. It is to be feared that in the forthcoming struggle for industrial supremacy many such firms, especially our larger ones, will too late realize that leadership cannot be retained merely on the prestige of their past good reputations.

The employee will be even more unfavourably placed. He knows that his employer values his service, but he should also realize that the hold on him becomes more marked as he approaches his pension age. The consequences are obvious and

fear is their governing factor. This type of man enjoys a placid and humdrum life until something unforeseen happens, and in these days of controls and regimentation such occurrences are likely to become more frequent. The employee knows how nearly hopeless and how costly to himself, through loss of pension, would be a search for another position. By the younger firms he would be told that he is too old-fashioned and "narrow" and the older firms would say that vacancies are filled by the promotion of those who for years have been waiting, like himself, for a chance to fill a dead man's shoes. So he finds that at all costs and on any conditions he must try to stay with his old firm and the retirement to which he has so long looked forward may become a period of frustration and disillusionment.

Even the non-pensionable man suffers through these conditions. A prospective employer will frown on a list of a number of positions held and will say, "You don't seem able to hold down a job for long," but probably his real objection is that the applicant has indicated the possession of initiative and independence, which, unfortunately, is definitely resented by too many of our larger firms. Yet in America the same man, who, in your editorial you have called a "rolling stone with no more than a smattering" would be welcomed as having a wide knowledge of the trade. Until it is realized by employer and employee that it is necessary to eliminate the fear of being "too old to change," which is very different from being "too old to work," so long shall we have square pegs rusting in round holes, with consequent inefficiency and discontent.

Is there a remedy? I think so. Let us have, in all our major industries, a pension scheme is which accumulated service is reckoned towards pension. It has been proved in more than one profession that such a scheme is easily workable. For instance, a hospital worker can move as often as he or she likes from one recognized hospital to another and the whole period of service counts towards superannuation. Such a plan would afford real freedom to both employer and employee and would eliminate many difficulties and grievances.

"No Pension."

Electrical Research

Increasing Cost and Staffing Difficulties Affect E.R.A.'s Activities

THE supply section of the electrical industry has hitherto provided nearly one-third of the income of the British Electrical and Allied Industries Research Association, which was formed twenty-eight years ago. How is public control of electricity supply likely to affect the Association's future? The need to continue the E.R.A. and also to preserve the co-operation between the supply and manufacturing sections of the industry, which is inherent in the E.R.A. constitution and essential to its proper usefulness, is appreciated by the British Electricity Authority, whose intention to support the Association and safeguard its finances is confirmed in the annual report of E.R.A. for 1947.

The obligations of its supply members are to be fulfilled largely in accordance with present arrangements by the B.E.A. for the transitional period, pending changes in the E.R.A. articles of association and the constitution of its Council, which must await consultation with the Area Electricity Boards. The B.E.A. is also to try to avoid undue delay in deciding whether to rehouse the E.R.A. in new laboratories outside London. The raising of a capital fund for that purpose remains, in principle, because the provision of enough money from revenue, as hitherto, is no longer practicable for the scale of expenditure now required. The cost of research has risen greatly; it entails the strictest "rationing" and will have to be seriously taken into account when facilities are extended to deal with investigational requests which the E.R.A. has been unable to meet.

Last year was one of unprecedented difficulty in respect of staffing. The National Physical Laboratory, a fellow sufferer from man-power shortage, has nevertheless been able to restart some programmes that were suspended during the war, while a number of attractive research proposals by the universities have been supported. Thus a large proportion of the E.R.A. difficulties were overcome. The large number of reports on work done which are just now in preparation has been partly due to delays caused by staff change-over. It is partly due also to shortage of paper and printing in which respects the outlook is unpromising and may force upon the E.R.A. measures which would be unpalatable in normal times.

Apparatus and equipment disposed of by the Government has been of considerable benefit. A small experimental heat pump has been nearly completed at the Perivale laboratory. It has been obtained from a German submarine on indefinite loan from the Admiralty. Tests on the heat pump at Norwich are to start very soon; they have been delayed by the slow

delivery of instruments. Water heating and space warming investigations have attracted strong interest at home and abroad. The work on insulated and metallized rooms has gained publicity abroad. A final report will shortly be ready on equipment for heating solid concrete floors; it will include a mathematical study of the heat flow into the earth from the floor and conclusions relating to the effects of insulating the room and of placing insulation directly below the floor itself.

Water-Heating Studies

Photographic means of studying the turbulent mixing of cold and hot water in storage vessels have been devised and it is hoped to issue a short technical film on the subject, study of which has resulted in the design of a simple spreader for insertion in the cold water entry. It is thus made possible for the amount of hot water that can be drawn off from a 30-gal. tank to be increased from 50 to 90 per cent of the tank capacity before reducing the temperature to lukewarmness.

Treatment of the surface of immersion heaters in various ways to prevent the formation of scale on them is being investigated. The severity of deterioration of the metal sheath caused by excessive temperature rise due to scale formation has been confirmed by "post-mortem" metallographic examination.

The search for better storage batteries progresses; a practicable standard has not yet been reached for the hydrogen-oxygen cell, but it has been improved to the stage of operating at over three times the current density previously obtained. It is hoped to show that with a greater rate of circulation of the electrolyte, the use of porous nickel electrodes of greater surface area and improved activation of the electrodes the density may be raised as high as 100 A per sq ft of the cross-section of the cell.

Radio Interference Suppression

Efforts to secure the suppression of radio interference continue, but the inductors usually needed to "silence" bedwarmers and clothes irons which are thermostatically controlled are too costly and bulky. It has not been practicable to incorporate the inductance in the heating element itself, owing to limitation of length. Accordingly a thermostatic iron has been made with a nickel element which requires only a cheap capacitor suppressor small enough to fit in the handle. The commercial aspect of the new element has not yet been explored. Radio interference suppression is also to be dealt with by the newly formed Section U (with the Ministry of Supply as a special contributor) which is to concern itself with high-frequency ignition and the treatment of the electrical equipment of automotive systems.

The old Section U, which dealt with glass insulators, has been disbanded and its work taken over by other sections. The many other aspects of insulation being pursued include experimental methods of studying the mechanical properties of dielectrics, which have led to useful practical applications and also shown the slowness but persistence of dimensional changes in many materials.

The diverse problems of circuit severity and intrinsic safety have both gained from the development of discharge theory. New means of high-speed observation and photography of atmospheric sparks have been developed at Liverpool University, while at the City and Guilds College discharge studies have proceeded at the highest practicable frequencies with the aid of cloud-chamber observation. At Queen Mary College it has been found that corona is replaced by a much more intense discharge at higher frequencies, to which attention has been diverted.

Commercial production of the E.R.A. surge arrestor has been difficult to arrange; it has now been decided, in conjunction with the Central Electricity Board, to make and install a few on the grid system. The prototypes will include an improved expulsion gap which greatly reduces the minimum surge with which the arrestor will deal. A continuous surge recorder is shortly to be installed in a Central Board substation near Oxford.

Lightning calculations now cover the probability of back-flashover; confirmation of theory has recently been obtained from the observation of a streamer in South Africa.

When the Welding Research Association was compelled last year to reduce its contribution to the work on the electro-physics of the welding arc (from more than half the total cost to a fraction) the E.R.A. found the balance for the second half of the year and is now to continue the work. A former member of the E.R.A. staff is now the director of the Welding Research Association.

Electric Cooker Spares

THE British Electrical Development Association has written to all undertakings asking them for particulars of any "V" cookers (in temporary bungalows) which have grill boilers out of action owing to lack of spare parts. The question of adequate production of spare parts, for which five firms (Falco, G.E.C., Jackson, Revo and Simplex) jointly agreed to make themselves responsible, has been the subject of discussion between the E.D.A. Cooking Sub-Committee and the manufacturers. As a result, official allocation of materials was obtained, and it is believed that the general position is now much improved, but in regard to the grill-boiler, production is mainly in the hands of one factory, and owing to the shortage of ceramics and castings, it may be some time before all orders can be executed. The manufacturers are therefore anxious to give first preference to cases in which grill-boilers are actually out of use on account of the lack of spare parts.

British Industries Fair

Arrangements for Overseas Visitors

INTENDING overseas visitors to the British Industries Fair (Birmingham and London, 3rd to 14th May) will be interested to learn something of the arrangements which are being made for their convenience.

Where a charge is normally made for visas to the United Kingdom visitors to the Fair may obtain a visa (valid for three months and covering families) free of charge from the nearest British consular officer. Accommodation and return passages should be booked by visitors coming to this country through travel agencies or their own connections in Great Britain. In cases of emergency only the Reception Branch of the Board of Trade will help in obtaining accommodation in London. Inquiries regarding accommodation in Birmingham should be sent to the Accommodation Officer, Birmingham Chamber of Commerce, 95, New Street, Birmingham.

At each section of the Fair there will be Exhibitors' and Overseas Buyers' Clubs, which will provide secretarial and information service to overseas visitors. The clubs will also issue temporary ration cards to visitors where necessary.

Catalogues of the London and Birmingham sections, indexed in nine languages, will be sent about six weeks before the Fair to buyers who have notified their intention to attend, to selected overseas firms and to all British commercial diplomatic officers and trade commissioners throughout the world.

A special corps of interpreters will be available at all three sections of the Fair. Special travel facilities are being provided between London and Birmingham and between the two London sections, and there will be arrangements for the provision of petrol for the use of overseas visitors.

I.M.E.A. Activities

Future of the Association

IT will be remembered that the Council of the Incorporated Municipal Electrical Association asked the Centres of the Association to discuss the possible future of the I.M.E.A. and submit proposals for discussion at a special meeting.

It is the general view of the Centres that the Association cannot continue in its present form after the vesting date for the electricity supply industry and the majority appear to favour the setting up of a new body. A sub-committee appointed to study the views put forward has decided in view of the urgency of the matter to send a memorandum on the subject to the British Electricity Authority advocating the establishment of a body to represent consumers' interests.

An extraordinary meeting has been called for 19th February to discuss an amendment to Clause 8 of the I.M.E.A.'s Memorandum of Association enabling it, if it desires, to use part of the accumulated funds for assisting any new association which may be formed.

The Transition Stage

Discussions have taken place between representatives of the Association and the British Electricity Authority on certain problems facing members upon the transfer of their undertakings to the Authority. The B.E.A. considered that these problems could best be dealt with by the appropriate Area Boards.

At the same meeting the chairman of the Authority (Lord Citrine) asked for the goodwill of all undertakings in the difficult transition period and he was given assurances by the I.M.E.A. representatives.

Domestic Cooker Prices

Prices charged for electric cookers were discussed at a recent meeting of the I.M.E.A.-B.E.A.M.A. Joint Committee when attention was called to the continued rise in prices and the variations in the charges made by different manufacturers for similar cookers. The B.E.A.M.A. members pointed out that any price increase had to secure the approval of the Ministry of Supply which scrutinized each maker's costs and agreed prices on this basis. Variations were accounted for by differences in manufacturing methods and in the numbers produced. It did not seem possible to arrange that prices of different makes should be kept to a level.

Precision Instruments

PROGRESS made more recently in the construction of precision instruments is the subject of a paper contributed to the Royal Society of Arts by MR. A. J. PHILPOT, director of research of the British Scientific Instrument Research Association.

The particular aspect dealt with is not greater precision of manufacture, but the utilization of methods devised to enable available accuracy to be more fully exploited.

The employment of instruments for the control of industrial processing demands something more than mere measurement of quantities, so there is a growing tendency to ease measurement by converting the small effect to be determined into a different type of effect of much greater magnitude. Such magnification by conversion is explained in principle with illustrative examples, including electronic amplification, which renders it possible to convert almost any physical change into an electrical effect.

The incursion of electronics into instrument design has been a most effective one, but is still in its comparatively early stages. The author has no doubt that the immediate future will witness striking advances in this direction.

Export Prospects—I

Attainment of Objectives Mainly Dependent on Raw Materials

IN the struggle in which this country is now engaged to recover from the ravages of war and to restore its economic prosperity, the electrical manufacturing industry has a part to play second to none in importance. Employing about half a million people, electrical manufacturers, apart from supplying in ever-increasing quantities the electrically operated production machinery for practically every industry and meeting the heavy demands of the home market, are now called upon to export by the end of this year at the rate of four times the pre-war figure in value.

The main details of the targets set by Sir Stafford Cripps, then Minister of Economic Affairs, were given in our issue of 19th September, 1947, but it is now possible to analyse the efforts required by the individual sections of electrical machinery manufacture and also to give the figures for turbines and condensers, as follows:—

ELECTRICAL MACHINERY TARGETS—MONTHLY VALUES (MILLIONS OF £)

	End 1946	End 1948
Generators, large —	0·460	0·288
,, small —		0·444
Motors	0·300	0·417
Convertors	0·045	0·023
Transformers	0·170	0·363
Rectifiers	0·020	0·022
Control gear	0·110	0·100
Switchgear	0·370	0·500
Other electrical machinery	0·015	0·024
Turbines	0·130	0·216
Condensers	0·025	0·074

With the average monthly target for the end of 1948 (in millions of £) previously published for wires and cables 0·900 (the same as at the end of 1946), radio apparatus 1·000 (0·930), telephone and telegraph apparatus 0·650 (0·460), lighting apparatus 0·500 (0·330), batteries and accumulators 0·250 (0·240), vacuum cleaners and other portable appliances 0·340 (0·200) and other products including domestic 1·000 (0·960), the overall electrical target is £7,110,000. It must be pointed out, however, that with prices generally rising the actual value of the exports required to meet the targets should be put substantially higher.

Now what are the prospects of attaining or, better still, exceeding our export goal? Let us look first on the favourable factors and then face the very considerable difficulties that have to be surmounted. In the first place the direct export of the electrical industry to-day places it among the leaders in the country's export achievements. Actually too, during July, September and December last with total electrical exports of £7,333,719, £7,318,093 and £7,389,127 respectively, the target figure for the end of 1948 was surpassed. It must be expected however that, due to inevitably intermittent dispatches of some of the larger and more costly items such as generating plant and submarine cables, the figures will fluctuate widely from month to month. To attain the target means an increase of 15 per cent on the average monthly rate of exports during 1947, but, assuming that the ratio of exports/home for the whole range of products is 25/75, the increase needed is equivalent to only 3·75 per cent of total production.

Greater Productive Capacity

Conversion of industry from war to peace is now fully completed and there should be no lack of manufacturing facilities. Because of extensions during and since the war, the total productive capacity is probably 20 per cent greater than before the war. The 10 per cent increase in production called for should, if achieved, more than cover the greater output necessary to attain our export objectives and should, in fact, leave a substantial margin available to meet the demands of the home market which, owing to the necessity for replacing worn-out plant, restoring bombed installations, making up leeway occasioned by the suspension of electrical development during the war, and meeting the normal increase in demand (which has itself probably doubled), are estimated to be up to ten times what they were before the war, depending upon the product.

Although the targets set are four times those of 1938 in value, prices to-day are generally approximately double what they were before the war. It follows, therefore, that, in volume, only twice the pre-war output is asked for. The Minister of Supply has now made it clear, too, that exports are to be given preference for materials second only to the "Prime Minister's List," which includes electrical generating plant, mining and railway equipment and material for development of atomic energy.

Before the war Great Britain was the largest exporter of electrical equipment in the world and built up a very high reputation for reliability and good quality of workmanship. This goodwill very largely remains and, moreover, the country is still held in high esteem for the part it played during the war. In addition there are at present considerable opportunities for taking the place, at least in the immediate future, of Germany and Japan as suppliers in certain markets, particularly in Europe. Conditions for increasing shipments to South America are also in some respects more favourable than they have ever been, though the present status of sterling is a handicap to be overcome. Taken as a whole, the demand for electrical goods throughout the world is probably about six times the pre-war figure, so that for the immediate future at any rate there is likely to be no lack of orders.

Supplies of Raw Materials

Some reservations need to be made here with regard to consumer goods and also the position that is likely to arise in a few years' time: we shall have more to say about this later. Though by no means complacent, all the manufacturers we have been in touch with are confident not only of attaining, but of exceeding, their targets and keeping to them if only—and this is the most important consideration—adequate supplies of raw materials are forthcoming. This applies particularly to sheet steel, but also to some extent to such items as ceramics, bakelite, copper sheet, small castings, ball bearings, enamelled copper wire and chromic acid.

It may not be fully realized how seriously the shortage and intermittent supplies of materials can throw production out of step and waste factory capacity through the necessity for storing half-finished products. We hear, for instance, of over a thousand motors held up for want of ball bearings.

Despite the high output of steel during the past twelve months we understand that no supplies of sheet steel at all have been allocated for over a year for such items as fires, whether they are for export or not—despite the fact that in 1946 there were 351,300 electric fires exported as against a total of 180,000 for 1937. Talk by the Ministry of Supply of "the sky being the limit" for the export of such appliances therefore appears to be meaningless.

Broadly speaking, the labour situation is now fairly satisfactory. Just before the Control of Engagement Order came into effect there was a certain amount of job changing but things have now settled down again. In a few areas there are still difficulties over either the quantity or quality of the labour force and here matters are not helped by the housing shortage. The most serious labour difficulties are in draughtsmen, moulders and female winders.

As a result of the lack of materials and labour difficulties the position to-day is that, while production capacity is probably 20 per cent higher than it was before the war, the electrical manufacturing industry is able to produce at the rate of only about 70 per cent of capacity, that is, 84 per cent of the pre-war capacity.

Apart from general insufficiency of the scarcest raw material, sheet steel, electrical manufacturers as a whole are not satisfied that the best results are being obtained by the present methods of distribution, though the new scheme coming into force on 1st April is expected to help in overcoming the chaotic condition that has arisen as a result of over-authorization. Some long-established domestic appliance manufacturers think that they have had a "raw deal" as compared with firms new to the industry, whose products have in many cases been of an inferior quality which they themselves would not have tolerated. They claim that the allocation of material to a large number of small firms, whose standard is not one of which this country can be proud, increases the cost of production and reduces the possibility of extending the export trade in these fields. In some quarters, too, it is suggested that, to achieve the greatest efficiency and largest output, control of iron and steel supplies should be removed altogether. This would certainly mean survival of the fittest and the closing down of many of the smaller firms. But whether it would be to the immediate or ultimate advantage of the country is a matter for conjecture.

Simpler Procedure Desirable

Be that as it may, there is no doubt that a further simplification of the procedure in securing raw materials would be welcomed. To this end the British Electrical and Allied Manufacturers' Association (the products of whose members making electrical machinery, turbines, condensers, portable domestic appliances, etc., represent over 90 per cent of the country's electrical equipment output), has made estimates of the main materials required for 1948, 1949 and

1950. Following this it has been suggested to the Minister of Supply that so far as heavy and medium electrical machinery is concerned, the allocation of supplies could best be effected by supplying to him details of total requirements with a list of the firms concerned and issuing permits accordingly.

With regard to domestic apparatus and accessories, however, it is considered that it is desirable to retain the present procedure, the 520 or so firms concerned being treated individually on their own recorded merits and results. Instead of licences for the manufacture and supply of domestic appliances covering periods of three months, however, it is suggested that they should be issued for not less than six months, which is the minimum for which production can be economically planned. A further complaint regarding the present system is that licences do not normally reach manufacturers until several weeks after the commencement of the period for which they are valid.

Whether the Minister will be prepared to accept B.E.A.M.A.'s suggestion still remains to be seen, but it is hoped that the proposal to require production returns from all branches of the electrical industry will not be persisted in. At present returns are required only for domestic equipment and to some extent for large generating equipment and with the information already available from the B.E.A.M.A. census it is difficult to see what useful purpose would be served by the returns, the preparation of which would absorb man-power for non-productive purposes both in the Government and in industry.

Next week we propose to report further on our investigations, more especially as they apply to the export of " consumer " goods.

Starting A.C. Motors

Joint Committee's Recommendation

WITH the object of obtaining uniformity in the rules relating to the starting of a.c. motors supplied at not more than 650 V from public mains, a Joint Committee of the electrical industry, with Mr. D. Maxwell Buist as chairman, has drawn up the recommendations outlined below. The Committee was representative of the various associations concerned in electricity supply and of the British Electrical and Allied Manufacturers' Association (from which copies of the recommendations are obtainable at 1s.), and had the co-operation of the Ministry of Supply and the Electricity Commissioners.

In the course of some general observations, the Committee refers to the difficulty caused by present variations in local rules in enabling contractors, manufacturers and others to determine the type of motor and starting methods permissible in any instance. Limitation of horse-power, it is pointed out, is not necessarily a criterion of the disturbance produced at starting, as starting current for a given horse-power may vary over a wide range according to the type of motor and its duties. In many areas, the starting current allowed is too low and bears no relation to the capacity of the system or to the load of the consumer concerned. The result is often to prevent the use of the best form of drive, or of the most suitable type of motor and method of starting.

The Committee recommends that applications for power supplies should be classified according to the starting currents as determined by conditions at the point of installation; a slip giving technical particulars of the motor and starter, hours of use and starts per day should be gummed to application forms, on which the undertaking would state the maximum starting current allowable for the information of contractors or manufacturers. Maximum permissible starting currents in ampères per line fall into five classes, viz., above 200, 200, 100, 50 and under 50 (but not less than 25) in special cases, as in rural areas, where 50 A would cause undue disturbance of supplies to other consumers. Provided the assigned starting current is not exceeded, any suitable starting method should be allowed.

Where a high-voltage supply is given direct to a consumer, the setting of the undertaking's protective apparatus should determine the maximum starting current. Initial starting currents for squirrel-cage motors with different methods of starting are stated as a percentage of starting currents at full voltage with windings connected for the running condition. These are: Direct-on, 100; star-delta, 33⅓; auto-transformer, $1{\cdot}1\ (T/100)^2$, where T = percentage of line volts applied to motor windings in the starting position; the factor 1·1 allows for the magnetizing current of the auto-transformer. It is, however, pointed out that in some installations mechanical considerations may decide the types of motor and starters required and these may entail lower starting currents than are covered by the recommendations.

British Refrigeration Association

This Association is holding its annual luncheon at the Connaught Rooms, London, W.C.2, on 18th February (12.45 for 1 p.m.). The principal guest will be Mr. J. H. Jones, Joint Parliamentary Secretary to the Ministry of Supply.

Large-Scale Wind Power

Study Section Formed

THE E.R.A. Section on Rural Electrification has already covered small-scale generation of electricity, principally by wind power, including analyses of wind statistics for Great Britain and of the energy obtainable from wind-driven generators of a few kilowatts each, suitable for supplying individual farms or small isolated communities.

Following discussions with the relevant Ministries and other interested parties, the E.R.A. convened a conference of these bodies in December last, for the purpose of deciding whether and in what manner the possibility of using wind power for generating electricity on a large scale should be investigated. The conference was unanimously in favour of such a course and on 9th January the E.R.A. Council authorized the establishment of a new Section to study the technical and economic problems involved.

The sectional committee, meeting under the chairmanship of Mr. T. G. N. Haldane, of Merz & McLellan, will comprise representatives from electricity supply, electrical manufacturers, consulting engineers, D.S.I.R., Lord President's Office, Meteorological Office, Ministry of Fuel and Power, Ministry of Supply and the aircraft industry. The research officer will be Mr. E. W. Golding, who is in charge of E.R.A.'s work on rural electrification and its Field Station at Shinfield Green, Reading. The committee secretary will be Mr. D. V. Onslow.

Electricity in Ships

Address to Batti-Wallahs

SOME interesting facts relating to the early electrical installations in ships were related by Mr. J. A. P. Farrant at last week's luncheon of the Batti-Wallahs' Society. He said that in the early days, the use of electricity in ships was very small, usually consisting of a few carbon filament lamps, a few arcs, a little ventilation, bells and possibly a telephone from the bridge to the engine room. Generators varied in size from 5 kW to about 50 kW and the voltages were anything from 40 to 80 with a very few at 100. The supply was d.c. The incandescent lamps were either 4, 8, 16 or 32 c.p. and fitted with bayonet or Edison screw caps.

Wiring was usually carried out on the " tree " system and fuses were often fitted in switches, plug sockets, and holders. Fuses were usually of uncovered wire. With the coming of lead covering, the old " tree " system of wiring was replaced by the distribution system, and the design of fuse holders improved leading up to the cartridge type.

Liners carried two or more generators of about 50 kW each, in case of breakdown, and selector switches were fitted on the outgoing circuits. The selector system had been discarded on British-built ships, paralleling of generators taking its place, but foreign-built ships still seemed to favour it.

The ventilation system had grown until to-day air supply to the whole of the accommodation was controlled, and it had further developed so that the air could be conditioned as regarded temperature, humidity and purity. The demand for power on ships had increased enormously, and with the introduction of radar, had to be seriously considered especially in warships, where the kW required might run into three figures.

Television Interference

Suppressors for Vehicles

THE campaign to reduce electrical interference with television reception in London and the Home Counties, planned by the Radio Industry Council, has already started with representations to motor industry and road transport organizations.

Some car manufacturers design their engine ignition systems so as to minimize interference, while others are fitting suppressors to cars equipped with radio receivers, which the Radio Industry Council is now asking should become the standard practice throughout the motoring industry whether cars carry radio sets or not. Garages and service stations are to be urged to co-operate in fitting suppressors to cars already on the roads as and when their owners take them in for attention.

All that is needed is a quite inexpensive resistor of from 10,000 to 15,000 ohms in the high-voltage lead between the ignition coil and the distributor as recommended in Code of Practice (CP. 1001) of the British Standards Institution. All vehicles used by the police, G.P.O. and B.B.C. are " suppressed " while the L.P.T.B. is to fit such resistors to 3,000 of its petrol vehicles. The main line railways have referred the matter to the Railway Clearing House while the National Road Transport Federation has circulated a recommendation to all its members. It is hoped that a questionnaire circulated by the Society of Motor Manufacturers & Traders to members of its Technical Committee will result in the adoption of a definite policy.

Electrical Benevolence

AN open meeting is being held in the Demonstration Room of the Wessex Electricity Co. at Chippenham on 25th February at 3.30 p.m. to inaugurate a new branch of the Electrical Industries Benevolent Association covering Wiltshire. All electrical people in the area are invited to attend, and it is hoped that there will be a good gathering. Preliminary reports indicate that the amount paid out by the Association in grants in 1947 shows a record increase of £6,078, or 38 per cent over the figure for the preceding year, emphasizing the urgent necessity for increased support.

Industry and the House

Petrol and Gas Under Consideration

By F. J. Erroll, M.A., A.M.I.E.E., M.P.

THE fuel which took first place in Members' minds on the resumption of Parliament in this New Year was petrol. The rapidity and eagerness with which they returned to the attack on the Government's withdrawal of the basic ration shows that the fight is to go on until it is restored. Much time in the House, and much labour in the Petroleum Board's regional offices are being wasted, while we are still uncertain that there has been an appropriate dollar-saving.

Then came discussion on the Gas Nationalization Bill, which has now received a second reading. The Conservative Fuel and Power Committee is studying this Bill and is preparing the Opposition's amendments. Although the new Bill is similar in many respects, and particularly in its financial provisions, to the Electricity Act of last year, it is slightly less controversial, mainly because of the 1945 Heyworth Report on the industry.

Electricity Supply Matters

The House was treated to a useful debate on 23rd January when Mr. A. M. F. Palmer criticized the unsatisfactory state of electricity supply in this country. Mr. Palmer, who is the Labour Member for Wimbledon, spoke with authority for he is an electrical engineer, and is editor of the *Electrical Power Engineer*. Similarly, a debate on a Prayer to annul the Control of Turbo-Alternators Order of 1947 was of considerable personal interest. The House is in fair agreement on the merits of turbo-alternator standardization. The controversy arose on the retrospective effect of the Order, a legal question, and the matter still remains unsatisfactory. The Prime Minister was present during the whole of the debate, which indicates both his interest in electrical matters and his desire to see the first appearance at the Despatch Box of Mr. Jones, the new Junior Minister at the Ministry of Supply.

International trade is yet another subject of discussion among Members at the moment. Readers need not be reminded of the very important part that the electrical manufacturing industry is playing in the British export drive. Here again standardization must be considered necessary in view of the need for increasing production, and especially in quota items such as switchgear, accessories and machinery components. Standardization and quantity production need not necessarily be accomplished at the sacrifice of technical development and quality. Those who had made accusations that the quality of British exports had seriously deteriorated were answered by Sir Stafford Cripps recently when he said that although in the immediate past there was some cause for complaint in the quality and packaging of exports, the position was now entirely satisfactory.

Geneva Tariff Agreement

Mr. Oliver Lyttelton (Aldershot), chairman of Associated Electrical Industries and a former President of the Board of Trade, led the Opposition in the debate on Geneva Tariff Agreements on 28th January. This long and rather dull debate was introduced in another maiden Despatch Box speech by Mr. Bottomley, Secretary of Overseas Trade, and he was congratulated by Mr. Lyttelton for having discharged a very difficult task on a specialized subject without losing the goodwill of the House. Under the Geneva Agreement we have made concessions covering £130,500,000, and have received concessions on £92,000,000—a bargain not particularly in our favour. The Conservative amendment to the motion was an ingenious compromise between those who favour imperial preference and those who desire a greater measure of international free trade.

Trade Associations

The Design for Freedom Committee, headed by Mr. Peter Thorneycroft, recently issued "Design for Recovery," which deals in a comprehensive manner with our future trading problems. This Committee's original pamphlet was strongly against trade associations and international price-fixing agreements. Although the electrical industry was not named it was certainly in mind. Since then opinion in the House has changed a fair amount on this matter, and the Geneva Agreement debate evidenced a closer degree of understanding between opposing factions.

Sir John Mellor has recently protested against the Government's retention of purchase tax on car radio sets. The Finance (No. 2) Act, 1940, imposed the tax on

domestic receiving sets. The question of whether or not car radio came within these provisions did not arise until 1946. In August of that year the Society of Motor Manufacturers and Traders was instructed that car receiving sets were chargeable for purchase tax at 33⅓ per cent of the wholesale value. Nearly a year later this ruling was reversed, and it was Sir John Mellor's contention that the tax imposed up to April, 1947, had been illegally levied, and should have been repaid. This was a good point of principle for it may affect other electrical goods, and Sir John was right to insist on a reply from the Government. But the statement on this matter from Mr. Glenvill Hall, Financial Secretary to the Treasury, was far from satisfactory. In sum, he said that it had not been proved that car radio sets were not liable from the start to purchase tax. Parliament, under the 1940 Order, intended these sets to be taxed; it was impossible to trace the claims, should they be made; and, anyway, the rule of law prevented repayments. Sir John was far from satisfied and does not intend to let the matter rest there.

PARLIAMENTARY NEWS

By Our Special Reporter

IN the House of Commons last week Mr. Erroll asked the Minister of Supply in view of the imminent shortage of electric welding electrodes, what steps he was taking to augment supplies of suitable steel to welding electrode manufacturers.

Mr. G. R. Strauss said that this type of wire was made from billets of special quality. Hitherto the expanded demand had been met by means of imports of billets from the United States, but this supply was no longer available. Expansion of production was difficult owing to the special capacity and technique required, but output was being increased as far as possible, while they were trying to import electrode wire as such from the United States.

Trams or Trolley-Buses?

Mr. Chamberlain asked the Minister of Transport whether he would request the British Transport Commission to consider the replacement of trams in South London by electric trolley buses, instead of by petrol buses, with a view to reducing demands on petrol imports and on our dollar resources.

Mr. Barnes said that the decision to replace the trams in South London by petrol buses was reached after a careful balancing of financial, traffic and other considerations, including that to which Mr. Chamberlain drew attention. In present circumstances it had been necessary to postpone the scheme of conversion. When the time came for the scheme to go forward, no doubt the British Transport Commission would take into account all considerations relevant in the circumstances which then prevailed.

Telephone Development

In moving the second reading of the Post Office and Telegraph (Money) Bill in the House of Commons, Mr. Paling, the Postmaster-General, reviewed telephone progress. He explained that the object of the Bill was to provide £75,000,000 as capital necessary for the development of the telephone, telegraph and postal systems. Of that amount, £71,000,000 would be for the telephone system. It was intended to provide for capital expenditure until December, 1950. Account had been taken of the considerable rise in the level of prices of telecommunications equipment, but the actual programme represented a drastically reduced version of the original.

During 1946 and 1947 1,322,000 new telephones had been installed, but there was still a waiting list of 450,000. Until new ducts and cables were provided 300,000 applications could not be met, and new subscribers could not be accepted at 1,500 exchanges until these were enlarged. To clear the waiting list would need an annual capital expenditure of £36,000,000 for the next five years, but under present restrictions the Post Office was limited to an expenditure of £24,000,000. Telephones would be provided for those engaged in the production drive, for public utilities, health services and doctors, as well as for farmers.

In the debate which followed, Mr. Grimston feared the serious effect of the cuts on industrial production. Mr. Viant urged the Cabinet to reconsider the severe pruning of Post Office capital expenditure, and Mr. Braddock suggested some limitation on the use of the telephone, such as an automatic cut-off at the end of a call limited to two minutes.

The Bill was read a second time.

Stretford Discount Scheme

Commander Maitland asked the Minister of Fuel and Power whether he could now state if the scheme of the Stretford Electricity Board, Lancashire, to give a discount to householders if they saved at least 10 per cent electricity had achieved its object; and if he proposed to take steps to extend the scheme to other parts of the country.

Mr. Gaitskell said the evidence so far available was not sufficient to show whether the scheme had achieved its object.

COMMERCE and INDUSTRY

Generating Plant Capacity. Ministry and Motor Manufacturers.

A TOTAL capacity of 465,500 kW of heavy electrical plant was manufactured and erected during 1947, states the Ministry of Supply. Of this amount sufficient was brought into service by the Central Electricity Board by the end of the year to supply an additional 340,000 kW to the grid, an increase of 35,000 kW in the additional power supplies to the grid in 1946. The plant was installed at Huddersfield, Meaford, Hull, Portsmouth, Ribble, Trafford, Kirkstall, Lincoln, Bradford, Woolwich, Nottingham, Ocker Hill, Hayle, Newport East, Brighton, Hams Hall " B " and Neepsend. In addition, repair work completed during the last nine months of 1947 amounted to the equivalent of 1,293,000 kW (586,000 kW in the last six weeks of the year). The capacity of the plant undergoing major repairs at the end of the year totalled 475,000 kW.

Coal Costs

The summary of costs and proceeds for the third quarter of 1947 issued by the National Coal Board shows that 42·8 million tons of saleable coal was produced, 39·3 million tons being disposable commercially after allowing for mine consumption and miners' coal. Total costs amounted to £91,649,879 (equal to 42s. 9·9d. per ton saleable), while proceeds were £86,207,274 (40s. 3·4d. per ton), leaving a loss of £5,442,605 (2s. 6·5d. per ton).

B.E.A. Consults Trade Unions

Meetings for the purpose of agreeing joint conciliation machinery to operate after the vesting date has taken place between representatives of the British Electricity Authority and (*a*) the trade unions party to the machinery of the National Joint Industrial Council for the Electricity Supply Industry, (*b*) the Electrical Power Engineers' Association, being the trade union side of the National Joint Board and (*c*) the unions representing clerical and administrative grades in the employment of the supply undertakings. Progress was made in the discussions which were adjourned to permit the union representatives to consult their executives and for the B.E.A. representatives to report the discussions to the Authority.

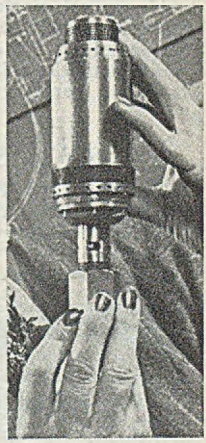
Senior B.E.A. Appointments

As the result of its advertisements for divisional controllers and other senior staff in the Generation Divisions, the British Electricity Authority has received a large number of applications which appear to cover the field of all who are likely to be interested in the chief positions in connection with generation and transmission. It is now proceeding with the appointment of the senior staff in the Generation Divisions with which most of the applications are concerned and will also shortly be making parallel senior appointments at headquarters.

Electrical engineers who are interested in these appointments but have not responded to the previous advertisements, are invited to forward in the immediate future to the Director of Establishments at British Electricity House, Great Portland Street, London, W.1, details of their qualifications and experience, in order that their cases may be duly considered. All who have sent in applications for any of the appointments in the Generation Divisions will be automatically considered for the parallel appointments at headquarters. The salary ranges, as is the case with all those advertised hitherto, are regarded as provisional until final scales have been negotiated with the appropriate organizations.

An " Inside-Out " Motor

A miniature motor of unusual design, which has been used on the U.S. Army's ordnance proving grounds at Aberdeen, Md., is built " inside out," the rotor being on the outside of the stator. It is rated at one-tenth h.p. at 80,000 r.p.m., the maker being the General Electric Co. of America.



Miniature motor of unusual design

E.D.A. Lectures

The ninth of the series of South East and East England Area sales meetings organized by the British Electrical Development Association was held on 26th January, in London, on the subject of " The Agricultural and Horticultural Applications of Electricity." At first sight it might appear that the subject was for the staffs of rural undertakings. It is, however, the aim of these lecture meetings to give all sales staffs employed in every type of undertaking a general knowledge of all the uses of electricity including its applications to food production, so that those assistants who are constantly dealing with the public in towns as well as country will understand and be able to indicate how the avoidance of waste in the towns can help in food production.

At this meeting, the audience numbered 160, a large number being from London and

other non-rural undertakings. Lectures were given by Mr. F. E. Rowland, manager of the Agricultural Department of the G.E.C., dealing with the agricultural side, and by Mr. W. Cover, dealing with the horticultural side.

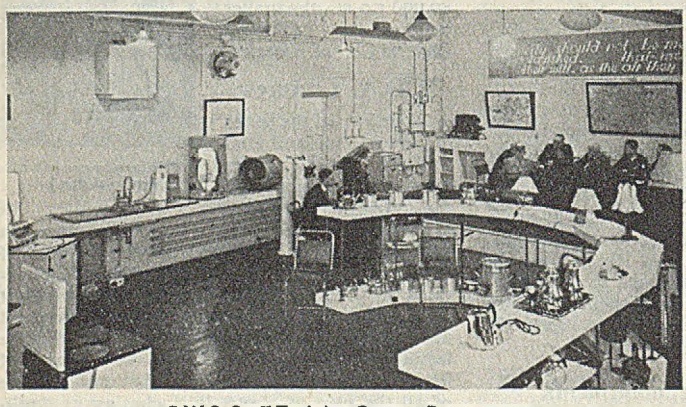
Another Fulham Collier

The launching of the *Fulham IX*, the ninth vessel to be built to the order of the Fulham Borough Council by the Burntisland Shipbuilding Co., Ltd., took place on 27th January, the naming ceremony being performed by Mrs. J. T. Horton, Mayoress of Fulham. This vessel is the second of three recently ordered from the Burntisland-Hall Russell Companies for transport of coal to the Fulham Council's power station and is specially designed for navigation on the Thames. The electrical features are similar to those of the *Fulham VIII* which was described in our issue of 19th December last. Single screw diesel propelling machinery of 1,520 b.h.p. consists of a two-cycle diesel engine constructed by British Polar Engines, Ltd. The engine is coupled to a double helical single reduction gear box by means of an electro-magnetic slip coupling. The design of the collier has been specially developed by the builders in collaboration with Mr. W. C. Parker, borough electrical engineer of Fulham.

S.W.S. Staff Training

The S.W. & S. Electric Power Co.'s Staff Training Centre at Bromsgrove has the object of assisting employees to maintain a high standard of service to the consumer, and by widening their interest enabling them better to enjoy their work and appreciate its significance in relation to the rest of the company's activities. The Training Centre was originally designed for those employees directly in contact with consumers, such as service representatives (including meter readers), local representatives, showroom assistants and demonstrators, but it is to be extended for all grades of employees. The training is given in a series of talks and demonstrations, each series occupying from two to three days. The talks fall broadly into two classes, those which give "background" and encourage the spirit of service, the right approach to and reception of consumers, and the others on the construction and operation of appliances, and they are given on a slightly raised platform at one end of the room with speaker and employees sitting round a table. The main body of the room is devoted to a display of apparatus and appliances, a number of which are "exploded" so that construction is easily followed.

The company also gives training in all branches of overhead line work and operates a comprehensive apprenticeship scheme embracing post-graduate courses, engineering, technician and trade apprenticeships.



S.W.S. Staff Training Centre, Bromsgrove

Electron Accelerator

Among the newer devices designed and built in the research laboratories of the British Thomson-Houston Co., Ltd., last year is a betatron particle accelerator, which has already been subjected to preliminary tests. It will be employed at the Clarendon Laboratory, Oxford, and is intended to furnish outputs ranging from 10 to 15 MVe. This accelerator is described as a departure from established designs in two respects. First because the a.c. magnetic field that serves to guide and focus the electrons in a circular path is quite separate from the a.c. magnetic field which accelerates the electrons. Secondly a logical consequence of the first is the employment of an evacuated tube (toroid or doughnut) of relatively small bore within which the acceleration takes place. Incidentally during the acceleration period, which is very short, the electrons are caused to circulate more than a million times and travel something like 850 miles within the narrow tube without hitting its walls.

Guatemalan Telephone Contract

A call for tenders for a telephone system for the city of Quezaltenango, Guatemala, has been issued by the Ministry of Finance and Public Credit, the American Embassy in Guatemala City reports. As the official notice calls for bids by 28th January, the Embassy has requested an extension of from 90 to 120 days. The system will comprise 500 extensions with facilities for expansion to 2,000. Bids are to include supply of all installation materials.

Labour and construction materials, will be furnished by the Guatemalan Government. —*Reuter's Trade Service* (Guatemala City).

Motor Production and Export

Guidance for manufacturers of electric motors is contained in a circular sent to them by the Ministry of Supply. These manufacturers have been pressed to meet clamant home needs and also to contribute to export trade. They have been asked to reduce " drastically " their exports of motors up to 50 h.p., including fractional h.p. machines, and a maximum of 10 per cent of production is suggested. Exports, moreover, should be directed towards hard-currency markets. It is not considered possible to adjudicate between the claims of home requirements and indirect exports; this must be left to manufacturers' common-sense. It should not be necessary to test the urgency of every customer's needs; particular attention should, however, be given to motors required for immediate use in connection with the export of plant or the production of goods for export.

The Government has made it clear that it does not intend that allocations of materials for such purposes as electric motor manufacture shall depend on export performance. The Ministry regards motors as " critical intermediate products " and suppliers of materials should be so informed.

Hospital and Catering Aids

A Hospital and Catering Aids Exhibition is being held in the West Grove Drill Hall, Cardiff, from 10th to 13th February. The exhibition, which has been organized by the South Wales Area Committee of the British Electrical Development Association, is designed to foster the use of electricity in hospitals. It will be divided into two main sections covering electro-medical and hospital equipment and hospital catering.

Electrical Travellers' Luncheon

The annual luncheon of the Electrical Trades Commercial Travellers' Association is being held at the Connaught Rooms, London, W.C.2, on 20th February.

Wholesale Trade Associations Unite

Britain's leading wholesale trade associations have agreed to unite on matters of common ground. The decision was made when representatives of seven organizations met in London on 26th January to form the National Joint Standing Committee on Wholesale Distribution. The chairman was Mr. W. A. Cooke (Wholesale Textile Association), and among those present were Mr. A. B. Wildsmith, representing the Electrical Wholesalers' Federation, and Messrs. C. D. E. Hobday and C. Horton, representing the Radio Wholesalers' Federation. The Joint Standing Committee will promote the interests of the bona-fide wholesale distributor, and make his functions better known and appreciated. It will collate and disseminate facts, figures and statistics relating to the British wholesale industry, and will act collectively in matters of principle relating to wholesale distribution as a whole. Member associations will, however, continue to conduct their own domestic affairs as before. Membership will be confined to trade associations which satisfy certain conditions. Mr. W. A. Cooke has agreed to continue in the chair temporarily, and Mr. W. T. Caves to act as secretary. Details can be obtained from Mr. Caves, Wholesale Textile Association, 75, Cannon Street, London, E.C.4.

Zinc Price Increase

The Minister of Supply has made the Control of Non-Ferrous Metals (No. 31) (Copper, Lead and Zinc) Order, 1948, S.I. 121 of 1948, which came into force on 30th January. This Order increases the maximum prices of zinc and zinc sheets by £5 a ton and of zinc oxide by £4 5s. a ton. The Directorate of Non-Ferrous Metals will resume on the same date the granting of licences for the acquisition of unwrought zinc.

Soil Sterilization

The British Electrical and Allied Industries Research Association has published a report (Ref. W/T14) on " Electrical Soil Sterilization by Immersion Heaters " (6s. 6d. net), by C. A. Cameron Brown and P. Wakeford. This report describes an investigation into the conditions governing the sterilization of soil for horticultural purposes by the insertion of insulated heating tubes in the soil, which is subsequently heated by conduction of heat from these tubes. The experimental work covered both laboratory investigations and long-period full-scale use. The conclusion reached is that with the appropriate inter-relation of heating load, spacing of heaters, soil volume and time of running, the use of immersion heaters has certain advantages over the electrode method. Working details are given of sterilizers which have operated successfully for several seasons. One is suitable as a basis prototype for commercial scale operation and the other for amateur gardeners.

Scottish Electricians' Wages

The E.C.A. of Scotland announces that from 9th February the standard rate of wage for journeymen electricians and returned apprentices serving under the Interrupted Apprenticeships Scheme will be 2s. 9½d. per hour. For the present there will be no alteration in the value of the holiday stamps. The standard working week will be 44 hours, in five or five and a half days, at the discretion of the employer, either for the establishment as a whole or for each particular job (the employer is to declare the working hours for each job). The five-day week will be worked in four days of nine hours and one of eight; the five-and-a-half-day week in five days of eight hours and one day of four hours. Five-day-week men will be entitled to

overtime at time and a half if required to work on Saturday morning. Rates for apprentices will be increased in proportion to the increase in the journeymen's rate as follows: First year, one-sixth of journeymen's rate; second year, one-quarter; third year, one-third; fourth year, two-fifths; fifth year, one-half.

The weekly country allowance will be 31s. 6d. (a man away from home five days or more is entitled to the weekly rate) and the daily rate in excess of a week will be increased from 4s. to 4s. 6d. For four days or less the daily rate will remain at 5s. 6d. The additional allowance for first and second year apprentices of 1s. and 4d. per day respectively will continue.

Trade Publications

Chloride Electrical Storage Co., Ltd., Whitfield House, Whitfield Street, London, W.1.—Aircraft battery instruction manual.

Northern Aluminium Co., Ltd., Banbury.—Revised version of "Specifications for Aluminium and Aluminium Alloy Products."

Toplis, Simpson & Co., Ltd., 130, Vaughan Road, Harrow, Middx.—Descriptive folder (No. 1947/12) on moisture meter with detachable electrodes designed for particular substances.

Londex, Ltd., 207, Anerley Road, London, S.E.20.—Descriptive leaflet (No. 116) of photoelectric switch for street lamps and traffic signs.

Coventry Refrigeration Developments, Ltd., Pedmore Road, Brierley Hill.—Folder illustrating the C.R.D. refrigerator.

Metway Electrical Industries, Ltd., King Street, Brighton, 1.—Illustrated catalogue of strengthened porcelain ceramics with separate price schedule.

Consumers' Co-operation Charts

Encouraging results obtained by the Advisory Service during the crisis period early last year persuaded the Portsmouth Electricity Service to launch a more ambitious scheme this winter, in an effort to assist the consumer and the undertaking during the period of possible load shedding. A consumers' co-operation chart measuring 10 in. by 6 in and printed in red and black, was designed, with a calendar for 1948 attached. Approximately 10,000 of these charts were distributed by the Advisory Service personnel. The charts are headed with a graph showing the undertaking's "load line." On the "peaks" stands a housewife pushing a water heater off, saying, "Please don't use them at the peak hours." Below this are pictures of a cooker, 1½-gal. and 12-gal. water heaters and an immersion heater. Alongside each picture are given the hours when it would be most helpful at the generating station for that particular piece of apparatus to be switched off. The addition of the calendar was hoped to be an inducement to the lady of the house to allow the chart to remain hung up in the kitchen, so as to be a constant reminder of the necessity of economy. Distribution was made only to consumers using water heaters and immersion heaters. In every instance the purpose of the call and the card was explained and general advice on the economical use of all apparatus was given.

Trade Announcements

Oldham & Sons, Ltd., are known to the electrical industry as makers of accumulators and mine lighting equipment. But they have also produced hat-making machinery for a hundred years and have recently acquired the sole European manufacturing and distribution rights in the high-speed hat-making processes of the American concern, Doran Bros. Oldhams have recently taken over a works in Stockport.

The Hoffmann Manufacturing Co., Ltd., has opened a branch office at 25, Dublin Road, Belfast (telephone No. 20741).

Trade Marks

THE following applications have been made for the registration of trade marks. Objections may be entered within a month from 28th January :—

AUSWAL. No. 652,002, Class 8. All goods included in Class 8.—Trumek, Ltd., 191-193, London Road, Kingston-on-Thames.

SPIREX. No. 643,796, Class 9. Coiled insulated wire for electrical connections.—Cordage Inc., Chicago. Address for service: c/o Frank B. Dehn & Co., 103, Kingsway, W.C.2.

MINIRACK. No. 651,575, Class 9. Electronic instruments and parts thereof and fittings for oscillograph apparatus.—Southern Instruments, Ltd., Fernhill, Hawley, Camberley, Surrey.

MULTIVOX and MISER. Nos. 651,799-800, Class 9. Radio receiving sets (complete) and component parts thereof included in Class 9.—M. Wilson, Ltd., 307, High Holborn, W.C.1.

CIVIC CONCORD. No. 653,422, Class 9. Radio and television receiving sets (complete).—Fulham Borough Council, Town Hall, Fulham, S.W.6.

PRIONOTRON. No. 653,791, Class 9. Electrical apparatus and instruments included in Class 91.—Compagnie Générale de Télégraphie sans Fil, Paris. Address for service: c/o G. F. Redfern & Co., Redfern House, Dominion Street, E.C.2.

DYNAMAX. No. 652,854, Class 10. X-ray tubes and housing therefor, all used for therapeutic purposes.—Machlett Laboratories Inc., Springdale, Connecticut, U.S.A. Address for service: c/o Cruikshank & Fairweather, 29, Southampton Buildings, Chancery Lane, W.C.2.

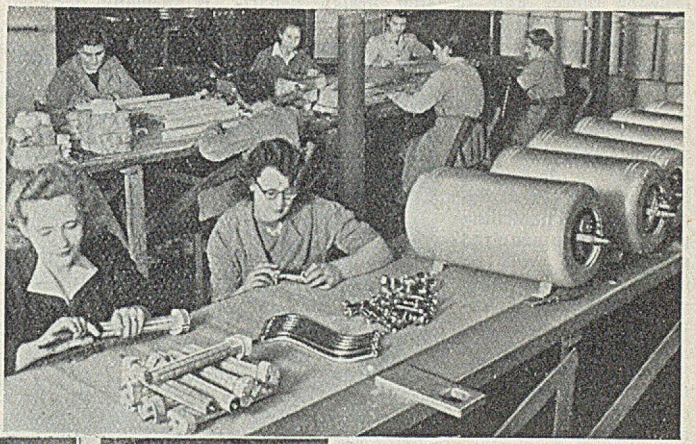
HARFERIC. No. 654,973, Class 11. Lighting fittings of metal.—Harcourts, Ltd., 222, Bristol Road, Birmingham, 5.

INSULOL. No. 649,884, Class 17. Oils for electrical insulating purposes and compounds made from processed mineral oils and rosin, to be used for the impregnation of paper-covered electrical conductors and for electric power cables, all for sale in the British Empire.—Sternol Ltd., 16, Finsbury Square, E.C.2.

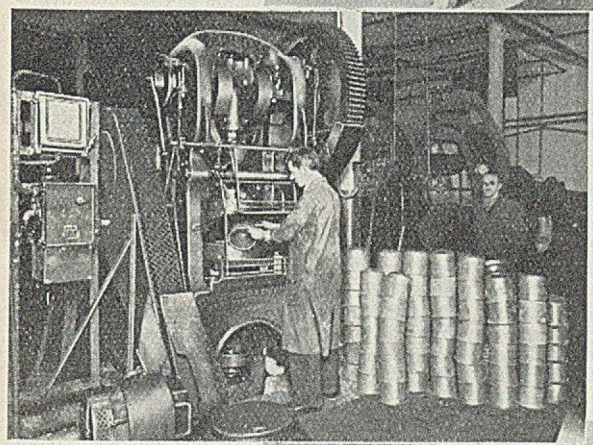
Entering the Appliance Market

Water Heater and Home Laundry Equipment Production

THOUGH H. Fisher (Oldham), Ltd., did not begin to make electrical appliances until after the war, their products are rapidly becoming well known all over the world. In designing the apparatus, the company has carefully studied modern technique both at home and abroad.



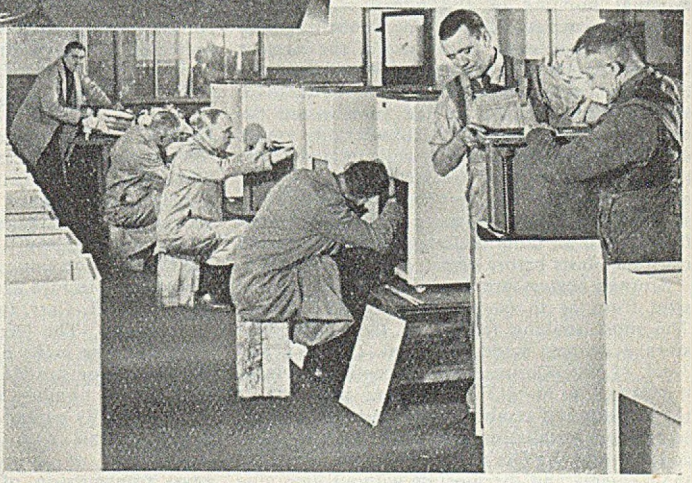
Inspection of water heater components before assembly



Pressing copper domes for the inner cylinders of storage heaters

Mr. H. Fisher, the managing director, and Mr. A. W. Glenning, commercial director, made a two months' tour of factories in the United States manufacturing electrical appliances, and have as a result decided to introduce several of the methods employed on the other side of the Atlantic to accelerate output. They are satisfied, however, that we in Britain have little to learn about technical efficiency of electrical appliances. To ensure that the purchasers of the apparatus, particularly the electricity supply authorities, are getting what they want, criticisms have been invited resulting in certain slight but worth-while modifications.

To facilitate expansion, production has been modelled on that of a large-scale organization. In addition to the routine test department a special test laboratory is available not only for checking



Washing machine assembling department

elements, thermostats, etc., but also for carrying out water hardness tests for consumers and efficiency tests of varied nature. There are separate drawing offices and research design departments. At the moment the layout of the production departments is still largely in the transitional stage but before long the flow system will be introduced. A second factory with an extensive vitreous enamelling plant has been acquired recently and will be laid out for the large-scale production of electric cookers.

The elimination of potential causes of failures coupled with easy servicing is aimed at. In the immersion heaters, made in four sizes, 12, 16, 22, and 28 in. with loadings up to 5 kW nickel-chrome elements have mica inset pieces every ¾ in. between each section of the ceramic former and are also twisted slightly in order to prevent sagging. The heavy nickel leads welded to the elements 7 in. (17·8 cm) from the top of the unit avoid risk of overheating the terminal box when mounted vertically and as a further precaution, porcelain with its better heat resisting qualities is used for mounting the terminals which are extra large to facilitate wiring. The use of heat-resisting steel for the centre tie bar prevents oxidization and possibly eventual bursting of the porcelain. Special chemical treatment of the element tube, together with the use of extra thick base of the element tube guards against leakage of water into the tube whilst the method of soldering (with silver solder) from the top of the tube inside the apparatus plate, though considerably more difficult, is considered worth while in view of the reduction of electrolytic action. All tube assemblies are given a test pressure of 80 lb per sq in. (5·6 kg per cm^2) at two stages of manufacture and all units undergo 2,000-V flash and resistance tests before dispatch.

Storage heaters are manufactured in varying sizes from 1½ to 60 gal. (6·8 to 272·7 litres). The most striking feature of the single-point storage heaters made in 1½-gal. (750-W) and 3-gal. (1,500-W) sizes is an exceptionally large "pocket," 6 in. (15·2 cm) dia., provided at the bottom and removable by undoing a single screw for installation servicing. This point, coupled with the fact that it is possible to change the elements and thermostats without emptying out the water, and that a drain plug is incorporated for descaling purposes is claimed to reduce the time required for servicing from about 2 hours to 15 minutes. The outlet swan neck is specially designed to give easy swivel and unbreakable connection, while a neat anti-splash device ensures a steady flow. The copper cylinder is tinned inside and all the sheet steel parts are "granodized." Specially burnt granulated cork is used for the thermal insulation. The units are finished in white or mottled enamel and all fittings are chromium plated. The design of the 20-gal. dual-purpose heater, which supplies either 6 or 20 gal. (27·3 or 90·9 litres) of hot water as required, minimizes heat losses. Containers are subjected to a pressure test of 80 lb persq in.

Assembling washer gear boxes

The company's washing machine is of simple construction involving very few moving parts. All the working parts are enclosed. A compartment in the body takes the wringer when not in use and sliding legs fitted to the lifting door form a stand for a receptacle to collect clothes after wringing. A rubber hose-pipe is provided for emptying the water. Another labour-saving device is an electric drying cabinet, which operates by means of convected hot air currents rising from three distributors mounted on a metal tray underneath which the elements (2 kW) are housed. These are controlled by a robust foot-operated switch and a pilot lamp indicates that the cabinet is switched on.

Students' Lectures

THE Bradford Group of the Illuminating Engineering Society recently held a series of Christmas lectures at Bradford Technical College, which were attended by over 1,200 secondary and grammar school students. Alderman Kathleen Chambers, the chairman of the Corporation Education Committee, formally opened the lecture session and was supported by Mr. T. H. Carr, the city electrical engineer, and others. The lectures, entitled "Rainbow Magic," were given by Mr. H. R. Ruff of the British Thomson-Houston Co., Ltd., and included a number of demonstrations on a stage specially equipped for the purpose. The subjects dealt with covered the scope and possibilities of fluorescent lighting, invisible rays, transmission of music by a modulated beam of light, radar, and ultra-violet light.

ELECTRICITY SUPPLY

Substation Site Rentals. Wimbledon Transmission Scheme.

Accrington.—NEW POWER STATION.—The first sod, cut by the Mayor of Accrington (Ald. H. Johnson) on 31st January marked the start of work on the new £6,000,000 power station at Huncoat.

Bradford.—PRICE INCREASES DEFERRED.—In view of the imminence of the transfer of the gas and electricity undertakings to national control, the Corporation Estimates Sub-committee has adjourned consideration of proposals to increase gas and electricity charges until the accounts for the year ending 31st March next are issued.

Brighton.—CHANGE-OVER.—The Corporation is proposing to change over the system of electricity supply in the Queen's Park Road district (approximately 250 consumers) at an estimated cost of £6,851, and in the Hove Park Road district (approximately 200 consumers) at a cost of £4,291. To meet the increasing demand for electricity in the Barnett rural district and to restore the voltage at consumers' terminals to within the statutory limits, the existing overloaded distribution mains are to be replaced by larger cables. At the same time the opportunity is to be taken to change over the system to a.c. (approximately 350 consumers); the estimated cost of the work is £3,551.

Chelsea.—CONDITIONS OF BATTERSEA POWER STATION EXTENSION.—With regard to the proposals of the London Power Co. for the further extension of the Battersea power station, the Electricity Commissioners have informed the Council that any consent they may issue will be subject to similar conditions to those applied to the previous consents to the extension of the station. The Commissioners will advise the Council in due course of their decision regarding the representations of the London County Council for facilities to enable their officers to inspect the records of sulphur emission and to make tests of the efficiency of the methods used.

Cheltenham. — LOANS SANCTIONED. — The Borough Council has recently received sanction to the borrowing of £5,000 for unspecified mains and services, £4,610 for specified mains and services and £1,255 for the provision of a central consumers' record system.

Chester.—HOUSING DEVELOPMRNT.—It is proposed to apply for consent to borrow £2,995 for the provision of a supply of electricity to 84 houses on the new Bellard estate, Hoole.

DEFERMENT OF POWER STATION SCHEME.—The electrical engineer has reported that under the economy cuts in expenditure the programme for the proposed generating station at Queensferry would be put back for probably 18 months and two years. The area manager of the Central Electricity Board has requested that efforts should be made to purchase additional land and carry out certain preliminary works not involving capital expenditure on plant or buildings, and this is being done.

Croydon.—COMPLETION OF PRE-WAR SCHEME.—In January, 1938, approval was given to the erection of a 6,600-V substation at All Saints, Beulah Hill, to replace an underground 2,000-V substation in Church Road. The building was erected and the majority of the plant installed, but the completion of the work, with cable laying, was deferred due to the war. Growth of load has now made it necessary to complete the work, at an estimated cost of £12,042.

Darlington. — NEW CABLE. — The Town Council is to spend £1,003 upon a cable to supply electricity to houses in the Carmel Road area.

Ipswich.—COST OF CLIFF QUAY STATION.—The estimated cost of the power station now under construction at Cliff Quay has risen to £9,605,173, it was stated at a meeting of the Town Council last week. The original estimate was £8,250,000. The Council agreed to apply to the Electricity Commissioners for sanction to borrow a further million pounds for the work.

London.—J.E.A.'s CHARGES.—Approval has been given by the Electricity Commissioners to the revised estimates of the London and Home Counties J.E.A. for 1948, which allow for revision of charges. The Minister of Fuel and Power has indicated that he sees no reason to intervene in the proposal to raise the summer "unit" rate under the Authority's domestic, business and power two-part tariffs in the inner zone from 0·55d. to 0·825d.

CONSULTATIVE COUNCIL COMMITTEES.—The Thames Valley (No. 1) Area Committee has asked that local authorities shall be given an opportunity of submitting observations on any scheme which may be promulgated by the Consultative Councils for the appointment of committees, before any such scheme is approved by the Minister. The J.E.A. has passed these views on to the South Eastern Electricity Board.

BANKSIDE PLANS.—The City of London Electric Lighting Co., Ltd., has notified the J.E.A. that orders have been placed for demolition and constructional work, plant, etc., at Bankside generating station at a cost of £1,460,920.

Nottingham.—PLANT RECOMMISSIONED.—The 20,000-kW set at North Wilford power station, which was damaged in an explosion caused by a transformer failure on 21st December, 1946, has now been brought back into service. The city electrical engineer (Mr. M. Wadeson) stated that the contractors had done an extremely good job and the set was brought back into commission almost to the day they expected it to be.

St. Pancras. — HIGHER CHARGES RECOMMENDED.—In 1946 a proposal by the Council to revise certain of the lower electricity charges did not receive the consent of the Electricity Commissioners. However, in view of the rise in costs the Electricity and Public Lighting Committee has again considered the matter. The present charges of $\frac{3}{4}$d. and $\frac{1}{2}$d. for cooking and heating, and the secondary rates under the business and domestic two-part tariffs, are below the initial cost per kWh and it is proposed to apply to the Commissioners for consent to increase them to $\frac{3}{4}$d.

NEW ASSOCIATION NOT SUPPORTED.—The General Purposes Committee, informed of the proposal to wind up the Conference of Local Authorities Owning Electricity Undertakings in Greater London as at present constituted and form a new association, has expressed the opinion that the Metropolitan Boroughs' Standing Joint Committee is the appropriate body to represent the views of London borough councils in any future negotiations. In the circumstances it is not prepared to support the formation of a new *ad hoc* association.

Skipton.—ELECTRICITY CHARGES.—If a recommendation of the Electricity Committee is approved by the Urban District Council, the 10 per cent increase in electricity charges will not be added for the March quarter. All consumers other than industrial and special agreement consumers will be allowed another 10 per cent discount.

Stoke Newington.—HIRE OF MOTORS.—As a result of the change-over of supply to a.c., a number of d.c. motors have been recovered from various premises. Before the war it was the practice to scrap such apparatus, but in view of the shortage of d.c. motors the borough electrical engineer has suggested the introduction of a scheme for the hire of the motors to consumers pending the completion of the change-over. In selected cases it is suggested that the motors might be lent to consumers at a nominal rental.

SUPPLIES TO L.C.C. BLOCK DWELLINGS.—The Greater London Committee of E.D.A., on behalf of constituent undertakings in the Area, carried out negotiations regarding the conditions of supply of electricity to block dwellings erected by the London County Council. A memorandum has been circulated, and the Stoke Newington Electricity Committee, after hearing the views of the borough electrical engineer, expresses the opinion that the agreement reached is most satisfactory.

MODIFICATION OF WOODBERRY DOWN SCHEME.—In connection with the supply to the Woodberry Down housing estate, modified proposals have been submitted by the borough electrical engineer following information that the L.C.C. would, under certain conditions, now permit the erection of outdoor substation equipment on its estates. At current prices, the modified scheme effects a saving of about £15,000, the estimated cost being £43,259. Two instead of four brick-built substations would be provided, with four 500-kVA outdoor transformers and feeder pillar units.

SUBSTATION SITE RENTALS.—The Finance Committee reports the receipt of a request from the Electricity Committee that the annual rental of £15 charged for the use of a substation site at the Hawksley Court estate should be reduced. It is pointed out that an agreement between E.D.A. and the L.C.C. provides for annual rentals of £1 per 100 sq ft of area occupied by the supply authority for substation purposes, and for any area in excess of the first 100 sq ft (£1 maximum) to be charged at the rate of 10s. per 50 sq ft. It is therefore recommended that the Hawksley Court rental should be reduced to £8.

Wimbledon. — THREE-PHASE TRANSMISSION SYSTEM.—The chief engineer has reported that the Electricity Commissioners have now agreed to sanction a loan of £76,510 in lieu of the original application for £87,704 for preliminary work in connection with the introduction of a three-phase transmission system. The engineer has further prepared detailed proposals for the second stage of the scheme, costing £86,461.

TRANSPORT

Newcastle-on-Tyne.—NEW TROLLEY-BUSES. — The City Council is expecting delivery to start tdis month of the first of a number of large trolley-buses 70 ft long and carrying 70 passengers. Plans for changing from trams to trolley-buses on the route to Gosforth await the delivery of new vehicles.

Scotland.—ELECTRIFICATION NOT FAVOURED. —Sir Cyril Hurcomb, chairman of the British Transport Commission, stated in Glasgow that he was not favourably impressed with the idea of electrifying suburban and certain district railways which had long been advocated in the west of Scotland. There were, he said, various possibilities of developing motive power as an alternative to electrifying the railway system. New developments had taken place in the design of diesel-electric and gas turbine locomotives which dispensed with the smoke nuisance and provided an alternative motive power. These were being carefully examined.

RADIO and TELEPHONY

London.—TELEVISION RELAY MAST.—Last October the St. Pancras Borough Council, on amenity grounds, disapproved the erection of a television relay mast on the roof of the Museum Telephone Exchange, Howland Street. The Ministry of Works has since pointed out that the L.C.C. and the Ministry of Town and Country Planning have approved the proposal. The mast, it was added, would form the first link in the London-Birmingham television relay system, plans for which have reached an advanced stage. The General Purposes Committee has therefore recommended the Council to reverse its previous decision.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

E. K. Cole, Ltd.—Trading profits for the year ended 30th September last, including £74,000 received in settlement of certain Government contracts, amounted to £264,666 compared with £160,392 for 1945-46. The net profit, after providing £136,000 (£61,376) for taxation, was £77,322 (£60,516). As already announced, the final ordinary dividend is 14½ per cent, making 22½ per cent for the year (against 20 per cent), and a participating dividend of 3 per cent is again paid on the preferred capital. A sum of £132,613 (£98,005) is carried forward. A consolidated statement shows combined net profits, after tax, of £104,740 (£65,054). The trading profit of Ekco-Ensign Electric (formerly Ensign Lamps) was £71,127 and the net profit £27,418.

Cawnpore Electric Supply Corporation, Ltd.—It is stated that a further payment of £500,000 has been made by the United Provinces Government (in addition to £1,000,000 already paid) on account of the purchase price of the corporation's undertaking. This sum is subject to adjustment when the fair market value of the undertaking at the date of acquisition has been determined. Pending the result of the lawsuit filed against the United Provinces Government the £500,000 has been deposited with the corporation's bankers and is not available to the corporation.

The Renold & Coventry Chain Co., Ltd., states that the financial year of the company and its subsidiaries will in future end nominally on 31st March. The current transitional period from 29th June last will end on 4th April and the directors expect to declare an interim dividend for payment on 30th April and a final one about the end of July.

Aberdare Cables of South Africa, Ltd., reports a net profit for the first trading period from 13th August, 1946, to 30th June, 1947, of £12,777. As we have already reported a dividend of 2½ per cent is recommended and the balance carried forward is £475.

The Cables Investment Trust, Ltd., is again paying an interim dividend of 2 per cent.

New Companies

British Electronic Products (1948), Ltd.—Private company. Registered 20th January. Capital, £15,000. To acquire the business of manufacturers of, and dealers in, electrical and domestic appliances carried on by British Electronic Products, Ltd., in liquidation. Directors: C. F. Jenvey, E. W. Jones, H. W. Mitchell and R. A. Bent. Regd. office: Moxley Road, Bilston, Staffs.

E.M.I. Relays (Hayes), Ltd.—Registered 23rd January. Capital, £10,000. Technical advisers or consultants, electrical and wireless engineers, constructors and maintainers of wireless signal stations, etc. Subscribers: D. I. Greenfield and I. D. Clements. Solicitors: Herbert Smith & Co., 62, London Wall, E.C.2.

Jack Burgess, Ltd.—Registered 21st January. Capital, £5,000. Repairers, wholesalers and retailers of wireless and television sets, service engineers, etc. Directors: J. Hodgson, J. Burgess and W. G. Ellis. Regd. office: 49, Queen Street, Blackpool.

Crosfridge, Ltd.—Registered 19th January. Capital, £2,000. Manufacturers, repairers, agents and dealers in electrical plant, machinery and accessories, wireless and television sets, refrigerators and cold-storage plant and apparatus, etc. W. T. Cross is permanent managing director. Secretary: R. Cross. Regd. office: 11, Calvert Terrace, Swansea.

Electromotive Supplies & Service Co., Ltd.—Registered 8th January. Capital, £500. Manufacturers, repairers and maintainers of, and dealers in, dynamos, motors, etc. Directors: J. B. Murray and F. G. Holmes. Regd. office: 29, Seymour Road, Molesey, Surrey.

Communication Components, Ltd.—Registered in Dublin 20th January. Capital, £20,000. Manufacturers of, dealers in, and agents for, all devices incorporating electronic tubes and apparatus associated therewith, etc. Subscribers: A. Bourke, The Bungalow, Marylands, Castlerea, and D. O. Mayne, 4, Herbert Park, Ballsbridge, Dublin.

Soco, Ltd.—Registered in Dublin 17th January. Capital, £1,000. Manufacturers of, and dealers in, electric lamps, fluorescent tubes and fittings, electric heaters, etc. Subscribers: S. Praberty, 374, Harolds Cross Road, Dublin and R. E. Marks, 58, Leinster Road, Rathmines, Dublin.

Southern Electric Co., Ltd.—Registered in Dublin 17th January. Capital, £1,000. Objects and other particulars are similar to Soco, Ltd.

Increases of Capital

Edison Swan Electric Co., Ltd.—Capital increased by £200,000, in £1 ordinary shares, beyond the registered capital of £432,565 8s.

V. W. C. Jupp & Co., Ltd.—Increased by £3,000, in 2,250 ordinary and 750 5 per cent preference shares of £1, beyond the registered capital of £2,000.

Carlisle Electrical Manufacturing Co., Ltd.—Capital increased by £45,000, in £1 ordinary shares, beyond the registered capital of £5,000. After reorganization the present capital of £50,000 consists entirely of £1 ordinary shares.

Liquidations

Star Electro Carbons, Ltd.—Creditors' meeting on 6th February at 20, Albion Hill, Loughton, Essex, for the purpose of appointing a committee of inspection and to receive an account from Mr. T. Jones, liquidator, of the conduct of the winding-up during the preceding year. This notice refers solely to the old company (in voluntary liquidation).

Lancaster Electric Co. (Enfield), Ltd.—Winding-up order made 19th January. Meetings of creditors and contributories 12th February at Columbia House (4th Floor), Aldwych, W.C.2.

Creditors' Meeting

Union Electrical Co., Ltd.—Meeting of creditors at the Norfolk Arms Hotel, Norfolk Street, Hyde, Ches., on 9th February for the purpose, if thought fit, of nominating a liquidator and of appointing a committee of inspection.

Bankruptcies

A. V. Richardson, radio and electrical engineer, carrying on business at 126, Manningham Lane, and lately carrying on business at John Street Open Market, and 195, Manchester Road, Bradford, under the style of Market Radio & Electrical Supplies.—First and final dividend of 2s. 10¼d. in the £, payable 6th February at the Official Receiver's Office, Hallfield Chambers, 71, Manningham Lane, Bradford.

J. Leivers, residing at and carrying on business at Victoria Radio Stores, 94, Victoria Road, Kirkby-in-Ashfield, Notts, radio electrical engineer.—Application for discharge to be heard on 19th March at the County Court House, St. Peter's Gate, Nottingham.

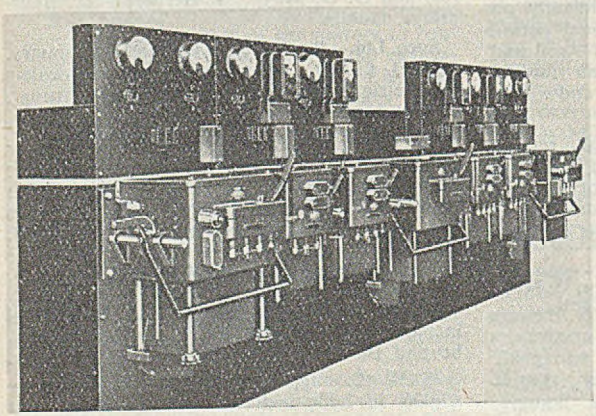
F. W. Bedingfield, carrying on business at 49, High Street, Folkestone, radio and electrical engineer.—Receiving order made 27th January, 1948, on a creditor's petition. First meeting 6th February at the Official Receiver's office, 1, The Parade, Canterbury. Public examination 2nd March at the Sessions House, Longport Street, Canterbury.

C. H. Boot, 39, St. Cuthberts Street, Wells, Somerset, formerly residing and carrying on business at 29, Lyndon Road, Rubery, near Bromsgrove, Worcs, radio and electrical engineer.—Trustee, Mr. R. K. Clark, Somerset House, 37, Temple Street, Birmingham, 2, Official Receiver, released 26th January, 1948.

Manufacturing Progress

Ferguson, Pailin Activities in 1947

FURTHER orders were received during 1947 by FERGUSON, PAILIN, LTD., for 132-kV switching stations incorporating 1,500- and 2,500-MVA oil circuit-breakers for the North of Scotland Hydro-Electric Board and the Central Electricity Board. These embody arc-control devices and resistors shunted across the pots, which result in reduced arc duration and total break time. The shunt resistors also equalize voltage distribution so that, for constant arc current, breaking capacity is proportional to the number of pots in series. The 2,500-MVA breakers are designed to have a maximum total break time of four cycles on a 50-cycle system at all currents up to the maximum on short circuit, and have torsion-bar operating springs instead of the usual helical accelerating springs; as a result of electrostatic shielding, overall dimensions are less than those of the original 1,500-MVA breaker.



Board comprising four KC4 and three KC5 units, incorporating bus section unit

In a new 33-kV, 750-MVA metalclad unit have been incorporated the rapidity of action, low oil content and complete phase segregation of the 1,000- to 1,500-MVA range without sacrificing the advantages of double break and accessibility of contacts; from tappings on condenser type bushings, leads are brought out to allow power-factor testing to be carried out on site.

Industrial switchgear with a breaking capacity of up to 25 MVA at 400 V is in increasing demand. A rayon factory (the atmosphere of which may be polluted by hydrogen sulphide fumes) which is nearing completion is equipped with fifty-three 300- and 1,000-A units. In another rayon factory a 14,000-kW power station feeds twelve substations, and the initial installation will include seventy-three 600- and 1,000-A panels of the same type.

STOCKS AND SHARES

BUSINESS in the Stock Exchange continues to be moderately active. There is a constant change-over from gilt-edged stocks to others, of lower grade, affording a better yield than the 3½ per cent obtainable from most of the British Government securities. This makes, of course, for market activity, and, on the whole, for a rising tendency amongst industrial ordinary and preference shares. Devaluation of the franc, which brought about a sharp fall in the price of British Government stocks last week, has had little further effect, though possibly it contributes to the favour now being shown to industrials. Optimism as to the likely outcome of the Cable & Wireless negotiations led to a brisk rise in the price of the combine's ordinary stock. Indian industrials went back, upon news of the assassination of Mr. Gandhi.

A point fall during the past week in the new 3 per cent British Transport Stock, now 96⅛, illustrates the extent to which confidence in the gilt-edged market has been unsettled by events across the Channel. Little of a definite nature has transpired to account for the setback, which is ascribed rather vaguely to the extra instability introduced into the situation by the currency developments, and to their inflationary possibilities. Talk of a capital levy has not helped confidence, but anxiety on this score appears to be least in the best-informed quarters.

Electricity Supply Shares

As was the case with the Home Railways, compensation stock for holders of electricity supply shares must be issued on terms in line with those prevailing in the gilt-edged market at the time of the take-over. Assuming a strictly fair deal, shareholders are in the position of having no concern with the intervening course of gilt-edged quotations, except in so far as a drop in their prices implies a better rate of interest on the British Electricity Stock. The reverse also applies of course. Railway stockholders apprehended, at first, compensation at 2½ per cent and received, eventually, 3 per cent. Home electricity supply shares are a very firm market, with prices showing no quotable changes since a week ago. The Indian group, Calcutta, Cawnpore, Madras, fell back on fears that Mr. Gandhi's tragic end might cause fresh outbreaks of trouble.

The Week's Price Changes

Few of the changes which have taken place since a week ago in electrical equipment shares are of sufficient consequence to call for comment. In the telephone market, Ericssons have eased to 45s., but Telephone Manufacturing rose to 10s., and Telephone Rentals to 11s. 6d. General Cable put on half-a-crown to 50s., and Walsall Conduits a florin to 54s. 6d. Ever Ready, 40s. 9d., and Falk Stadelmann, 51s. 3d., are also better. On the dull side are Chloride Electrical at 5⅛, Crabtrees 43s. 6d., Westinghouse Brakes 70s. 6d., and some in the radio group, including Cossors at 17s. The slump in Anglo-American Telegraph stocks, caused by the company's unexpected deferment of the dividend due this month, encouraged hardy buyers of the deferred stock, which from 20 recovered to 22½, but went back to about the former figure. The 6 per cent preferred remains an almost nominal market after its 10 point drop to 120. Anglo-Portuguese Telephones strengthened to 21s. 3d.

Thomas Tilling

Thomas Tilling shares dipped from 92s. 6d. to 88s. 6d. upon declaration of the usual dividend of 10 per cent, but rallied within the course of a few minutes to the previous figure. Apparently some of the recent speculative buying had gone for an increase in the dividend. That the latter did not materialize served to bring in a few sellers, who, however, quickly repented of their haste. The company's net profits, after tax, rose by £110,000 to £532,000. The quotation of the shares is governed by what compensation the company may receive from the sale of its transport interests to the British Transport Commission. The price movements in Tillings are being reflected to some extent in those of British Electric Traction deferred stock, which, after a dip to 1,680, recovered to 1,735, showing a fall of 5 points on the week.

Palestine Electricity Supply

Middle East disturbances have lowered the price of Palestine Electric ordinary since last year from 40s. to 32s., and that of Jerusalem Electrics from 26s. 6d. to 21s. 3d. The latter company's interests are confined to the city and the immediate neighbourhood. Palestine Electric owns a hydro-electric power house on the Jordan, and other power stations at Haifa and Tel-Aviv, which distribute power in most parts of the country outside Jerusalem. On a comparative yield basis, the Palestine company's shares are the cheaper. They return 8 per cent gross, against 5⅛ per cent on Jerusalem ordinary. The difference in the sphere of operations would account largely for the discrepancy.

Preference Shares

Lower gilt-edged prices have not brought many preference shares into the market or affected their prices to any great extent. It is still possible to buy without difficulty lines of the Siemens, Parsons and Reyrolle 4 per cent issues at about 23s., the yield of 3½ per cent being 7s. 6d. per cent above the return on British Transport Stock. Of the higher-priced shares, G.E.C. 7½ per cent preference are on offer at 40s. 3s., and Electric Construction "sevens" at 37s. 6d., to yield in each case a few pence under 3¾ per cent. Oldham & Son 5 per cents at 25s. give a round 4 per cent, and Plessey 4½ per cent preference, at 21s. 3d., £4 4s. 9d. per cent.

Next Week's Events

Monday, 9th February

BIRMINGHAM.—Imperial Hotel, 6 p.m. I.E.E. South Midland Installations and Transmission Group. "The High-Pressure Mercury-Vapour Discharge and its Applications," by V. J. Francis and W. R. Stevens.

LONDON.—Savoy Place, W.C.2, 7 p.m. I.E.E. London Students' Section. "Rural Electrification," by K. W. Wardrop.

RUGBY.—Corporation Electricity Showrooms, 6.30 p.m. I.E.E. Rugby Sub-Centre. "Electric Traction on the Southern Railway," by C. M. Cock. (Joint meeting with the Rugby Students' Section).

NEWCASTLE-ON-TYNE.—Neville Hall, Westgate Road, 6.15 p.m. I.E.E. North-Eastern Centre. "The Lightning Strength of Power Transformers," by E. T. Norris.

Tuesday, 10th February

BELFAST.—Queen's University, 6.45 p.m. I.E.E. Northern Ireland Centre. "The Extinction of Arcs in Air-Blast Circuit-Breakers," by A. Allan and D. F. Amer.

CARDIFF.—Reardon-Smith Lecture Theatre, 6 p.m. I.E.E. Western Centre. Faraday Lecture on "Electricity and Everyman," by Dr. P. Dunsheath.

LEEDS.—Corporation Electricity Showrooms, Whitehall Road, 6.30 p.m. I.E.E. North Midland Centre. "Standardization of Switchgear," by D. E. Lambert and J. Christie.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Radio Section. Discussion on "The Maintenance of Television Receivers in the Home." Opened by G. H. Watson.

School of Hygiene and Tropical Meducine, Keppel Street, W.C.1, 6 p.m. Illuminating Engineering Society. "The Lighting of Architecture," by G. G. Baines. (Joint meeting with the Royal Institute of British Architects).

NOTTINGHAM. — Gas Department Lecture Theatre, 6.30 p.m. I.E.E. East Midland Centre. "Speech Communication under Conditions of Deafness or Loud Noise," by Dr. W. G. Radley.

Wednesday, 11th February

ABERDEEN.—Caledonian Hotel, 7.30 p.m. I.E.E. North-East Scotland Sub-Centre. "The British Grid System in War Time," by J. Hacking and J D. Peattie.

BOURNEMOUTH.—The Pavilion, 6.30 p.m. I.E.E. Southern Centre. "Sources of Auxiliary Power," by W. E. Warrilow.

BIRMINGHAM.—Chamber of Commerce, New Street, 6.30 p.m. Association of Supervising Electrical Engineers (Birmingham Branch). "Police Radio," by G. Brown.

BRADFORD. — Midland Hotel, 7.30 p.m. Association of Supervising Electrical Engineers (Bradford Branch). "Refrigeration," by L. L. Emmett.

GLASGOW.—Grosvenor Restaurant, Gordon Street, 8 p.m. I.E.E. Scottish Centre. Buffet dance and visit of President.

LIVERPOOL.—The Temple, Dale Street, 6 p.m. I.E.E. Mersey and North Wales Centre. "Electricity on Ships." by R. G. A. Dimmick. (Joint meeting with the Liverpool Engineering Society).

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Transmission Section. "Centralized Ripple Control on High-Voltage Networks," by T. W. Ross and R. M. A. Smith.

At the Institution of Civil Engineers, Great George Street, S.W.1, 2.30 p.m. Institution of Heating and Ventilating Engineers. Presidential address.

NORTHAMPTON.—College of Technology, St. George's Avenue, 7.15 p.m. Northampton and District Electrical Association. "Electrical Equipment for Hospitals," by W. R. F. Brown.

Thursday, 12th February

BRIGHTON.—Municipal Technical College, 7.30 p.m. Illuminating Engineering Society (Sussex Group). "Photometry and Light Measurement," by J. W. T. Walsh.

DUNDEE.—Royal Hotel, Union Street, 7 p.m. I.E.E. North-East Scotland Sub-Centre. Paper by J. Hacking and J. D. Peattie.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Installations Section. "The Application of Electricity to Horticulture," by C. A. Cameron Brown and E. W. Golding.

WORCESTER.—City Electricity Works, Hylton Road, 7 p.m. Electrical Power Engineers' Association (Midland Technical Group). "Some Aspects of the Nationalization of the Electricity Supply Industry," by A. M. F. Palmer.

Friday, 13th February

BATH.—I.E.E. Bristol Students' Section. "Power Station Efficiency," by T. Thomas.

CARDIFF.—Park Hotel, Park Place, 6.15 for 6.45 p.m. I.E.E. Western Centre. Annual dinner and visit of President.

LONDON.—Connaught Rooms. Great Queen Street, W.C.2. British Electrical and Allied Industries Research Association, 11.30 a.m. Annual meeting. 12.15 for 1 p.m. Buffet luncheon.

Caxton Hall, S.W.1, 6.30 p.m. Electrical Power Engineers' Association (Southern Meter Engineers' Group). Open discussion.

Saturday, 14th February

BARNSLEY.—Association of Mining Electrical and Mechanical Engineers (Yorkshire North-West Branch). "Trailing Cable Fault Location."

MANCHESTER. — Engineers' Club, Albert Square, 2.30 p.m. I.E.E. North-Western Students' Section. "The Place of the Engineer in the Post-War World," by Sir Arthur P. M. Fleming.

ST. ALBANS.—The Peahen Hotel, London Road, 3 p.m. Association of Supervising Electrical Engineers (St. Albans Branch). "Refrigeration as Applied to Industry," by W. Boag.

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.

1941

M-O Valve Co., Ltd., and B. Benjamin (legal representative of M. Benjamin).—"Construction of electric discharge devices, and more especially thermionic valves, having vitreous envelopes." 809. 1st December, 1941. (596967.)

General Electric Co., Ltd., P. E. Ackland-Snow, L. I. Farren and R. S. Rivlin.—"Electrical calculators and predictors for directing anti-aircraft gunfire." 12371. 24th September, 1941. (Cognate application 13625/41.) (597026.)

1943

British Thomson-Houston Co., Ltd.—"Electrical voltage regulators." 14791. 12th September, 1942. (597027.)

1944

British Thomson-Houston Co., Ltd.—Production of insulating coatings on silicon steel." 5604. 29th March, 1943. (596848.)

W. C. Robinette.—"Alternating-current motor control systems." 12971. 16th February, 1943. (597032.)

Nalder Bros. & Thompson, Ltd., and C. L. Lipman.—"Electrical relay arrangements for the automatic control of electrical systems." 13925. 20th July, 1944. (596907.)

Standard Telephones & Cables, Ltd.—"Metal rectifier element." 14010. 23rd July, 1943. (596850.) "Dry contact rectifiers." 14012. 16th July, 1943. (596972.) "Selenium rectifiers and methods of making the same." 14670. 14th August, 1943. (596910.)

General Electric Co., Ltd., M. C. Goodall, R. W. Sutton, C. S. Wright, R. J. Ballantine and E. G. James.—"High-frequency tunable electric circuits." 14229. 25th September, 1944. (Cognate application 24419/45.) (596909.)

W. W. Triggs (Carnegie-Illinois Steel Corportation).—"Control means for electric current regulating systems." 15375. 11th August, 1944. (596853.) "Electric controls." 17119. 7th September, 1944. (596855.) "Means for and method of controlling power output of transformers." 17121. 7th September, 1944. (596857.)

Kodak, Ltd.—"Manufacture of electrical condensers." 15984. 27th August, 1943. (596974.)

Westinghouse Electric International Co.—"Torque producing electro-responsive devices." 17875. 22nd September, 1943. (597088.)

General Electric Co., Ltd., R. L. Breadner and C. H. Simms.—"Methods of, and means for, passing electrical conductors through metal walls." 18126. 22nd September, 1944. (597035.)

Amalgamated Wireless (Australasia), Ltd.—"T.R. switches of the electron discharge types." 21299. 9th February, 1944. (596912.)

1945

Kodak, Ltd. (Eastman Kodak Co., and W. E. Merryman).—"Manufacture of electrical condensers." 198. 3rd January, 1945. (Addition to 596974.) (596979.)

F. R. Borrajo and A. Heidenreich.—"Electric drilling apparatus for earth boring." 340. 4th January, 1945. (596980.)

First Industrial Corporation.—"Snap-action electric switches." 2575. 28th January, 1944. (596981.)

Standard Telephones & Cables, Ltd., and G. P. de Mengel.—"Thermionic valve oscillators." 4600. 23rd February, 1945. (596916.)

J. C. Brown and H. B. Brown.—"Electric theft alarms." 4892. 27th February, 1945. (597041.)

Lumalampan Aktiebolag.—"Electric discharge tubes." 6376. 2nd May, 1944. (597096.)

Westinghouse Electric International Co.—"Electro-magnetic apparatus for measuring torque." 7000. 19th November, 1942. (596983.) "Electric discharge tubes." 9267. 27th April, 1944. (596985.) "Mercury vapour devices." 20185. 25th August, 1944. (596947.)

General Electric Co., Ltd., E. Gallizia and W. G. Thompson.—"Regenerative braking of d.c. motors supplied from a.c. mains." 8448. 5th April, 1945. (596919.)

General Electric Co., Ltd., R. L. Breadner and C. H. Simms.—"Methods of, and means for, passing electrical conductors through metal walls." 8839. 10th April, 1945. (596920.)

J. W. Pletts.—"Circuits for measuring short periods of time." 11199. 2nd May, 1945. (597052.)

Sperry Gyroscope Co., Inc.—"Circuit arrangements for suppressing the carrier in a modulated carrier wave." 11299. 3rd May, 1944. (596877.) "Impedance transformers." 24310. 4th February, 1942. (Divided out of 592119.) (597025.)

Westinghouse Brake & Signal Co., Ltd.—"Remote control systems." 13684. 9th September, 1944. (596994.)

Western Electric Co., Inc.—"Wave guide apparatus for ultra-high-frequency electromagnetic waves." 15051. 16th June, 1944. (596924.)

Union d'Electricité.—"Portable stroboscopic device for checking electric meters." 16980. 15th November, 1940. (Addition to 462104.) (596997.)

S. Smith & Sons (England), Ltd., and W. H. Ruffle.—"Variable electric resistances." 17500. 9th July, 1945. (596998.)

Siemens Bros. & Co., Ltd., and D. P. Long.—"Electric pulse transmission circuits." 19080. 25th July, 1945. (597100.)

Ferguson, Pailin, Ltd., and J. P. Balmforth.—"Means for overload protection of power presses and the like." 19105. 25th July, 1945. (597061.)

Standard Telephones & Cables, Ltd., and C. T. Daly.—"Arrangements for graduating the scales of electrical instruments." 20005. 3rd August, 1945. (596889.)

Standard Telephones & Cables, Ltd.—"Impregnated coils and method of making." 20006. 7th August, 1944. (596890.)

English Electric Co., Ltd., and J. H. Abbink-Spaink.—"Control of engine-driven electric generating plant." 20009. 3rd August, 1945. (596892.)

A. C. Cossor, Ltd., and F. C. Robinson.—"Acoustic reproducers." 20012. 3rd August, 1945. (596893.)

C. A. Parsons & Co., Ltd., Sir Claude D. Gibb and W. D. Horsley.—"Driving means for high speed dynamo-electric machines." 20037. 3rd August, 1945. (597063.)

London Electrical Manufacturing Co., Ltd., and A. H. B. Brodrick.—"Protection of electrical components, including electrical condensers." 20200. 7th August, 1945. (596949.)

Linde Air Products Co.—"Multi-electrode welding." 20238. 20th October, 1944. (596959.)

Kapella, Ltd., and R. E. Reason.—"Electrical measuring apparatus." 20336. 8th August, 1945. (597009.)

Cinch Manufacturing Corporation.—"Holders for thermionic valves and the like." 20461. 16th August, 1944. (597079.) "Holders for thermionic valve and mounting devices therefor." 20462. 16th August, 1944. (597101.) "Shielding devices for thermionic valves and the like." 20463. 16th August, 1944. (597102.)

W. Fiszdon and R. P. N. Jones.—"Cathode ray display systems." 20466. 9th August, 1945. (597081.)

Metropolitan-Vickers Electrical Co., Ltd., G. Cluley and R. M. A. Smith.—"Electrical control and/or signal systems." 20496. 9th August, 1945. (597108.)

General Electric Co., Ltd., and A. A. Chubb.—"Radio signalling systems." 20527. 10th August, 1945. (597114.)

S. C. Harris and B. Gold.—"Means for supporting an electric motor adapted to drive a pulley by an endless chain or belt." 20564. 10th August, 1945. (597122.)

General Electric Co., Ltd., and A. B. Sowter.—"Glass to metal seals." 20626. 10th August, 1945. (597138.)

J. Lucas, Ltd., and J. A. Laird.—"Regulating means for alternating electric current generators." 20628. 10th August, 1945. (597140.)

Amended Specification

586553. Metropolitan-Vickers Electrical Co. Ltd., and another. "Turbines."

Municipal Reports

Ipswich.—Besides the Cliff Quay power station the Electric Supply Department has been engaged during the year on the reconstruction of new primary substations and further progress has been made with the long-term project for establishing a 33-kV radial transmission system. Regarding Cliff Quay, the engineer and manager (Mr. G. A. Vowles) comments that the alteration whereby the C.E.B. is to use overhead transmission and not under-water cables to cross the River Orwell must inevitably delay the effective use of the output from the station. Other activities of the undertaking have included change-over work and the substitution of underground mains for overhead lines in the urban area.

Excluding bulk supplies, 80·6 million kWh was sold compared with 71·5 million in 1945-46, an increase of 12·7 per cent. An additional 1,142 consumers were connected, making 29,826 in all. At the Constantine Road station 52·3 million kWh was generated, an increase of 34·4 per cent. On 3rd January, 1947, a 12,500-kW set was wrecked through blade failure while the machine was being shut down Income from all sources rose by £71,758 to £560,664 and working expenses by £100,842 to £504,031. The net result (loan charges were lower and no income tax was payable) was a profit of £88 against £10,040 for the preceding year.

Preston.—Of the 120·6 million kWh sold in 1943-44 motive power accounted for 53·4 million and the domestic "Home System" tariff for 45·7 million kWh. Since then the balance has changed and last year's total sales of 144·8 million kWh included 36·8 million supplied for motive power with 78·7 million under the domestic tariff. Compared with 1945-46, consumption in the undertaking's area was up by 17 per cent. The number of consumers at 31st March was 51,786 (1,863 more than a year before) and their average annual consumption was 2,849 kWh.

Surveying development in the area, the borough electrical engineer (Mr. G. A. Robertson) says that 40 out of the 41 textile mills are connected to the undertaking's system but there is still a high proportion of potential textile load not taken from the public supply. In the rural area there are 1,056 farms connected out of a possible 1,971. There are 12,264 consumers in the rural area (average consumption 2,917 kWh) and 6,578 cookers are on hire.

During the year 370·1 million kWh was generated (against 348·9 million in 1945-46). Ribble No. 2 station, where two sets were brought into commission during the war, was officially inaugurated by Mr. Shinwell.

Income, at £1,183,459, was up by £147,580, while working expenditure advanced by £162,834 to £1,085,645 and there was a net deficit on the year of £4,231 against a profit of £3,907 in the previous year.

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.

Ashford.—8th March. U.D.C. 150-MVA main switchgear. (See this issue.)

Belfast.—20th February. Electricity Department. Electrical materials. (30th January.)

Birkenhead.—17th February. Electricity Department. Electric lamps for year commencing 1st April next. (30th January.)

Blackpool.—10th February. Electricity Department. Cable drum and transformer trailer. (See this issue.)

Cheadle and Gatley.—16th February. Electricity Department. Cables, lamps, meters, and street lighting standards and fittings for the year ending 31st March, 1949. (23rd January.)

Derbyshire.—25th February. County Council Works Department. Cables, lamps and sundry electrical accessories for the year ending 31st March, 1949. (See this issue.)

Glasgow.—24th February. Public Health Department. Four electric vehicles. (30th January.)

Heston & Isleworth.—25th February. Electricity Department. Supply of goods for the year ending 31st March, 1949. (See this issue.)

Huyton-with-Roby.—16th February. Urban District Council. Electric cables and flexes, lamps, and sundries for one year from 1st April. Surveyor, Council Offices.

Isle of Wight.—7th February. County Council. Applications are invited for permission to tender for heating, hot and cold water and fire-fighting services and electrical services at the County College, Newport, I.W. (30th January.)

Kent.—14th February. County Council. Applications are invited from firms for inclusion in the Council's approved list of contractors for electrical and engineering works. (23rd January.)

Kettering.—1st March. Electricity Department. Transformers. (See this issue.)

Mitcham.—10th February. Town Council. Electric lamps for one year from 1st April. Borough engineer, Town Hall.

Northampton.—25th February. Rural District Council. Electric wiring of 37 permanent houses.—R. J. Miller, Council's architect, 1, Cheyne Walk, Northampton.

Plymouth.—28th February. Electricity Department. Electric motors for generating auxiliaries. (23rd January.)

28th February. Five-ton hand-operated overhead travelling crane. (30th January.)

Plympton St. Mary.—6th March. Electricity Department. Supply, delivery and erection of approximately 18 miles of 6,600 V 0·1 sq in. overhead line. (See this issue.)

Poole.—18th February. Town Council. Electric cables, lamps, etc., for one year from 1st April. Borough engineer, Municipal Buildings.

Ramsgate.—23rd February. Borough Council. Electrical equipment for one year from 1st April, 1948. H. G. Curtis, town clerk, Albion House.

Rhondda.—14th February. Electricity Department. Two 500-kVA transformers. (See this issue.)

Southampton.—17th February. Domestic appliances for the year ending 31st March, 1949. (30th January.)

Orders Placed

Arnold.—Electrical installation in Redhill County School for Notts Education Committee (£1,440).—F. Lamb, Ltd.

Fulham.—Borough Council.—Accepted. Installation of e.h.v. feeders (£14,928) and 6.6-kV ring main feeders to Kingwood Road substation (£5,722).—Aberfren Cable & Construction, Co. Substation switchboard (£1,417).—A. Reyrolle & Co. Three 400-A panels, Barclay Road substation (£1,708).—Ferguson, Pailin.

Manchester.—Electricity Committee. Accepted. Electric water heaters (annual contract). —Hotpoint, Heatrae, Duncan Low, English Electric and Simplex. Diesel-electric locomotive, Carrington.—Stephenson & Hawthorns (sub-contractors for diesel engine, Crossley Bros.). Extension of 33-kV transmission system, Benchill to Cheadle substation.—B.I. Callender's.

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. It must be borne in mind that many of the projects mentioned may be postponed as a result of the Government's suspension of building activities for the time being.

Abram.—Houses (72); H. Allen, surveyor, U.D.C. Offices.

Accrington.—Secondary school; G, Noel Hill, county architect, County Offices, Preston.

Barking.—Extensions for Cle-pol Manufacturing Co., Ltd., West Bank; Stretton & Co., architects, 462, Hoe Street, Walthamstow.

Bath.—Factory and offices, Wood Street; R. A. Harding (Bath), Ltd., 19, Lower Bristol Road.

Bedford.—Houses (40), Shotstown; Air Ministry, Kingsway, London, W.C.2.

Bentley.—Houses (256), Jossey Lane, for U.D.C.; R. N. Penlington, surveyor.

Bishop's Cleeve.—Housing estate for S. Smith & Sons (England), Ltd., Cricklewood Works, London; T. P. Bennett & Son, 43, Bloomsbury Square, W.C.1.

Bolton.—Extensions for Jas. Lever & Sons, Ltd., Delph Street.

Extensions for Joshua Crook & Sons, Ltd., Deave Road Mills.

Bradford.—Civic restaurant, Summerville and Woodhead Roads; city architect

Brighouse.—Extensions to factory for Hellimell & Co., Ltd., Birds Royd Works.

Brixham.—Houses (38); surveyor, U.D.C. Offices.

Burnley.—Factory, Harling Street and White Street; Harling & Todd, Ltd., Rosegrove.

Bury.—Crematorium; J. Chadwick, borough surveyor, 28, Bank Street.

Cheadle.—Houses (38), Blythe Bridge, for Cheadle R.D.C.; J. A. Bailey, builder, Tape Street.

Chesterfield.—Extensions to William Rhodes Council School, Boythorpe (£35,000); Wilcockson & Cutts, architects, 12, Saltergate.

Houses (38), Chatsworth Road; W. S. Wilson, borough surveyor.

Colchester.—Community dwellings, for Aged Trust (Colchester), Ltd.; Duncan, Clark & Beckett, 7, West Stockwell Street.

Cowley.—New office block, Garsington Road; Pressed Steel Co., Ltd., Cowley Road, Oxford.

Durham.—Three new schools in the Jarrow area for the County E.C.; county architect, 34, Old Elvet, Durham.

Ealing.—Block of flats, Kingsbridge Avenue, for Liverpool Victoria Friendly Society; F. Boreham, Son & Wallace, Victoria House, Southampton Row, W.C.1.

Enfield.—New factory for Chase Non-ferrous Metal Co., Ltd., Genotin Road; W. Goodchild & Co., architects, 4, Silver Street.

Felling-on-Tyne.—Houses (50), High Lanes, for the U.D.C.; D. W. Green, housing architect, Council Buildings.

Fife.—Houses for miners (600); county architect, County Buildings, Cupar.

Flint.—School (500 places); W. Griffiths, deputy county architect, Mold.

Gosport.—School, New Elson, for Hampshire C.C.; S. Low, county architect, The Castle, Winchester.

Hebburn.—Houses (38), Lambley Crescent; T. A. Page, Son & Hill, 75, King Street, South Shields.

Hindley.—Junior, infants' and nursery schools for Catholic Authorities of St. Benedict's; Rev. S. D. Young, St. Benedict's Presbytery.

King's Lynn.—Straw pulp mill, near Lynn Docks; Wiggins Teape & Co., Ltd., Mansell Street, E.1.

Leeds.—County primary school, Halton Moor; R. A. H. Livett, City Architect's Department, Leeds, 9.

Manchester.—Factory, Northenden, for John Lee & Co., Ltd.; A. Brocklehurst & Co., architects, 10, Norfolk Street.

Margate.—New factory, Ramsgate Road, for A.B. Metal Products, Ltd.; Shaw & Lloyd, architects, 74, Great Russell Street, London, W.C.1.

Newcastle-on-Tyne.—Hostel for teachers' training college, Montagu estate; education architect, Northumberland Road.

Newton-le-Willows.—Secondary school for Rev. J. R. Meagher, SS. Mary and John, Crow Lane; F. X. Velarde, architect, 3, Abercromby Square, Liverpool.

North Riding.—School, Ormesby, for the C.C.; D. C. Hall, architect, 6, Masons Yard, Duke Street, St. James's, London, S.W.1.

Penrith.—Industrial buildings, Foundry Field site; J. W. Kieser & Son, Victoria Road.

Portsmouth.—Two fire stations (£18,000); borough engineer, Royal Beach Hotel, Southsea.

Reading.—First section of Technical College; Lanchester & Lodge, 10, Woburn Square, W.C.1.

Ripley.—Installation of electric lighting in the Town Hall; W. E. Clark, surveyor.

Rochdale.—Extensions and additions, Mellor Street depot workshops (£32,919); S. H. Morgan, borough surveyor.

Romney Marsh.—Cottages (44) on five sites, for R.D.C.; Jackson & Jackson, architects, 13, North Street, Ashford, Kent.

Shotts (Lanarkshire).—New silk factory, Shottskirk Road; Garvin Paterson & Son, architects, 6, Cadzow Street, Hamilton.

South Elmsall.—Spinning mill, Exchange Street; H. Holdsworth (Wakefield), Ltd., Worsted Spinners, Balne Mills, Wakefield.

Stirling.—Houses (100); burgh surveyor.

Stobswood (Northumberland).—Miners' canteen; R. Carse & Sons, High Street, Amble, Northumberland.

Stockport.—Engineering works; R. McIvor & Son, Ltd., Mottram Street.

Walsall.—Factory and offices, Bott Lane; Joseph Dixon Tool Co., Ltd., Albewell Street.

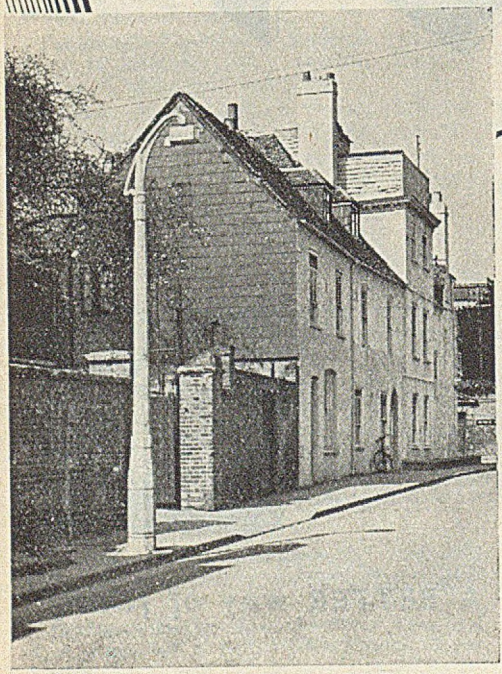
Wellingborough.—Permanent houses (30), Croyland Hall Farm estate; R. Kilby, Council Offices.

West Ham.—Rebuilding of factory, Brydges Road; T. A. Clark (Ilford), Ltd., 2, Rodney Road, Ilford.

Willesden.—Extensions to works; P. B. Sillimanite Co., Ltd., Atlas Road, Victoria Road.

1200 G.E.C. LANTERNS at SALISBURY

For use with Sodium Lamps



For the re-lighting of Group "B" roads in Salisbury, the G.E.C. is supplying 1,200 lanterns. The photograph shows one of these on its concrete column.

This lantern, which is suitable for use with a 45-watt or 60-watt Osram Sodium Lamp, is made of die-cast light alloy, the prismatic refractor plates being sealed so that all glass surfaces are smooth.

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,** subject to space being available, and should be addressed to Classified Advertisement Department, Dorset House, Stamford Street, London, S.E.1.
THE CHARGE for advertisements in this section is 3/- per line (approx. 7 words) per insertion; ***ONLY OFFICIAL AND GOVERNMENT ANNOUNCEMENTS CAN NOW BE DISPLAYED*** :—42/- per inch. Where the advertisement includes a Box Number this counts as two words and there is an additional charge of 1/-.
SITUATIONS WANTED.—Three insertions under this heading can be obtained for the price of two if ordered and prepaid with the first insertion.

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

Original testimonials should not be sent with applications for employment.

OFFICIAL NOTICES, TENDERS, ETC.

BOROUGH OF HESTON AND ISLEWORTH ELECTRICITY DEPARTMENT

Annual Contracts

THE Borough Council invite tenders for the supply of such quantities of the following goods as may be required during the year ending 31st March, 1949:—

(1) Sheet Steel Kiosks.
(2) 600-kVA Transformers with on-load tap changing gear.
(3) E.H.T. and Pilot Cables, L.T. and Service Cables.
(4) Cabtyre and V.I.R. Cables and Flexibles
(5) All Insulated Service Cut-outs.
(6) Cast Iron Service Cut-outs.
(7) Joint Boxes.
(8) Joint Box Compound.
(9) Street Lamp Brackets and Lanterns.
(10) Street Lamp Columns.
(11) Meter Boards.
(12) Insulating Tapes.
(13) Plumbers' Metal.
(14) 11,000-volt Switchgear.

Forms of tender and conditions of contract may be obtained on application to Mr. S. H. Fowles, M.I.E.E., M.I.Mech.E., M.I.B.E., Borough Electrical Engineer and Manager, 11, Staines Road, Hounslow, and tenderers should indicate the goods in respect of which they propose to tender. Additional copies of the specifications and form of tender may be obtained upon payment of a fee of 10s. 6d. per copy (which is not returnable).

Tenders, in plain sealed envelopes endorsed "Tender for Electrical Supplies," must be delivered to me by 12 noon on the 25th February, 1948, and the envelopes must not bear any name or mark indicating the sender. Tenders which do not comply with this requirement will not be considered. The Council do not bind themselves to accept the lowest or any tender, and reserve the right to accept the whole of a tender or any part thereof.

HAROLD SWANN,
Town Clerk.

Council House,
Treaty Road, Hounslow. 1363

BOROUGH OF KETTERING ELECTRICITY DEPT.

TENDERS are invited from British manufacturers for: Specification No. 110.

3 500-kVA, 3-ph. Transformers, ratio 11,000/420 v.
1 500-kVA, 3-ph. Transformers, ratio 6,600/420 v.
1 400-kVA, 3-ph. Transformer, ratio 11,000/420 v.
1 200-kVA, 3-ph. Transformer, ratio 11,000/420 v.
1 200-kVA, 3-ph. Transformer, ratio 6,600/420 v.
1 200-kVA, single-ph. Transformer, ratio 11,000/480-240 v.
1 200-kVA, single-ph. Transformer, ratio 6,600/480-240 v.

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

Tenders must be submitted in a plain sealed envelope, supplied by the Corporation, endorsed "Tender for Specification No. 110," and must be received by me not later than Monday, 1st March, 1948. The Corporation do not bind themselves to accept the lowest or any tender.

J. CHASTON,
Town Clerk.

Town Clerk's Office,
High Street, Kettering.
28th January, 1948. 1388

RHONDDA U.D.C. ELECTRICITY DEPARTMENT

Three-phase Static Transformers

THE Rhondda Urban District Council invite tenders for the supply and delivery of 2 500-kVA. 3-phase, oil-immersed Static Transformers, 11,000/415/240 volts, 50 cycles.

Specification and form of tender may be obtained from Mr. T. R. Evans, M.I.E.E., Electrical Engineer, Electricity Works, Porth, Glam.

Tenders must be addressed and delivered to the undersigned not later than 12 noon on Saturday, 14th February, 1948. No tender will be received except in a plain sealed envelope, which must bear the word "Tender" followed by the subject to which it relates, but shall not bear any name or mark indicating the sender. The Council do not bind themselves to accept the lowest or any tender.

D. J. JONES,
Clerk of the Council.

Council Offices,
Pentre, Rhondda.
27th January, 1948. 1399

ASHFORD URBAN DISTRICT COUNCIL

6.6-kV Switchgear

THE Council invite tenders for the supply and erection of 150-MVA Main Switchgear at the Electricity Works. Specification and conditions of contract may be obtained from Ramsden Mellor, M.I.E.E., Electrical Engineer and Manager, Electricity Works, Victoria Road, Ashford, Kent. A deposit of £2 2s. will be required, but is returnable on receipt of a bona fide tender.

Tenders, in plain sealed envelopes marked "Ashford U.D.C., Tender for 6.6-kV Switchgear" in left-hand corner, must be delivered not later than 8th March, 1948, to the undersigned. The Council do not bind themselves to accept the lowest or any tender.

J. SUDLOW.
Clerk to the Council.

Council Offices,
The Cedars, Church Road,
Ashford, Kent. 1424

COUNTY BOROUGH OF BLACKPOOL ELECTRICITY DEPARTMENT

TENDERS are invited for the supply and delivery of the following: One Four-wheel Cable Drum and Transformer Trailer, to carry loads up to 8 tons.

Specification, conditions and forms of tender may be obtained from the Borough Electrical Engineer, Shannon Street, Blackpool.

Completed tenders, in sealed envelopes marked "Tender for Trailer," must be delivered to the undersigned not later than 10 a.m. on Tuesday, 10th February. The Corporation do not bind themselves to accept the lowest or any tender.

T. TREVOR JONES,
Town Clerk.

Town Hall, Blackpool.
23rd January, 1948. 1387

DERBYSHIRE COUNTY COUNCIL WORKS DEPT.

TENDERS are invited for supplies of Cables, Lamps and Sundry Electrical Accessories during the year ending 31st March, 1949. Applications to tender must be forwarded to the County Architect, St. Mary's Gate, Derby, before 14th February, 1948. No tender will be received except in a sealed envelope. Tenders must reach the undersigned before 10 a.m. on 25th February, 1948. The Council do not bind themselves to accept the lowest or any tender and reserve the right to accept the whole or such portion of any tender as they may think fit to select.

H. WILFRID SKINNER,
Clerk of the Council.

County Offices,
Derby. 1400

PLYMPTON ST. MARY RURAL DISTRICT COUNCIL
ELECTRICITY UNDERTAKING

THE above Council invite tenders for the supply, delivery and erection of approximately 18 miles of 6,600-volt .1 sq. in. Overhead Line. Route plans and survey details may be inspected at the offices of the Electrical Engineer.

Forms of tender and specification may be obtained from me, the undersigned. The person whose tender is accepted shall, when required, enter into a formal contract with the Council with bond (with two sureties) for the due performance thereof, such contract and bond to be prepared by the Clerk to the Council, but the written acceptance by the Council of the tender is to constitute a binding agreement in that behalf.

Sealed tenders, endorsed "6,600-volt Overhead Line," to be delivered at my office not later than the 6th March, 1948. The Council do not bind themselves to accept the lowest or any tender.

PERCY T. LOOSEMORE.
Clerk to the Council.

Council Offices, Plympton.
26th January, 1948. 1362

SITUATIONS VACANT

Vacancies advertised are restricted to persons or employments excepted from the provisions of the Control of Engagement Order, 1947.

BRITISH ELECTRICITY AUTHORITY

Senior Appointments at Headquarters

IN response to their earlier advertisements in connection with the appointment of Divisional Controllers and other senior staff in the Generation Divisions, the Central Authority have received a large number of applications which appear to cover the field of all who are likely to be interested in the chief positions in connection with Generation and Transmission.

The Authority are now proceeding with the appointment of the senior staff in the Generation Divisions with which most of the applications are concerned. They will also shortly be making parallel appointments at Headquarters.

The purpose of this advertisement is to invite any who may be interested in the senior appointments concerned with Generation and Transmission at the Headquarters of the Authority, but who have not made application in response to the previous advertisements, to forward in the immediate future to the Director of Establishments at the address below, details of their qualifications and experience, in order that their cases may be duly considered. All who have sent in applications for any of the appointments in the Generation Divisions will be automatically considered for the parallel appointments at Headquarters.

The salary ranges, as is the case with all those advertised hitherto, are regarded as provisional until final scales have been negotiated with such organisations as are appropriate.

British Electricity House,
Great Portland Street, London, W.1. 1425

ADWICK-LE-STREET URBAN DISTRICT COUNCIL

Appointment of Electrical Engineer and Manager

APPLICATIONS are invited for the appointment of Electrical Engineer and Manager. Salary in accordance with agreement respecting salaries of Electrical Engineers made by the National Joint Council of Local Authorities and Chief Electrical Engineers for the Electricity Supply Industry, commencing at 85% of schedule for first year, 92½% for second year, rising to full salary at commencement of third year. Present full scale salary £550, plus temporary cost-of-living bonus (at present £59 16s.) and car allowance.

Candidates must be fully qualified Electrical Engineers and have had practical experience in the administration and management of an electricity supply undertaking.

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

Closing date for receipt of applications, 10th February, 1948. Applications, on the prescribed form, with copies of not more than three testimonials, to be forwarded in a sealed envelope, endorsed "Electrical Engineer and Manager," to the undersigned.

C. R. MARSHALL,
Clerk of the Council.

Council Offices,
Adwick-le-Street, Nr. Doncaster. 1390

METROPOLITAN BOROUGH OF ISLINGTON
ELECTRICITY DEPARTMENT

Appointment of Showroom Assistant

(Published by permission of the Ministry of Labour and National Service under the Control of Engagement Order, 1947.)

APPLICATIONS are invited from persons of not less than 21 years of age for the position of Showroom and Sales Assistant (male or female).

The salary will be in accordance with the Clerical Division of the National Joint Council Scales of Salaries, namely, £335 per annum rising to £380 per annum (inclusive of London Weighting) plus temporary cost-of-living bonus at present £59 16s. per annum in the case of males, and £268 per annum rising to £304 per annum (inclusive of London Weighting) plus temporary cost-of-living bonus at present £48 2s. in the case of females.

Candidates will be required to possess experience of all aspects of enquiry bureau and general showroom duties and also, should be well acquainted with the electricity supply industry. Experience in display work is desirable and the holding of an Electrical Development Association Salesmanship Diploma will be an advantage.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and to satisfactorily passing a medical examination. Candidates are required to disclose in writing whether to their knowledge they are related to any member of or holder of any senior office under the Council. Canvassing either directly or indirectly will be a disqualification. The Council are unable to make any arrangements for the provision of housing accommodation for the successful candidate.

Applications, stating age, qualifications and experience, accompanied by copies of not less than two recent testimonials, should be enclosed in an envelope clearly marked "Showroom Assistant," and forwarded to the Engineer and General Manager, Electricity Department, 341/343 Holloway Road, N.7, not later than 19th February, 1948.

H. DIXON CLARK,
Town Clerk.

Town Hall,
Upper Street, N.1. 1429

CITY OF GLOUCESTER ELECTRICITY DEPT.

Electrical Housecraft Adviser and Demonstrator

APPLICATIONS are invited for the above appointment at a salary of £330 per annum rising by annual increments of £15 to £375 per annum plus cost-of-living bonus, at present £48 2s.

Candidates must have had a good general education, and the possession of a recognised Diploma in Domestic Science and Electrical Housecraft will be an advantage. Candidates must be able to conduct lecture-demonstrations both in the showrooms and on consumers' premises, and to advise consumers on the selection and use of electrical apparatus. The appointment will be subject to the National Joint Council Conditions of Service and to the provisions of the Local Government Superannuation Act, 1937. The successful candidate will be required to pass a medical examination.

Applications for the above appointment, stating age, details of training and subsequent experience, together with copies of three recent testimonials, must reach the undersigned not later than the first post on Monday, 16th February, 1948. Canvassing in any form will disqualify.

EMIL BRAATHEN,
Chief Engineer and General Manager.

Electricity Department,
Commercial Road,
Gloucester. 1313

COUNTY BOROUGH OF GREAT YARMOUTH
ELECTRICITY SUPPLY DEPARTMENT

APPLICATIONS are invited for the appointment of Shift Charge Engineer at South Denes Generating Station. The undertaking is at present in Class G, N.J.B. Scnedule, with the possibility of an early alteration to Class H.

Applicants should have experience in the operation of generating stations. Salary will be in accordance with Class G, Grade 8, N.J.B. Schedule.

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

Full particulars, stating age, training and past experience, should be forwarded, in a suitably endorsed envelope, to the undersigned not later than the 9th February, 1948. Canvassing, either directly or indirectly, will be deemed a disqualification.

FARRA CONWAY,
Town Clerk.

Town Hall, Great Yarmouth.
26th January, 1948. 1417

BOROUGH OF DARWEN ELECTRICITY DEPT.

APPLICATIONS are invited for the following appointments:—

MAINS ASSISTANT. Salary and conditions in accordance with the N.J.B. Schedule, Class D, Grade 7 (commencing at £120 per annum). Applicants, who should preferably be Corporate or Graduate Members of the Institution of Electrical Engineers, must have had a sound technical and practical experience in the construction, operation and maintenance of E.H.T. and L.T. distribution systems. Some experience in D.C. to A.C. changeover will be an added recommendation.

SHIFT ENGINEER. Salary and conditions in accordance with the N.J.B. Schedule, Class B, Grade 8 (commencing at £354 per annum). Applicants must have had a good technical training and experience in the operation of turbo-alternators and associated plant, rotary convertors, E.H.T. and L.T. switchgear.

CABLE JOINTER, CLASS I. Wages and conditions in accordance with N.J.I.C. No. 3 District Council, present rate 31.25d. per hour. Applicants must have had experience in E.H.T. and L.T. jointing, feeder pillars, network boxes and substation boards.

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

Applications, suitably endorsed, and giving full particulars of age, training and experience, together with copies of three testimonials, should reach the undersigned by 21st February, 1948.

A. WATSON, A.M.I.E.E.,
Electricity Works, Borough Electrical Engineer.
Robin Bank, Darwen. 1389

SURREY COUNTY COUNCIL

County Architect's Department

APPLICATIONS are invited for the following appointment: Assistant Maintenance Engineer, Grade VI. Commencing salary £535, rising by annual increments of £20/£25 to a maximum of £600 per annum, plus London allowance of £20, together with cost-of-living bonus at present £59 16s. per annum.

Applicants should be Corporate Members of the Institution of Mechanical Engineers and/or Institution of Heating and Ventilating Engineers, and should be experienced in the preparation of specifications, drawings and estimates for the maintenance of heating, ventilating and hot water supplies, and the engineering equipment of large buildings.

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

Applications, stating age, qualifications and experience, and accompanied by copies of three recent testimonials, should be sent to the County Architect, Surrey County Council, County Hall, Kingston-upon-Thames, not later than the 21st February, 1948. Canvassing, either directly or indirectly, will disqualify a candidate from consideration. The Council will be unable to provide any housing accommodation, and the successful applicant will be expected to make his own arrangements in this direction.

DUDLEY AUKLAND,
County Hall, Clerk of the Council.
Kingston-upon-Thames. 1418

CITY OF LANCASTER ELECTRICITY DEPT.

Assistant Shift Charge Engineer

APPLICATIONS are invited for an Assistant Shift Charge Engineer at Caton Road Generating Station. Salary in accordance with N.J.B. Schedule, at present Grade 9, Class H, £402 per annum.

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

Experience of operation of large boilers and general power station operation desirable. Applications, stating age, qualifications and particulars of training and experience, also probable date on which duties can be taken up, together with copies of two testimonials, should be addressed to the City Electrical Engineer, Electricity, North Road, Lancaster, not later than Monday, February 16th, 1948. Canvassing either directly or indirectly will disqualify the applicant.

(This advertisement appears with the permission of the Ministry of Labour and National Service under the Control of Engagement Order, 1947.)

R. M. MIDDLETON,
Town Hall, Lancaster. Town Clerk.
31st January, 1948. 1427

COUNTY BOROUGH OF SWANSEA ELECTRICITY DEPARTMENT

Appointment of Junior Power Station Engineers

APPLICATIONS are invited from men not over the age of 45 years, unless at present in the employ of a local authority, for two vacancies as Junior Engineers at Tir John Power Station at a salary corresponding to Grade J.10 of the N.J.B. Schedule, at present £355-£371 per annum. The persons appointed must be prepared, if called upon, to accept shift duties.

Candidates must hold the Higher National Certificate, or other similar qualifications, and have secured passes in some electrical subjects, and should have sound technical and practical experience in electrical and/or mechanical engineering.

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

Applications, stating age, qualifications, training and experience, together with copies of not more than two recent testimonials, must reach the undersigned not later than Saturday, 21st February, 1948. Canvassing, either directly or indirectly, will be a disqualification.

T. B. BOWEN,
Guildhall, Swansea. Town Clerk.
February, 1948. 1401

BOROUGH OF SWINDON

Appointment of Power Station Chemist

APPLICATIONS are invited for the position of Power Station Chemist at the Moredon Power Station of the above Authority's Electricity Undertaking.

Applicants should possess a suitable qualification in chemistry and have had practical experience in the chemical laboratory of a modern power station with high-pressure boiler plant. Salary and conditions of employment will be in accordance with the National Joint Board Agreement, Class G, Grade 8, at present £467 rising to £476 per annum.

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

Applications, stating age, training, qualifications, experience and present appointment, accompanied by copies of three testimonials and endorsed "Power Station Chemist," must reach the undersigned not later than first post on Saturday, the 21st February, 1948. Canvassing in any form will be deemed a disqualification, and applicants must state whether to their knowledge they are related to any member of the Council or to any senior officer of the Corporation.

D. MURRAY JOHN, Town Clerk.
Civic Offices, Swindon. 1392

SALISBURY, SOUTHERN RHODESIA

Vacancies in the City Council's Electricity Department

(A) Assistant City Electrical Engineer, on the grade £950 × £40 to £1,150, plus cost of living.

(B) Chief Distribution Engineer, on the grade £780 × £24 to £900, plus cost of living.

All applicants who are interested should write to the undersigned, who will forward full details of qualifications and experience required, and the general conditions, leave, cost-of-living allowances, travelling expenses, etc.

Applications for the posts should reach the undersigned not later than 27th February, 1948.

DAVIS & SOPER LTD.,
52-54, St. Mary Axe, (Southern Rhodesia)
London, E.C.3.
19th January, 1948. 1253

THE WIGTOWNSHIRE ELECTRICITY CO. LTD.

APPLICATIONS are invited for the following appointment: Mains Assistant. Salary in accordance with N.J.B. Schedule, Grade 8a, Class E, at present £387 per annum. Applicants must have had a sound technical training, together with practical experience in the installation and operation of H.T. and L.T. overhead and underground distribution systems in a rural area.

Applications, giving age, details of training and experience, together with copies of not more than three recent testimonials, should be forwarded to the Resident Engineer and Manager, Electric House, George Street, Stranraer.

(This advertisement is published by permission of the Ministry of Labour and National Service under the Control of Engagement Order, 1947.) 1356

CORPORATION OF PAISLEY ELECTRICITY AND PUBLIC LIGHTING DEPARTMENT

Mains Superintendent

APPLICATIONS are invited for the above appointment from qualified engineers at a salary in accordance with N.J.B. Schedule, Class G, Grade 4, at present £630 per annum.

Applicants must have sound technical and practical training and experience of E.H.T. and L.T. distribution, substation equipment, protective gear, fault localisation, the control of staff and workmen, the preparation of estimates for mains extensions, etc. Experience in change of system and voltage is desirable. Candidates should be Corporate Members of the Institution of Electrical Engineers.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1922, and the successful candidate will require to pass a medical examination.

Applications, stating age and full particulars of experience and appointments, together with copies of three recent testimonials, to reach the undersigned not later than 17th February, 1948, endorsed "Mains Superintendent."

JOHN P. MORRISON,
Town Clerk.

Municipal Buildings, Paisley.
19th January, 1948. 1298

CENTRAL SUSSEX ELECTRICITY LIMITED AND ASSOCIATED COMPANIES

APPLICATIONS are invited for the following positions: ENGINEERING ASSISTANT. Candidates must have a sound experience in the construction of high and low tension overhead lines, laying of underground cables, equipping of substations and be capable of maintaining, testing and operating such networks. Salary £573 per annum. N.J.B. Schedule, Class G, Grade 5.

ENGINEERING ASSISTANT. Candidates must have technical knowledge in the preparation of schemes for high and low tension overhead and underground extensions, including substations, and must have experience in testing and operating such networks. Salary £408 per annum. N.J.B. Schedule, Class G, Grade 8b.

DRAUGHTSMAN. Candidates must have experience in the preparation of plans and drawings pertaining to a Supply Undertaking including the recording of overhead lines and underground mains on site. Salary according to qualifications.

Applications to be sent in not later than the 18th February, 1948, to—H. Dixon, M.I.E.E., Chief Engineer and Joint General Manager, Electra House, Church Road, Haywards Heath, Sussex. 1428

MARGATE, BROADSTAIRS AND DISTRICT ELECTRICITY BOARD

Appointment of Change-over Engineer

APPLICATIONS are invited for the above position. The duties would include responsibility to a departmental head for the organising of all work, including purchase of materials, on the consumers' side of the main fuses for system change-over from D.C. to A.C. There are some 14,000 D.C. consumers involved. Knowledge of radio conversion is essential. On completion of the change-over the person appointed would be absorbed into the undertaking.

The salary payable would be Class E, Grade 6, at present £478 per annum. The appointment is subject to the provisions of the Local Government Superannuation Act, 1937, and to medical examination.

Applications, on a form to be obtained from me, should be completed and returned on or before Wednesday, 18th February, 1948.

C. CAMERON KIRBY,
Engineer and Manager,

Power Station, St. Peter's,
Broadstairs, Kent. 1255

LONDON COUNTY COUNCIL

TECHNICAL Assistants required in Chief Engineer's Department for work on the installation and maintenance of electrical wiring and equipment in buildings of all types. Applicants should have Higher National Certificate in Electrical Engineering, or its equivalent. Salary up to £580 per annum according to qualifications and experience. Selected candidates will be subject to the provisions of the Local Government Superannuation Act, 1937.

Application forms, obtainable by sending stamped addressed foolscap envelope to the Chief Engineer (47/15), County Hall, Westminster Bridge, S.E.1, returnable with copies of three recent testimonials not later than 14 days after the publication of this advertisement. Canvassing disqualifies. (276) 1391

BEDFORD CORPORATION ELECTRICITY UNDERTAKING

Switchboard Attendant

APPLICATIONS are invited for the position of Switchboard Attendant at the Council's Selected Generating Station, in accordance with the N.J.I.C. Conditions of Employment at the rate of 2s. 11½d. per hour.

Applications, stating age, giving particulars of training and experience, together with copies of recent testimonials, should be forwarded to the undersigned, suitably endorsed, not later than the 27th February, 1948.

P. G. CAMPLING,
Chief Engineer and General Manager.

Electricity Offices,
Prebend St., Bedford,
30th January, 1948. 1426

A well-established firm in N.W. area require Draughtsman with previous experience of domestic electric appliances, including cookers. Position offers excellent prospects to man with initiative and ability. Reply stating age, previous experience and salary required.—Box 1231.

ARMATURE Winder, first-class man, experienced all types, to take charge winding department. Excellent wages and prospects for suitable applicant.—The Priory Electric Service (Coventry) Ltd., 3, Lower Ford St., Coventry. 1430

ARMATURE Winder for A.C. & D.C. repairs and maintenance work. Good working conditions.—Abington Electric Supplies, 118, Colwyn Rd., Northampton. 1394

ARMATURE Winders with good general experience on A.C. and D.C. machines up to 500 h.p. Good working conditions, top rates of pay. Apply—The Nelson Engineering Co. Ltd., Netherfield Rd., Nelson. 1435

ASSISTANT, capable of surveying, estimating and supervising all classes of industrial and domestic installations to work with Managing director of an old-established company of electrical contractors in Cardiff. Age 25/35. Permanent and progressive post for suitable applicant. Applications, stating age, qualifications, experience, salary required and personal references which will be treated as confidential, to—Box 1431.

ASSISTANT Manager for progressive firm of motor manufacturers; must have thorough knowledge of electric motors, be able to maintain production and control labour. Apply, giving full details of experience and positions held, to—Box 1127.

BULL Motors (E. R. & F. Turner Ltd.) invite applications for appointment as Sales Manager to be responsible for all sales activities. This is an important executive position and holds excellent prospects for a gentleman with sound knowledge of both home and oversens markets. Applications, which will be treated in confidence, should give full information as to qualifications and experience, salary required, positions held (past and present), and be sent to—The Secretary, E.R. & F.Turner Ltd. Ipswich. 1260

CABLE Jointers, by Drake & Gorham, for maintenance contracts in area comprising South and South-West England. Applicants must be experienced in working on cables up to 11 kV and capable of erecting switchgear and taking charge of jobs. Must be prepared to travel. Apply to Area Engineer, 3 Richmond Rd., Plymouth. 1433

CHEMIST, with B.Sc., A.R.I.C., Higher National Certificate or equivalent qualifications, required for chemical and physical testing of materials used in cable manufacture. Experience of spectrographic analysis desirable. Age not more than 30. Salary according to qualifications and experience.—Box 1432.

C. M. Churchouse Ltd. require experienced Representative with drive and initiative and a wide knowledge of the electric light fittings trade. Excellent prospects and remuneration to suitable applicant. Write in confidence, stating age, married or single, experience and type of connection, and when free, to—Secretary, C. M. Churchouse Ltd., Clarendon Works, Clarendon Cross, London, W.11. 1055

COMPETENT Shorthand Typist for electrical manufacturers' office, W.C. district, 5-day week, canteen facilities, salary approx. £6 according to age, ability and experience.—Box 1396.

CONTRACTING, Small West End business established many years offers permanent situation to serious worker, age 30-40 (view to early partnership without investment).—Box 7269.

COSTING and Estimating Clerk, by non-association rubber cable makers, Southern England. Applications to—Box 1132.

DRAUGHTSMAN with initiative for the design and detail of electric clocks. Experience in tool design, cam layout and production detailing an advantage. N.E. Coast. Reply, giving full particulars of age, experience and salary required, to—Box 1403.

DESIGNS Draughtsman, with knowledge of elect. switch and motor control gear. Capable of developing ideas. Write stating age, experience and salary required.—M.E.M. Co. Ltd., Reddings Lane, Tyseley, Birmingham, 11. 1366

DRAUGHTSMAN with experience in light mechanical engineering; some knowledge of light gauge sheet metal work required. Apply—Personnel Department, G.E.C., Union Works, North Wembley. 1385

DRAUGHTSMAN with experience of transformer manufacture required for a position where initiative and energy will be rewarded. Apply, stating age, experience, salary, to — Brentford Transformers Ltd., Kidbrooke, London, S.E.3. 1131

ELECTRICAL Engineer required as Designer by company manufacturing electrical and mechanical equipment used in conjunction with internal combustion engines. Salary according to qualifications, experience.—Box 1272.

ELECTRICAL Engineer with good general education, having technical and commercial experience, wanted, aged 30-38. Suitable applicant, after short training period in South of England, will have opportunity of taking over northern area branch office of electrical switchgear specialists. Full details to—Box 1257.

ELECTRICAL engineering manufacturers in the Midlands have a limited number of vacancies for Junior and Senior Engineers, with professional qualifications in electrical or mechanical engineering for tendering contracts and design work in relation to switchgear, rotating machines and transformers. Applications should be made, quoting ref. 85, and stating age, qualifications, experience and salary required, to—Box 24.

ELECTRICIAN for London contractor, must have thorough knowledge of trade. Good prospects to live man. Write, stating age and experience, to—Box 1232.

ELECTRICIAN. Good opportunity for capable man of high intelligence and integrity, desiring responsible position in small, soundly established London business. State age and full details of experience.—Box 7308.

ELECTRICIANS, by old-established contractor in Melbourne, Australia; must be experienced in industrial and domestic installations, thoroughly proficient, and not more than say 30 years of age. The passage of emigrants would be expedited if they have relatives who could provide them with board residence. Commencing wage is £8 1s. per 40-hour week. Applicants should supply full details of experience, enclose copies of references, and state if they require Government assistance towards cost of passage.—L. R. W. Moss Pty. Ltd., 12, Bank Place, Melbourne, Australia. 1367

ELECTRICIANS, D.J.I.C. conditions and rate, with experience of domestic and business installations. Apply, with full details of apprenticeship, training and experience, to the East Anglian Electric Supply Co. Ltd. (L.R.S.), Finborough Hall, Stowmarket, Suffolk. 1436

EXECUTIVE Works Manager, by electrical and mechanical equipment manufacturers in Cheshire. Permanent progressive post for man able to assume complete control of works comprising ten departments, predominantly assembly of components and equipment, metal plating, spraying, machine shop, etc. Applicant must be of proved organising ability, with imagination and drive and experience of control in similar industry. High remuneration, outstanding prospects. Write full details, age, experience, etc.—Box 226, Phillips Advertising, Thanet House, Craven Road, London, W.2. 1386

EXPERIENCED Overhead Transmission Line Steel Erectors for several years' work in Midlands—Box 7250

EXPERIENCED Transformer Draughtsmen for all sizes of transformers and associated equipment, for employment in office, Central London. Security and prospects for suitable men. Apply—Central Personnel Services, English Electric Co., Queens House, Kingsway, W.C.2. 1419

FILAMENT Designer, by non-combine lamp factory operating in the London area. Must be able to design filaments for all types of vacuum and gas-filled lamps. Knowledge of spiralizing machines essential. State experience and wage required.—Box 195.

FOREMAN for electric cable works. Must have sound working experience in the running of cable plant both for rubber and P.V.C.—Box 1365.

LEADING firm of mechanical engineers in Birmingham area require an Electrical Engineer to assist in the application and standardisation of electric drive and control to their products. Age 22/30. Grad. I.E.E. minimum. Sound electrical apprenticeship with test and D.O. experience, including preparation of control schemes. Some experience electronic control desirable. Send full details to—Box 1333.

LOUDSPEAKER Engineers (additional to present staff) to carry out research and development work. Apply in writing, giving full details of experience, education, age and salary required.—Goodmans Industries Ltd., Lancelot Road, Wembley, Middx. 1271

LONDON Power Co. Ltd. Control Room Assistants are required for the operation of E.H.T. switchgear. Applicants must possess good technical qualifications and have previous experience of this class of work. Wages in accordance with the N.J.I.C. Schedule (over 50,000 kW), 35.75d. per hour inclusive of shift rate. Successful applicants will be required to pass the company's doctor. Applications to be addressed to—The Chief Executive Officer, London Power Co. Ltd., Ergon House, Horseferry Road, Westminster, S.W.1. 1334

LONDON Power Co. Ltd.: Auxiliary Switchboard Attendant for works power board. Applicants should possess good technical qualifications and be familiar with the operation of H.T. and L.T. switchboards. Salary in accordance with the N.J.B. Schedule, Class M, Grade 10b. The successful candidate will be required to pass a medical examination and join the company's pension scheme, for which a salary deduction of 5% per annum will be made. Applications submitting full particulars, stating age and experience, to be addressed to the Chief Executive Officer, London Power Co. Ltd., Ergon House, Horseferry Road, Westminster, S.W.1. 1256

MANUFACTURERS of wooden electric light switch blocks, boxes, etc., with increasing output, seeks representative with connection among wholesalers. Midland area. Commission basis.—Box 1107.

NORTHERN manufacturing electrical engineers with good sales organisation (200 employees) require General Manager. Applications only considered from disciplinarian, with proved ability and at present holding similar position. Good salary to right man.—Box 1227.

OIL company in Trinidad requires practical Electrical Engineer for supervision of general maintenance work, age 25-35, with full apprenticeship and/or degree, plus practical experience, with corporate membership of the Institution of Electrical Engineers. Experience should preferably be of a general industrial nature, including A.C. motors, power plant work, underground distribution up to 6.6 kV, and oil-immersed and air break automatic switchgear up to 2.3 kV. Administrative and cost control experience very desirable. Salary range £500-£700, plus cost-of-living allowances. Reply with full particulars to —Box 1364.

PRODUCTION Engineer-Manager, by leading electrical manufacturers. Must have extensive first-class practical experience of modern methods of manufacture. This is a senior appointment and involves the control of methods planning, jig and tool design, press tool design, tool room and production development. Applications will only be considered from fully established and qualified production engineers who have held a similar appointment with leading manufacturers over a number of years, and who can produce sound evidence of success in achieving high-class economical production. State age, experience and salary required to—Box 969.

QUALIFIED Electrician for maintenance and extension of paper mill, London, E.17. Applicant must be conversant with maintenance and installation A.C. and D.C. plant and will be trained to our special requirements by the resident electrical engineer. Excellent prospects. Please state age, qualifications, salary required, and previous experience.—Box 1357.

REPRESENTATIVES for manufacturers of fluorescent fittings and control gear for London and the Home Counties. Car essential. Good salary, expenses and commission. Only first-class candidates with sound connections considered. Apply—Croft Electrical Co., 5, Middleton Buildings, Langham St., W.1. Tel. Museum 9941. 1262

REPRESENTATIVES for Sussex, Hants, Surrey. Good commission.—Box 1338.

REPRESENTATIVES on high commission basis, having good connections with the electrical trade, by reputable London wholesale firm. Write giving references—Box 1229.

REQUIRED, by large wholesale electrical company, Assistant to deal with enquiries and correspondence. Must have knowledge of the trade. Reply stating age, experience and salary required.—Box 1402.

REQUIRED by Montague L. Meyer Ltd., Timber Importers, 14, Buckingham St., London, W.C.2, first-class Electrical Engineer to reside in London for maintenance at main sawmill, visiting provincial branches. 1214

SALES Representative with established connection among contractors, works, supply authorities, etc., by London firm of electrical motor repairers. Write, stating age, experience, territory covered, and salary and/or commission required. 1395

SUPERVISING Engineer with estimating experience for South Wales office of electrical contracting organisation. Reply stating age, experience, salary required.—Box 7296.

SWITCHGEAR Designer for modern output, preferably with mechanical engineering experience; also General Switchgear Designer. Apply, stating age, experience and salary required, to—Box 1322.

ROYAL Air Force, Education Branch: Permanent Commissions. Applications are invited for a number of appointments to Permanent Commissions. Age limits 23 to 33 (the upper limit may be raised for war service). Candidates should ordinarily have a first or second class honours degree and some teaching experience. Engineering, science and mathematics are the subjects mainly required, but appointments will also be offered to men with qualifications in teaching method, history, geography, etc. Pay on appointment varies according to qualifications, educational or industrial experience, and war service in H.M. Forces. As an example, a man aged 25 may draw pay at the rate of £310, £347 or £420 a year on entry according to individual qualifications and experience, while an older candidate could draw correspondingly higher rates if he had war service. In addition to pay, single men receive free furnished accommodation; married men receive a marriage allowance of £228 a year. Rations are provided in kind or a tax free allowance of £57 a year paid in lieu. There is time promotion to squadron leader, and in this rank basic pay with marriage allowance rises to £1,004 per annum. Promotion beyond squadron leader is by selection. Retired pay varies with rank (e.g., £475 for squadron leader, £625 for wing commander, etc.). Short Service Commissions: A considerable number of vacancies exist for education officers on Short Service Commissions of five years. Candidates should be not less than 21 years of age and should have a university degree or be otherwise entitled to recognition as qualified teachers. Teaching or other suitable experience is an added qualification. Pay on appointment and allowances are on the same basis as for permanent commissions. In addition, a gratuity is payable on completion of five years' service. Opportunities will arise for appointment to permanent commissions during the tenure of the short service commission for officers with high academic qualifications. Completed application forms should reach the Air Ministry as early as possible, and candidates for permanent commissions should state whether they wish to be considered also for short service commissions. Full details and application forms from Air Ministry, A.R.1, Kingsway, London, W.C.2. 812

STOREKEEPER for manufacturing electrical engineers, Manchester district. Only experienced men with full knowledge of stock control, issue and storage, incoming goods, etc., need apply. Good prospects for right man. State age, experience, in confidence, when at liberty, salary.—Box 1134.

TEST Room. Testers and Calibrators, preferably with technical and practical experience in the handling of electrical measuring instruments. State in detail, experience, age and salary required.—Everett, Edgcumbe & Co. Ltd., Colindale Works, Hendon, N.W.9. 1434

THIS advertisement is published by permission of the Ministry of Labour and National Service under the Control of Engagement Order, 1947. Draughtsmen required by Dorman Long & Co., with industrial or manufacturing experience, for layout of electrical equipment, cable layouts and wiring diagrams, etc., for steelworks development schemes. Apply, stating age, experience and salary required, to —The Manager, Ministry of Labour and National Service Employment Exchange, 36, Grange Road, Middlesbrough. 150

TRANSFORMER Sales Engineer, internal appointment, with Higher National Certificate or equivalent; competent to handle specialised technical correspondence, specifications, tenders and contracts, mainly home market; preferably conversant association requirements; five-day week; canteen facilities; pension scheme. Applications, with details of training, experience, age, availability, salary required, to—HTC, British Electric Transformer Co. Ltd., Clayton Rd., Hayes, Middx. Hayes 1954. 1275

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.

H. & E. Lintott Ltd., Horsham, Sussex, take this opportunity of thanking all applicants who recently replied to their advertisement for an Installation Engineer. As the volume of replies has been so great we hope the applicants will accept this announcement in lieu of a personal reply. The position has been filled. 1439

SITUATIONS WANTED

ABILITY is cognisant of ability. Assistant to Managing Director, Chartered Secretary, experienced accountancy, costing, correspondence, export, journalism, marketing, organising, publicity, radio, recording, sound film engineering, shipping, seeks change.—Box 7249.

A.M.I.E.E. requires administrative post. Full details from—Box 7195.

A Production Executive available, 20 years' experience instruments, lamps and valves. A.M.I.I.A., A.M.I.P.E., diploma I.I.A., excellent refs., age 42 years, keen and efficient, min. sal. £750. Willing to consider any proposition of executive type in light industries. All replies will be acknowledged.—Box 7221.

A.M.I.E.E., Dipl. Ing. (Prague), 43, Brit. subj. Exper.: wireless set production, measur. instrum., transf., machinery production, planning, costing, buying, selling (some on exec. level), here and abroad, non-comm. service R.A.F. (radar), several European languages, seeks appointment (lives S.W.1), admin., techn.-comm., repres., committee works, liaison.—Box 7315.

CABLE and insulating materials. Experienced Technical Representative seeks similar post, or one as process development engineer. Own car. Present salary £570. Details through—Box 7267.

CONTRACTORS' Engineer and Manager, large experience estimating, designing, supervision accounts, good connections.—Box 7261.

DIRECTORS requiring live assistance, experienced works, sales, commercial management. Capable organiser. London area. Please write—Box 7233.

ELECT. Engnr. fully qualified, 14 yrs.' specialised experience design and production F.H.P. Requires evening and weekend consultant work.—Box 7300.

ELECTRICAL Engineer (34), B.Sc.Eng. (Hons.), A.M.I.E.E., wide experience in design, sales, costing and manufacture of elec. control gear and heating apparatus, past positions sales and general manager, seeks responsible position.—Box 7236.

ELECTRICAL Engineer (40), 15 years' experience in switchgear, high-voltage apparatus, developing and patents. Russian and German perf.; English, French and Czech well. To-day in Czechoslovakia, and seeks position in England or overseas.—Box 7281.

ELECTRICIAN, Power, desires change. Installation of electrical equipment, new industrial power stations. North of Scotland Hydro-Electric Scheme or Home Counties. Age 46, single, E.T.U.; present situation, paper mill; previous, war period, Admiralty. Full particulars, wages, allowances, accommodation, approx. contract, to—Box 7259

ELECTRICIAN wants job. Good all-round; town or country.—H., 17, Bradiston Rd., Paddington. 7292

ELECTRICIAN, 25 years' exp, factory lighting and power, desires elec. maintenance job in factory, Romford or nr. district. Sole charge preferred.—Box 7251.

ENGINEER requires position, fully experienced in production, sales and personnel management; 36 yrs. age.—Box 7299.

ENGINEER (35), with experience as production controller, progress manager, chief draughtsman, asst. works manager, expert knowledge F.H.P. motors, desires change.—Box 7313.

EX-R.E.M.E. warrant officer requires position in supervisory capacity, London area preferred. Has reorganised and run stores for workshop employing 1,500 and has experience of electrical instrument testing and inspection.—Box 7215.

FOREMAN, long experience instrument and apparatus production and assembly, training and control male and female labour, etc., requires progressive and responsible position.—Box 7298.

GRAD. I.E.E. (28) desires permanent technical situation with responsibility. Experience manufacture, design, repair, installation and maintenance of electrical machines. Knowledge production methods, drawing office and labour control. Starting salary £400.—Box 7274.

PART-time evening work up to 25 h. weekly req.: qualified El. and Mech. Engineer, long practical and theoretical experience, designs, drawings, preparation of specifications, reports, opinions, patents, translations, etc., also practical work considered.—Box 7277.

SALESMAN, age 44, seeks position as Outside Representative or Senior Showroom Assistant. Experienced in all domestic elect. apparatus, including domestic and commercial refrigeration. Holder of the E.D.A. Certificate and Diploma. Held similar position with supply authority. —Box 7275.

SENIOR Production Executive, Grad. I.E.E.-I.M.E., 20 years' exp. design-development-manufacture and production-management of industrial electrical heating appliances, thermostatic and energy control, seeks responsible position demanding initiative, drive and resourcefulness. Excellent organiser. Preferably N.W. or Central London.—Box 7278.

TECHNICAL Engineer (40), A.I.E.E., M.I.E.I., first-class experience in management, design and production engineering. Good organizer and disciplinarian. Switchgear, domestic apparatus, small electric motors, scientific instruments. Apprenticed B.T.H. Co. Executive position London or Home Counties. Excellent references. —Box 7266.

SOUTH Coast. Situation wanted by Electrical Engineer (42), maintenance, installation, inside staff.—Box 7264.

WORKS Executive, A.M.I.Mech.E., M.I.Ec.E., comprehensive administrative experience covering the application of time and motion study, production control, scheduling standard costing and process planning to electro-mechanical engineering work. Good organiser with successful record in handling labour and getting results. —Box 7265.

AUCTION NOTICES

G. R.

BY ORDER OF THE MINISTER OF SUPPLY

M.O.S. DEPOT No. 103, KINGS NEWTON, NEAR MELBOURNE (6 miles south of Derby)

GOVERNMENT SURPLUS STORES, INDUSTRIAL, ELECTRICAL AND MISCELLANEOUS EQUIPMENT

including Aveling Barford Diesel Road Roller, 5-ton Smith's Railway Crane, Ransome Rapier Petrol Electric Crane, Coles 5-ton Crane, 3 Ransome Rapier 2-ton Cranes, 4½-ton Steam Winch, Ace Winch, Warping Head Winch, Railway Crane Bogies, 70-h.p. Allen Diesel Engine, Heenan Water Coolers, Heavy Tackle Blocks, Crane Spares, Lifting Beams with Chains and Grabs, Gas and Electric Furnaces, Smith's Hearths and Oven Cores, Priestman Grab, Allen Shovels with Rope and Chains, Benford Regulus Concrete Mixers, Electric Grinding Machine, Generating and Lighting Sets, Tube Winding, Cutting and Glueing and Rolling Machines, Flow Benches, Parawash Equipment, Packing Machines, Askworth Parker Steam Compressors, Broom & Wade Electric Compressors, Schmutz 60" Sheet Printing Machine, Snow Ploughs, Welding Sets and Machines, Steel Loading Table, Mitchell Ropeways Conveyors, Roller Conveyors, Ford V.8 Marine Engines, Pattern Making and Moulding Machines, Large Brush Oil Transformer and other Transformers, 1,500 Electric Motors and Generators, B.T.H. Switchgears, large quantity of Condensers, Rectifiers, Battery Charging Outlets, large quantity of Electric Cable, Tank Wading Equipment in Wood Crates, 1,000 Gunsighting Telescopes, 10-ton Jacks, Flexible Fuel Hose, Hydraulic Pumps, Coffing Pull Lifts, Overhead Travelling Chain Blocks, Croft's Winches, S.W. Ropes and Slings, Sisal Rope Slings, Keying, Spiking and Sledge Hammers, Chain Slings, and a large quantity of Miscellaneous Equipment and Stores.

To be sold by auction without reserve by W. S. BAGSHAW & SONS, at M.O.S. Depot No. 103, Kings Newton, Melbourne, Nr. Derby, at 11 a.m. daily, on Tuesday, Wednesday, Thursday and Friday, 17th, 18th, 19th and 20th February, 1948.

View days: Wednesday, Thursday, Friday and Monday, 11th, 12th, 13th and 16th February, from 10 a.m. to 5 p.m. each day.

Admission by catalogue only, price 6d. each, obtainable from the Auctioneers (to admit two persons to view and one person on sale days).

Auction Offices: High Street, Uttoxeter, Staffordshire. Tel. No. Uttoxeter 44 (2 lines). 1335

G. R.

BY ORDER OF THE MINISTER OF SUPPLY

(Without Reserve)

FULLER, HORSEY, SONS & CASSELL have been instructed to offer for sale by auction in lots at the MINISTRY OF SUPPLY DEPOT, 12-14, TOWER BRIDGE ROAD, LONDON, S.E.1, on Tuesday, 24th February, 1948, and following days, at Eleven o'clock precisely each day.

SURPLUS STORES AND EQUIPMENT

including Blacksmiths', Carpenters' and Engineers' Hand Tools, Transporter Trucks, Chain Blocks, Rope Tackle, 200 A.C. Motors up to 15 h.p., Electric Welding Machines, Electric Cable, Electric Switchgear and Fittings, Magnetic Separator, Air Compressors, Centrifugal Pumps, Electric Fans, Lathe Chucks, Machine Tool Equipment, 500 Waterproof Covers (average 10' × 6'), 8 tons Cotton Canvas Tentage, Webbing, Canvas, Canteen Equipment, 40 Auto Bacon Slicers, Platform and Bench Weighing Machines, Cast Iron Wheel Valves, Paint Spraying Equipment, and numerous other effects.

Note: Some of the above material is lying at the R.S. Depots, Dover, Tongham and Ashford.

Catalogues, 6d. each (admitting two persons on view days and one on sale days) may be had (when ready) of Messrs. Fuller, Horsey, Sons & Cassell, Industrial Auctioneers, 10, Billiter Square, London, E.C.3. 1305

G. R.

BY ORDER OF THE MINISTER OF SUPPLY

16 MAINTENANCE UNIT, STAFFORD
(on main Sandon road, 2 miles from centre of Stafford).

SOUTH & STUBBS are instructed to sell by auction on Wednesday, 11th February, 1948, at 11 a.m., on No. 1 Site, a very large quantity of

ELECTRICAL AND RADIO EQUIPMENT

including 239 Ironclad Switches with Fuses, 2-pole, 500 v., 100 and 200 amps.; 65 Transformers, 10 kVA, single-phase; 52 Douglas Generating Sets, 1,200 VA/350 w.; 137 Generating Sets, P.E., 32 v., J.A.P. 2-a. Engines; Fans, Electric Motors, Control Panels, Switches, Suppressors, etc.

Cameras and Photographic Equipment, including 84 Air Cameras, American type, K.19, with Kodak Aero Ektar lens f2.5, 12"; 2,240 Aero Cameras, type K.24, lens f2.5, 7"; 60,000 Sashalite Photoflood Bulbs; E.1 Heated Camera Covers; large quantity Bromide Glossy Contracting Paper; Plates; Aluminium Foil; Camera Mountings, etc.; 700 pairs of Prismatic Binoculars in cases, 6 diam. mag. by 30 mm. ob. and 2¼ diam. mag. by 2" ob.

Miscellaneous Items, including 3,200 Aladdin Wicks, 17 Coppersmiths' Hearths; Salt Baths; 40 Elson Closets; 1,220 large Floating Sheath Knives; Scrap Canvas; New Tent Guy Slings; Cable, etc.

View Day, Tuesday, 10th February, 10 a.m. to 4 p.m., and morning of sale. Catalogues, 6d. each, admit two persons view and sale. Auctioneers' Offices: Bank Passage, Stafford. Tel. 82. 1196

G. R.

SANDS DEPOT, WEST WELLS, CORSHAM, WILTS

FORTT, HATT & BILLINGS, F.A.I., will sell by auction at the above on Tuesday, 24th February, 1948, and three following days, at 11 a.m. and 2 p.m.

GOVERNMENT-OWNED SURPLUS EQUIPMENT

including Building Materials, Galvanized Tanks and Cylinders, Ranges, Boilers, Steel and Enamelled Sinks, Urinals, Taps, Ball Valves, Pipes, Junctions and other Plumbers' Fittings, 25,000 ft. of Asbestos Water Pipes, Steel Hangar Doors, Girders, Plates, Wood and Steel Window Frames, 7,250 sheets of Corrugated Iron, Doors, Roofing Felt, D.P.C., Roofing Tiles, Slates and Ridges, 4,000 Corrugated Asbestos Sheets, Latches, Locks and Door Furniture, Nuts, Bolts, Washers, Nails, etc., 80,000 gallons of Paint, Varnish, Sulphuric Acid, Turpentine, 12,600 gallons of Synthaproof, Electrical Equipment, 5,000 yards of Fuse Wire, Switches, Couplings, Ducts, Insulators, Electric Fans, Plenum Units, Tubular and Panel Heater, etc. Catering Equipment: Ice Boxes, Refrigerators, Potato Washers and Peelers, Gas and Electric Hot Cupboards, Hot Plates, Boilers, Cookers, Steamers, Steam Oven, Dish Washers, Pie-making Machines, Pastry Ovens, Tea Urns, and other miscellanea.

On view Friday and Saturday, 20th and 21st February, and Monday, 23rd February, 1948, from 10 a.m. till 4 p.m. each day.

Catalogues, 6d. each (postal orders only), to admit two persons on view days and one on sale days, can be obtained from the Auctioneers at their offices, 3, Burton Street, and The Central Auction Mart, Bath. Tel. 4268. 1423

G. R.

BY ORDER OF THE MINISTER OF SUPPLY

ADMIRALTY STORAGE DEPOT, RISLEY, NEAR WARRINGTON

OUTHWAITE & LITHERLAND, F.A.I., will sell by auction on Wednesday, 18th February, commencing at 11 o'clock, on the above premises, a vast quantity of

RADIO EQUIPMENT AND GENERAL STORES

125,000 yards of Electric Cable.

60 Alternators, 230 v., 50 cycles, D.C. supply, 10 K.B. Transformers, Receivers, Rectifiers, Rotary Converters, Fitter Units, Milliammeters, Clamps, Couplings, Brackets, Switches, Resistances, Control Units, Plugs, Range Coils, Condensers, Thermostats, Bearing Bushes, Cable Pulleys, Voltmeters, Electrodes, Potentiometers, Noise Suppressors, Junction Panels, Ammeters, Power Units, Blowers, Gaskets, Boxes of Spares, Metals and various Alloys, etc.

Goods may be viewed Monday and Tuesday, 16th and 17th February, from 10 a.m. till 4 p.m. each day. Admission to the depot for viewing and sale will be by catalogue only, which may be obtained from the Auctioneers (6d. each) or from the gatekeeper at the depot.

Auctioneers' Office: 3, Eberle St., Liverpool, 2 (Central 6561), or 23, Bridge Rd., Litherland, Liverpool. 1336

G. R.

BY ORDER OF THE MINISTER OF SUPPLY

M.O.S. DEPOT No. 55, WESTON-SUPER-MARE, SOM.

PERCY PALMER, F.A.I., is instructed to sell by auction without reserve, in lots, at the above Depot, on Tuesday, Wednesday, Thursday and Friday, 17th, 18th, 19th and 20th February, 1948, at 11 a.m. each day, the

GOVERNMENT SURPLUS PLANT, EQUIPMENT AND STORES

including Aircraft Instruments, Wiring and Assembly Boards; Small and Large Dynamos; Condensers; Resistances; large quantity of Nuts, Bolts, Screws, Metal and Fibre Washers; 1,280 Bed Under-felts; 530 "Nife" Portable Cap Lamps; 500,000 sheets of Emery Paper, grades 0 and 00; 15,000 sheets of Glass Paper, No. 3; lengths of Rubber Hosing; 2,060 lengths of Flexible Piping; 4,300 Air Cocks with Unions; 180 Oil Pumps; 1,780 Gun Sighting Telescopes; 1,160 5-ton Lever Jacks; 340 15-ton Lever Jacks; 130 Flat Cap Track Jacks; 1,750 lengths of Flexible Drive, 17 and 22 mm.; 134 Centrifugal Pumps; 16 Portable Jib Cranes, capacity 1 ton and 30 cwt.; Mobile "Cranemobile" Crane, capacity 4 tons; 31 Aircraft Landing Wheels and Tyres, size 1400 by 14; 500 4-cylinder "Coventry Climax" 2.75-kVA Generators; 78 Small Motor-driven Electrical Generators; 2 "Quasi-Arc" Portable Electrical Welding Plants; Electrical Generators, including "Lister-Bruston," "Laurence Scott" 50-kW and others; 5 "Metropolitan Vickers" 3.75-kW Transformers; 6 Electrical Auto Seam Welders (new); High Frequency Suppressors; 4 Electrical Quick Pump Stations; 4 Electrical Ageing Racks; 2 Electrical Spark Panels; 3 Activating Racks; 37 Electrically Driven Air Compressor Units; Air Screw Blade Twisting Machine; 12 "B.T.H." Thrustors; 7 Electrical Aerial Drive Units; Electrical Carbonising Station; "Magnoid" Rotary Annealer; Main Seal Annealer; Hydrogen Annealing Furnace; Glass Lathe; 6 Glass Beading Machines; "Visco" Dust Extractor Unit; 2 Drying Stoves; 14 Drummond Washers; 5 Water Softening Plants; Degreasing Plant; Tangye Hydraulic Pump; 7 Tipping Furnaces with 3 Turntables, etc.

View Days, 12th, 13th and 16th February, 1948, 9 a.m. to 3 p.m. Admission by catalogue only.

Catalogues covering complete sale, price 6d. (postal orders only), admitting two persons on view days and one person only on sale days, available from the Auctioneers' Offices, 3, Magdala Buildings, Weston-super-Mare. Telephone 2451-2452. 1050

FOR SALE

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

CITY OF PORTSMOUTH

TENDERS are invited for the purchase and removal of the following:—

(a) One "Cohen" Countershaft and Back-geared Lathe, 8" centres, 9' bed between centres.
(b) One Mather & Platt D.C. Electric Motor, 85 h.p., 230 volts, 1,400/1,500 r.p.m., with Brookhirst Controller.
(c) One Battery Booster Set by Lancashire Dynamo & Crypto Ltd. (1933), Motor D.C., shunt wound, 93 h.p., 520 volts, 150 amps.
(d) One 20-ton Morris Chain Block in good working order.
(e) One Tank, 10g. galvanised steel, 1,200 gallons capacity, in excellent condition.
(f) A quantity of Steel Door Shuttering and fittings.

Forms of tender may be obtained on application to the City Treasurer's Department, Contracts and Supplies Section, 48-51, Clarence Parade, Southsea, and tender must be returned to the undersigned in the envelope provided not later than 10 a.m. on Monday, 16th February, 1948. The envelope must not bear any name or mark indicating the sender.

V. BLANCHARD,
Town Clerk.

City Council Chambers,
1, Clarence Parade,
Southsea, Hants.
3rd February, 1948. 1422

A bargain: Brand new Coventry Climax/Crompton petrol-driven, complete self-contained Generating Plants, 3.5 kW, 230 v., 1-ph., 50 cycles, price £130. Also brand new similar Sets, with separate new switchboards and automatic voltage regulators, 9 kW, price £400. Full details —Max Electric Co. Ltd., 190, Thornton Road, Croydon. Phone, THO. 4276/8. 162

A. Cooksley & Co. Ltd. offer large selection of used Electric Motors. D.C. Write—21/25, Tabernacle Street, London, E.C.2. Monarch 3357/58. 46

BOROUGH OF NELSON ELECTRICITY DEPT.

THE Nelson Corporation offer for sale on site the following:—

1 Rotary Converter (by M.V.E.) comprising the following: 1 rotary, kilowatts output 455/545, volts, 460/550 direct current; D.C. amps. 1,010, revs. per minute 1,000, 6-phase, 50 cycles; 1 transformer, 600 kVA, 6,600 volts, 3-phase, to 385/330 volts. Complete with starting panel, low voltage D.C. panel, but no 6.6-kV switchgear. This machine is suitable for lighting or traction supply.

Also 1 Rotary Converter (by M.V.E.), as above, but with faulty armature, and without D.C. switchgear or starting panel.

The plant can be seen at the Nelson Corporation Electricity Works, Charles Street, Nelson, Lancs.

Offers to be sent in a sealed envelope endorsed "Rotary Converters" and addressed to the undersigned.

T. D. MARTIN, A.M.I.E.E.,
Engineer and Manager.
1408

A number of brand new, cold start Diesel Engines, 44 h.p., 1,000 revs., 2-cylinder, vertical, electric start, radiator cooled, ex stock.—Box 1328.

A quantity of A.C. and D.C. Motors, all sizes always in stock. Call or write, we may be able to help you.—John Phillips & Co. Electrics, Clydesdale Works, 32, Park Rd. North, Acton, W.3. Tel. Acorn 6011 & 4841/2. 149

A quantity of ½-h.p., 230/1/50 A.C. Motors, 1,420 revs., at £8 5s. each.—Electric Machinery Co. Ltd., Union Works, Ancoats, Manchester. 1063

A.C. Generating Sets, petrol, 3-phase, 50 periods, 400 volts and 230 volts; 50 periods, single-phase, 5 to 15 kVA; 40 sets available.—Midland Counties Elec. Eng. Co. Ltd., Grice Street, West Bromwich. 43

A.C. Motors, ¾ and ½ h.p., single phase; few ¾ h.p. 3-phase, new, makers' list prices.—Box 7307.

A.C. Motors, 1 to 35 h.p., new and reconditioned.—Industrial Electric, Church Street, Blackheath, Birmingham. Bearwood 3353. 7314

A.C. and D.C. House Service Meters, all sizes, quarterly and prepayment, reconditioned, guaranteed one year. Repairs and recalibrations.—The Victa Electrical Co., 47, Battersea High Street, S.W.11. Tel. Battersea 0780. 138

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

A.C. and D.C. Motors, Generators from stock.—Service Electric Co. Ltd., Water Road, Alperton, Middx. Perivale 7251/2/3. 91

ADHESIVE Thread. Just what you have been looking for! Particularly suitable for binding ravelled ends of flexible wires; 100 yards, 4s. 6d., subject.—Barries Electrical Agencies Ltd., King Street, Brighton. 127

AERIALS, rubber-covered 16-strand tinned copper wire, on reels with plug and insulator, 25' 1s. 3d.; 45' 1s. 10d. post free.—"Register," 26, Waterloo Road, Epsom, Surrey. 7291

AEROTIGHT Nuts, mild steel, zinc coated; 2,750 gross 4.BA, 6,250 gross 2.BA.—D. C. Woodberry, Engineering Supplies, Treforest Trading Estate, Glam. 7178

ALMOST new Motor Converter, Bruce Peebles, 500 kW, incoming 6,600 volts, outgoing 440 volts D.C., for immediate disposal at low price to clear.—Box 1329.

ALTERNATOR Sets. Immediate delivery of brand new 10-kVA, 3-phase Diesel Sets, guaranteed for 12 months; also several other smaller and larger sizes of both A.C. and D.C. Generating Sets. We also hold large stocks of Switch Fuse Gear, Change-over Switches and new and guaranteed Diesel Engines up to 16 h.p. from £136. Please send for our lists.—Hampson Industries Ltd., Union St., West Bromwich. Phone 1391. 897

ALTERNATOR Sets: 2 brand new A.B.O.E. Brush 55-kW Diesel Electric Generating Sets, 400/440/3/50, 4-wire, engine 88 b.h.p., 1,000 r.p.m. Complete with paralleling equipment. Delivery expected within ten days. Surplus to requirements. Apply—Evans of Camberwell, 24, Linnell Rd., Camberwell, S.E.5. Rodney 3104. 1319

ALTERNATORS and Alternator Sets from 2 to 75 kVA, petrol or diesel. Send for our stock lists.—Hampson Industries Ltd., Union Street, West Bromwich. 950

ALUMINIUM and its alloys in sheet and extruded form. Over 93% of our total business during 1947 came from customers who placed repeat orders with us. We invite your enquiry.—Blaiklock Gray Ltd. (Specialists in the Light Alloys), Hockley, Essex. 1237

ANODISING Sets, 300 amps. (2), 250 amps. (1), all at 60 v. and direct coupled to A.C. motors, complete with vats, agitators, etc.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 1405

APPROXIMATELY 300 yards heavy duty Electrical Cable, suitable for carrying 30-50 kW. First reasonable offer. Sample sent on request.—317, Regent's Park Road, N.3. Finchley 5143. 178

AUTOMATIC Kohler Sets, 800 w., 1,500 w., 110 v. rebuilt; Diesel Alternator Sets, 400/3/50, 15 to 350 kVA; Alternators, 1 and 3-phase; two Steam Turbo Sets, 20 kW, 120 v. D.C.—E. Binns, 156a, Falsgrave Road, Scarborough. 7310

AUTOMATIC Voltage Regulators, new and unused, from stock. Also Generating Plant from 5 to 30 kVA, diesel or petrol, ex stock.—Hampson Industries Ltd., Union Street, West Bromwich. 1009

B. & W. Water Tube Boilers for disposal: Two 50,000 lb. evap., 310 lb. w.p.; one 30,000 lb. evap., 260 lb. w.p.; one 20,000 lb. evap., 175 lb. w.p.; two 16,000 lb. evap., 190 lb. w.p.; one 12,000 lb. evap., 200 lb. w.p.; one 9/10,000 lb. evap., 200 lb. w.p. We install complete, including brickwork. Economisers, Pumps, Piping, Valves, Motors in stock. We can give immediate delivery.—Burford, Taylor & Co. Ltd., Boiler Specialists, Middlesbrough. Tel. No. Middlesbrough 2622. 32

BAKELITE Switchplugs, 15 × 3; Ironclad Switchplugs, 15 × 3; Shuttered Surface and Sunk Sockets, 15 × 3. All sizes of switchplugs, sockets, plugtops, multiplugs, switches, lampholders, battenholders, adaptors, connectors, fuses, elements, junction boxes, fuse boxes, ceiling roses, etc. Immediate delivery.—Douglas Turner Ltd., 13a, Edge Street, London, W.8. 1339

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

B.I.C. Spot Welder for 400 v., 50 cycle supply, fitted with N.P.C. automatic timing contactor and designed for spot welds up to a maximum of ¼" M.S. plate. Treadle operated. Horizontal arms allow throat depth of 3' from electrodes.—C.S. Ltd., Staffa Rd., Leyton, E.10. 176

BI-Metal. Surplus supplies of Highflex and Low Temperature Thermometal for disposal, various thicknesses and widths.—Box 1358.

BLOCKS. A limited number offered, I.W.: 3" × 3" × ⅜", 55s. gross; 3" × 3" × 1", 75s. gross; 3½" × 3½" × ½", 64s. gross; 3½" × 3½" × ¾", 62s. gross. Rubber Bushes, ½", 5s. gross; ¾" 8s. gross.—Graham Supplies, 58, Gloucester Road North, Filton, Bristol. 7286

BRAND new Paxman 75-kVA Diesel Electric Set, 440/250 v., supplementary to requirements. Immediate delivery.—Holden Automotive & Marine Co. Ltd., 317, Regent's Park Road, N.3. Finchley 5143. 180

BRAND new 20-kVA Lister/Mawdsley Diesel Alternators, output 400/3/50, 4-wire, complete with fuel tank, radiator control panel with A.V.R., 4 available, £1,250. Also 3 ditto but 230/1/50, output 15 kVA, £950 each. In maker's packing cases.—Stewart Thomson & Sons (Liverpool) Ltd., Seaforth, Liverpool. Bootle 2697/8. 1379

BRASS Strip, export and home: 150 tons New Cold Rolled Brass Strip in coils 70%/30% and 63%/37%. Prompt deliveries ex stock, 4" to 9" widths, 12 to 25 s.w.g. —Box 1247.

BROOKS Motor, R1.15450, 10 h.p., 480 v., 40-50 c., 800-1,000 r.p.m., 1-phase; Veritys Motor, 74989, 25 b.h.p., 440 v., 50 c., 720 r.p.m., 3-phase; B.T.H. Induction Motor, B.35166, type U.K.T., 440 v., 40 c., 3-ph., 1,150 r.p.m., 15.5 amps.; Cox Walkers D.C. Generator, No. 29070, 230 v., 12 amps., 1,456 r.p.m. Available for inspection by appointment. Offers required. Apply—Chief Engineer, United Automobile Services Ltd., Grange Road, Darlington. 1351

B.T.A. A comprehensive service is now available for all classes of tools and equipment for the accumulator trade. — B.T.A., 246, Cavendish Road, London, S.W.12. Tel.: Balham 6691/2. 10

BURDETTE & Co. Ltd. stock Reconditioned A.C. and D.C. Motors and Starters equal to new. Day and night service.—Stonhouse St., Clapham, S.W.4. Mac. 4555. 17

BUSBAR Chambers, watertight, 100-500 amps., 3-ph. and neutral and D.P., ex stock.—Edwards & Co. (Twickenham) Ltd., 36, Orleans Road, Twickenham. POP. 2377. 7280

CABLE, 1/.044, 3/.029, 7/.029, 7/.044, P.V.C., single, twin, triple, from stock. Lists available.—Barries Electrical Agencies Ltd., King Street, Brighton. 76

CABLES, Condensers, Wire, Volume Controls, etc. Write for a list, guaranteed delivery.—H. Fisher & Co. Ltd., Titan House, The Quadrant, N.W.4. 171

CANDLE Tubes (with or without drips). We are actual manufacturers, and can offer immediate delivery. Price list and sizes available on application.—The Bridgewater Electrical Fittings Co., 150, Manor Park Road, Harlesden, N.W.10. Telephone: Elgar 7672. 201

CHEAP Diesel Power, new Govt. stock, 90-375 h.p., from £325. Photos and specifications on request.—Norths, 94, Vicar Lane, Leeds. Phone 26248. 1381

CLIMAX Petrol Engine Generators (new), 120 volts, 2.5 kVA, mounted on skids. Immediate delivery. £25 each.—C.D.S. Trading Co. Ltd., Helm Royal Works, London Road, Wallington, Surrey. 1384

CHANGE Pole Squirrel Cage Motors, 3/2/1½/1 h.p., speed 1,450, 970, 720, 460 r.p.m., 400 v., 3-ph., 50 cyc.; Two-speed Flange Mounting Squirrel Cage Motors, 2 h.p. at 1,425 r.p.m., 1 h.p. at 705 r.p.m., 400/440, 3-ph., 50 cyc.; 2-h.p. and 1-h.p. Flange Mounting Squirrel Cage Motors, speeds 2,850, 1,425, 945 r.p.m.—Burdette & Co. Ltd., Stonhouse St., Clapham, S.W.4. Macaulay 4555. 141

CHANGE-over Switches, 60 and 100 amps.; Starter Batteries, 168 amp.-hr., 12 v.; Delco-Remy Dynamos, 24 v., for G.M.C. engines; brand new Electric Motors, ¼ and ½ h.p., 400 v., single-phase, 50 cycles.—L.E.S.C.O., 10, Lovat Lane, London, E.C.3. 1382

CONDENSERS. Power Factor Correction Condensers by British Insulated Cables. Supply 400/440/3/50, capacities 5, 7½, 10, 15 and 25 kVA. Standard oil immersed tank unit for floor or wall fixing.—George Cohen, Sons & Co. Ltd., Wood Lane, London, W.12; and Stanningley, near Leeds. 1440

CURRENT Transformers by Sangamo Weston, type S2, 400/5 amps.; ditto, 200/5 amps., 700-v. system, new; Freq. Meters by Cromp. Park, 40/60 cycles, 230 v., 4" dial; 25-amp. Change-over Tumbler Switches by Lundberg. —Oak Instruments, 195, Coppermill Lane, London, E.17. Larkswood 6122. 7282

D.C./A.C. Rotary Converters: Universal Electric, input 500 v. D.C., output 225/1/50, 20 amps., B.B., S.P.; Newton, input 500 v. D.C., output 220/1/50, 15 amps., B.B., S.P. Both complete with starter.—Cox & Danks Ltd., Electrical Dept., Faggs Rd., Feltham, Middx. 1243

D.C. Starters (Allen West): 40-h.p., 220-v., drum type, wall-mounting steel panel type, weather-proof and suitable for arduous conditions, incorporating mechanically interlocked hand operation, N.V. and overload coils, ammeter, signal lights, line contactor, starting resistance integral, new condition, price £55 each, plus carriage; 11-h.p., 220-v., drum type, wall-mounting steel panel type, specification as above but without ammeter and signal lights, new condition, price £25 each, plus carriage. —Cox & Danks Ltd., Electrical Dept., Faggs Road, Feltham, Middx. Phone, Feltham 3471. 1246

D.C. Switchboard, 3-wire generator and distribution type, size 13' long, 7' high, 4' deep, comprising 3 incoming generator circuit breakers, 3-pole, 750 amps., with no-volt, overload and shunt regulators; feeding to bars with two double-pole, 500-amp. and one triple-pole, 70-amp. circuit breakers outgoing, with overloads; also 46 double and triple-pole outgoing circuits, controlled by knife switches, protected by fuses.—Cox & Danks Ltd., Electrical Dept., Faggs Rd., Feltham, Middx. Phone, Feltham 3471. 1240

D.C. to A.C. Motor Alternators, 110 v. D.C. input, 220 v., 50 cycles, single-phase A.C. output, 250 watts, ball bearings, £12 10s.; 400 watts, £15.—Johnson Engineering, 319, Kennington Road, S.E.11. Reliance 1412/3. 99

DIESEL Engines, brand new, carrying manufacturers' guarantee for twelve months, from 4-16 h.p., and from £128.—Hampson Industries Ltd., Union Street, West Bromwich. 1184

DIESEL Engines, 8 h.p. and 15 h.p., both brand new; also Lister 1½-h.p. Petrol.—Selwood, Chandler's Ford, Southampton. 1191

DIESEL Generating Plants, various sizes, both A.C. and D.C., from 3.5 to 300 kW.—Box 1008.

DIESEL Paxman Gen. Plant: Two 30-kVA, one 100-kVA, 230/400-volt, 3-phase sets, electric start, rad. cooled. Maker's guar. At list prices.—Box 1353.

DISTRIBUTION Board, 4, 5 and 6-way, I.C.—S. J. Terry, 5 St. Giles High St, W.C.2. TEM. 0475. 7311

DISTRIBUTION Boards, 2 and 3-pole, 5-15 and 30 amps.; "Glasgow Rex" Switchfuses, 100 and 200 amps.; Ammeters, Voltmeters and a few Frequency Meters. —Weldaneon Signs Ltd., 125 Water Lane, Leeds 11. 1085

DISTRIBUTION Boards, 5 and 15 amps., 2, 3, 4, 6, 8 and 10-way, D.P. or S.P. and N.P.; wood cases; improved design and finish; complete with busbars and terminals. Double-ended Loudspeakers, Admiralty pattern, by Parmeko, 10 ohms impedance, 4 w., permanent magnet, weatherproof, unused; 180 available. Generators or Motors, 12 v., 60 w. D.C., new, in maker's packages, 15s. each. Rotary Convertors, 18-v. input, 7.3-v. and 225-v. output; fifty at clearance prices.—Metropolitan Distribution Ltd., 9, River Street, Truro. 92

DISTRIBUTION Boards, 15 amps., D.P. and S.P., 3, 4, 5, 6 and 8-way, clad type in aluminium die-cast housing. Supplies from stock or good deliveries for larger quantities. For catalogues apply—Renas Engineering Co. Ltd., 107 Albert Rd. S.E.25. Addiscombe 6055/6/7. 148

DUNLOP 16" × 4" Pneumatic Tyred Barrow or Truck Wheels, brand new, 37s. 6d. each, carriage paid. Immediate despatch.—Selwood, Chandler's Ford, Southampton. 1192

ELECTRIC Bulbs, Miniature and Auto, all types, promptly from stock.—Suplex Lamps Ltd., Suplex House, 239, High Holborn, London, W.C.1. Holborn 0225 & 4543. 1413

D.P. I/C 500-volt Change-over Switches, 60 amp., £2 10s. ea. nett; 30-amp. ditto, £1 15s. ea. nett; T.P. I/C 500-volt ditto, 15 amp. £2 nett; 60-amp., 30-amp., 15-amp. and 5-amp. Slydlok Fuses, all new London stock.—Ryness Electrical Co. Ltd., 178, Stamford Hill, London, N.16. STA. 7906. 7305

EIGHT new 30-h.p. Brook 400/3/50 S.C. Motors, 900 r.p.m.; 8 ditto, 20 h.p., 720 r.p.m.; 5 reconditioned ditto, 20 h.p., 1,440 r.p.m.; 3 B.T.H. ditto, 1,460 r.p.m.; 5 L.D.C. ditto, 960 r.p.m.—Stewart Thomson & Sons (L'pool) Ltd., Seaforth, Liverpool. Bootle 2697/8. 1376

ELECTRIC Generating and Storage Set by Fairbank Morse, 30/40 v., complete outfit in perfect working order. Offers invited.—Willow Café, Tadworth, Surrey. Phone, Tadworth 2179. 1289

ELECTRIC Motor, new, 10 h.p., 400 v., single-phase, 1,500 r.p.m., Brook, with starter.—Box 7253.

ELECTRIC Motors, A.C. We have available a large selection, both new and reconditioned. Inspection invited. Repairs and maintenance given immediate attention. Send particulars of your requirements to—Max Electric Co. Ltd., 190, Thornton Road, Croydon. Thornton Heath 4276. 72

ELECTRIC Motors, A.C., 3-phase, single-phase, and D.C. Motors; Electric Motor-driven Pumps and Blowers; 1 Allen West, 5-h.p., slipring, 400-440-v., 3-ph. Starter, and single-phase direct-on Starters, Switchgear and Fuseboards; 2 210-v., 300-amp. D.P. P.E.C. Circuit Breakers; 1 B.T.H. 3-phase Oil Circuit Breaker; 1 British Federal Electric Flash Butt Welder, 100 kVA, 50 cycles, 400 v.; 1 Metrop. Vickers Flash Butt Welder, 60 kVA, 400-440 v., 1-phase; 2 Birmingham Electric Furnaces, 25 kW, 400 v., 3-phase, 50 cycles, 1 zone, temp. range 0-700° C.; 1 Birlec Cassel Carboneutral Furnace, 40 kW, 420 v., 3-phase, 50 cycles, 1 zone, temp. 0-1,400° C., complete with transformer and control panel; 1 Birlec 40-kW, 400 v., 3-ph., 50 cycles, 1 zone, temp. 0-1,000° C., complete with transformer and control panel; 4 Keith Blackman Blower Exhausters, type 30, 400 v., 20 amps., 15 h.p., 2,900 r.p.m.; 4 do., type S.4, 400 v., 11 amps., 8 h.p., 2,900 r.p.m.; 1 Vickers Rotary Converter, 200 kVA, 220-150 v., 50 cycles, 750 r.p.m., 6-phase, complete with starting panel; 1 Lucas Twin Chambered Hardening Furnace, 6′ × 3′ × 9′, with air unit; 1 Wild Barfield H.M.3 Furnace, electric, 3′ × 5′ × 6′; 2 Oil Feed H.T. Furnaces, with motor-driven blowing fan, 10′ × 10′ × 10′; 1 Birlec Type V.F.C.2018 Furnace, 4′ dia., 6′ high; 1 Brayshaw Oil-fired Furnace, 8′ × 6′ ×10′; 1 Oil-fired Salt Bath, 4′ × 4′ × 3′; 4 Oil S.1 Furnaces, 1′ × 8″ × 10″.—C. J. Rice, 137, Mayplace Road West, Bexleyheath, Kent. Bexleyheath 3282. 55

ELECTRIC Motors, A.C. and D.C. We supply all types and sizes of electrical machinery, motorised slow speed reduction gears built to customers' specific requirements. Short deliveries.—Electropower Co. Ltd., 3, Retreat Close, Kenton. Wordsworth 4928. 42

ELECTRIC Motors, new, Brook, 230/1/50, 3,000 r.p.m., totally enclosed, capacitor start, with condensers, £15 each (24 available); Bakelite Sheet, paper base, ⅛″, 4s. lb. (1,200 lb. available); Fabric, ⅛″, 5s. lb. (224 lb. available); Ebonite Sheet, Rod, Tube, various, large quantity, 2s. 3d. lb.; Constant Voltage Transformers, 1.6 kVA, 180/260-v. input, 230-v. output, plus/minus 1%, 11 available, £25 each; Insulating Sleeving, 1, 1.5, 2 mm., various colours, Permanoid and Peribraid, 9s. gross yds.; P.V.C., 5s. gross yds.—D. Caplin, 20, Ridgmount Gdns., London, W.C.1. 7185

ELECTRIC Motors and Dynamos. We hold one of the largest stocks of new and secondhand motors. Secondhand machines are thoroughly overhauled. Inspection and tests can be made at our works. For sale or hire. Send your enquiries to—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, City Road, London, N.1 (Phone, 5512-3 Clerkenwell). 13

ELECTROPLATING Generators, complete with regulators, 450 amps, 12 v.; Fuller 55-h.p., single-phase Motor, slipring, complete with starters, 220 v.; Spot Welders, single-phase, 230 v., 2 kVA. New and reconditioned motors, all sizes and types in stock. Enquiries appreciated.—B. & M. Services, 24, Maury Road, Stoke Newington, N.16. Phone, Amherst 2175. 7293

EX-U.S.A.F. Signalling Lamps, 3 yds. flex and plug, in fibre carrying case, 9″ × 9″ × 7¾″, steel corner plates and leather handle, lamp 24 v., enclosed reflector type, large size 35s., slightly smaller 25s. 6d. each; Bomb Release Signal Lamps, incorporating magnetic operated red screen brilliant reflector and leads in original cartons, 10s. 6d. each; Cockpit Lamps, vulcanite case, 5″ fluorescent tube and starter lamp in original cartons, 7s. 6d. each; 24-v. Geared Electric Motors, incorporating magnetic clutch, 40-1 reduction, final shaft speed 95 r.p.m., new and unused, 30s. each; Electric Motors, as above, without gearing, approx. 1/6 h.p., £1 each. Ex these works.—Roberts & Co., Engineers, East Coker Rd., Yeovil. 1352

ELECTRIC Welding Plant, Engine and Electric, A.C. driven, 300 amps. output, complete with weatherproof covers.—Box 34.

EN. Cu Wire, 17.28 s.w.g.; 16, 24, 27, 28, 20 Synthetic Laminations, 4A, 40 MEA and others, good quantities, good service, no profiteering; also 7/45, 9/47, 10/45 Lity and 46 s.w.g. Necomex H.F.—A. G. Doddrell, 31, Woodland Road, Southall. 7263

ENTIRELY self-contained House Lighting Plant, comprising small gas engine complete with dynamo starter, batteries, artesian well type water pump, £65, ex London.—317 Regent's Park Rd. N.3, Finchley 5143. 108

EX-Govt. stock: 100 A.C./D.C. 230-v. Fractional H.P. Motors (made by Hoover), in perfect condition. Price to clear, 39s. 6d., carriage 2s.—James, 2, Preston Circus, Brighton. 7285

FACTORY Sheds, large range of sizes, steel and asbestos construction. Delivered and erected. Full details from—J. Thorn & Sons Ltd., Box 111, Brampton Road, Bexleyheath, Kent. Tel. Bexleyheath 305. 136

FANS, 110 v. D.C., desk or bracket type, 12″, G.E.C., all new. State quantity required.—Barries Electrical Agencies Ltd., King Street, Brighton. 89

FIREBARS, 8½″ × 2½″, 1,000 w., 200 at 43s. 9d. doz. in gross lots, a high grade job. Sample dozen 45s. 6d., carriage paid.—Horton, 15 Palmerston Road, Sutton, Surrey. 7302

FLEXIBLES: 14/36 TT Maroon or Gold Silk, two 100-yard coils, 55s. 6d., post free; Flat Transparent, 24s. 9d. 100 yds.—Horton, 15 Palmerston Road, Sutton, Surrey. 7303

FLUORESCENT Chokes, 80 watt. Low noise level, for satisfied users; long life, for low replacement costs; characteristics matched with lamp, for rated lamp life and light output. Prompt deliveries.—Micramatic Ltd., Meico Works, Congleton, Cheshire. 73

FLUORESCENT Lighting. The Scemco "Supra-Lux" 3-ft., 40-watt flush to ceiling fitting, with 45 lumens per watt efficiency.—Scemco Ltd., 6 & 7, Soho Street, London, W.1. Gerrard 1461 (3 lines). 111

FLUORESCENT Lighting. Two exceptional value lines. "The Scemco Compendium" Sets per 4′ 40 watts, 3′ 30 watts, 2′ 20 watts, 1′ 10 watts. Fluorescent Compendium Sets comprise lamp, lampholders, starter lamp and holder, choke, P/F condenser, radio suppression condenser. Special terms for Export. Details from—Scemco Ltd., 6 & 7, Soho Street, London, W.1. Gerrard 1461 (3 lines). 120

FLUORESCENT Lighting. We invite you to send for our latest pamphlets and price list. 5′, 4′ and 3′ fittings, complete with tubes. Spares available. Keen export prices can be quoted. Apply—Croft Electrical Co., 5 Middleton Bldgs., Langham St. W.1. MUS. 9941. 1263

FLUORESCENT Lighting, 1 ft. to 9 ft. 6 in. units, industrial and domestic, hot and cold cathode types, largest selection in the trade. Special types. Write for illustrated list. "Pearlray" trade mark. Manufacturer—L. Bloom, 2, 3 & 4, Eden Street, Hampstead Road, London, N.W.1. Telephone, Eust. 3071/2/3. 158

FLUORESCENT Lighting. 1′ 10-watt, 2′ 20-watt, 3′ 30-watt, 4′ 40-watt and 5′ 80-watt Flush and Trough Type Fittings, complete with tubes and guaranteed control gear. Special terms for Export. For details apply—Scemco Ltd., 6 & 7, Soho Street, London, W.1. Gerrard 1461 (3 lines). 117

FLUORESCENT Lighting. 1,000 Fittings complete with Tubes always in stock. Send for our 20-page list price illustrated catalogue. Generous terms to export, wholesale and trade. Apply—Scemco Ltd., 6 & 7, Soho Street, London, W.1. Gerrard 1461 (3 lines). 100

FLUORESCENT Lighting Units from stock: 3′ batten, £5 5s. 6d.; 4′, £5 9s. 6d.; 5′ swallow or reflector, £7 17s. 6d. All complete with new tubes and self-contained. Perspex models now available. Call or write for lists. Spare chokes, starter switches, holders, etc., for all makes. 3′, 4′, 5′ tubes always in stock.—Moss Bros., 53, Goodge St., W.1. MUS. 5385/7070. 1003

FOR disposal: Prestcold Electric Cookers and Refrigerator Cabinets, including eye level 1,400 watt oven, hot plate and grill boiler; 12 and 24-volt, Voltage Regulators, Stones type, Dynamo and Battery Cut-outs, Relay Switches, Generators and Alernators, from 12s. 6d. each, new and secondhand; 2 Charging Boards, cap. 36 v., 15 amp., 3 circuits, £4 10s. each; Box Choke Units; 12 and 24-volt Suppressors Radio Interference Junction Boxes and various other items.—Cooper, 269 Farnborough Road, Farnborough, Hants. 1194

FOR immediate disposal, Squirrel Cage Motors, 3-phase, 400 volts, 50 cycles; 1 3-h.p. protected type Higgs, 1,425 r.p.m.; 1 5-h.p. protected type Brook, 950 r.p.m.; 1 7½-h.p. totally-enclosed surface-cooled Higgs, 965 r.p.m.; 1 15-h.p. ditto Met-Vick., 1,425 r.p.m.; 1 15-h.p. protected type Higgs, 750 r.p.m.; Starters: 1 Allen West S.D.1 Star Delta; 1 Morecambe Star Delta, 7½ h.p.; 1 Brook T.15 Star Delta, 5 h.p.—Christy Bros., Chelmsford, Essex. 7301

FOR disposal, as surplus to requirements, twelve ¾" dia. × 21" 230-v. 1,000-watt Cartridge Heaters, Genristo, unused, at cost price. 62s. each.—Godfrey Holmes (Plastics) Ltd., Wragby, Lincoln. 1141

FOR disposal: 43-s.w.g. S.S.C. Copper Wire, 45 lb. at 16s. lb.; 47-s.w.g. S.S.C. Copper Wire, 4 lb. at 45s. lb.; 10-s.w.g. Aluminium Wire, 850 lb., 2s. lb.; .036" Tinned Copper Wire, 425 lb. in 4 coils, 2s. 3d. lb.—D. Caplin, 20, Ridgmount Gardens, London, W.C.1. 7287

FOR sale, supplementary to requirements: One brand new McLaren M.R. 5-cylinder Diesel Power Unit with built-in radiation, extension shaft, outboard bearing, the whole mounted on one bedplate. Available for immediate delivery at manufacturers' list price.—317, Regent's Park Road, N.3. Finchley 5143. 140

FRACTIONAL H.P. Motors, ex stock. We have purchased a large quantity of new Fractional H.P. Electric Motors, available ex stock now and in monthly batches thereafter. Brief specification: Single-phase, 50 cycles, 4-pole, capacitor type, screen protected, ball bearing induction motors, complete with capacitor condenser. Rated to develop outputs: 110/120 v., 1/32 h.p., 1,390 r.p.m.; 200/240 v., 1/30 h.p., 1,400 r.p.m. Full specification for home and export.—Civitas Trading Corporation Ltd., 10, Portman Street, London, W.1. Tel. Mayfair 6522. Cables, Civitas, London. 70

FRACTIONAL Motors: New manufacturers offer for incorporation with small machine tools, ⅓-h.p. or ½-h.p., 1,400-r.p.m., single-phase, 230-v., with start-run push-button switch; ¾-h.p., 3-phase, 400/440-v.; all drip-proof. Delivery commencing 3-4 weeks. Large contracts required up to 10,000 machines. Write—Ring Motors Ltd., 76, Roundwood Road, Northenden, Manchester, or Tel. Altrincham 4016. 7258

FRINGES, Braids, Tassels for lampshades always in stock.—Philip Cohen, 77, Great Portland Street, London, W.1. Langham 1385. 38

FULLER 7-h.p., 400/440-v., 3-phase, 50-c. Slipring Motor, 1,450 r.p.m., with starter, £62 10s.—Universal Electrical Co., 221, City Rd., E.C.1. 1450

GEAR Units built to customers' requirements. All voltages. Short delivery.—Electropower, 3, Retreat Close, Kenton, Middx. Wordsworth 4928. 1300

G.E.C. Generating Set at £155: 5 kVA, 230 v. A.C., s.p., powered by 4-cyl. Coventry Climax petrol engine. All as new, complete with accessories.—Daking & Wright, Estate Offices, Broadway, Peterborough. 1267

GENERATING Plant. Hampson Industries can supply you with Diesel or Petrol Sets, see below. Switchgear, Switchfuses up to 100 amps. T.P., and up to 200 amps. D.P. Change-over Switches; also several Fuse Bridges, Automatic Voltage Regulators, Switchboards, etc. All ex stock, see below. Diesel Engines from stock, 4 to 16 h.p., brand new, carrying manufacturers 'guarantee for 12 months.—Hampson Industries Ltd., Union Street West Bromwich. 557

GENERATING Plant. Self-contained Petrol-driven Alternator Set, 230 v., single-ph., 50 cycles, 15 kVA, with 25-h.p. Morris engine, with control board, tank, automatic voltage regulator and all accessories. Available for inspection and test run at—RCA Photophone, 36, Woodstock Grove, Shepherd's Bush, W.12 (9-5.30 Monday to Friday). Phone: Shepherds Bush 1200. 1343

GENERATING Plant: 5 to 28-kVA, 400/3/50, 4-wire Diesel or Petrol Alternator Sets, in new condition, complete with switchboard, for immediate delivery; also 5 to 20-kVA, single-phase Sets; also several Alternators only, single and 3-phase up to 30 kVA, with switchboards if required.—Hampson Industries Ltd., Union Street, West Bromwich. 949

GENERATING Sets, 5-kVA diesel engine-driven alternating, 230 volts, single-phase, 50 cycles, complete with switchboard, incorporating automatic voltage regulation. Limited number available, early delivery.—Berry Hill Plant Division, Cheadle, Staffs. Phone 2181 & 2261. 170

GENERATING Sets, 75 kVA, 400 v., 3-ph., 50 cycles, G.M.C. diesel engines direct coupled to English Electric alternators. Complete control panel, electric start and all accessories. Guaranteed one year. £2,150 ex works.—L.E.S.C.O., 10 Lovat La., London E.C.3. Man. 3838. 100

GLOW Type Starter Switches, 80 watt and 40 watt, S.B.C. or tails.—Parkinson & Worden Ltd., 49, King Street, Blackburn. Tel. 5432. 1361

GRAVITY Spiral Roller Conveyors, spiral diameters outside 124", inside 70", ball bearing rollers. Particulars, apply—Box 1078.

HACKBRIDGE Transformer, 100 kVA, 3-phase, 5,500 volts input, connected delta, with tappings plus or minus 5%, output 400/230, 4-wire, or 230/115, 4-wire, amperage 144 and 288, rating B.S.S., oil cooled, in new condition.—Cox & Danks Ltd., Electrical Dept., Faggs Road, Feltham, Middx. 1241

GEORGE Cohen, Sons & Co. Ltd. for guaranteed Electrical Plant, Motors, Generators, Switchgear, etc.—Wood Lane, London, W.12 (Telephone, Shepherds Bush 2070) and Stanningley, near Leeds (Telephone, Pudsey 2241). Established 1834. 27

H/C Copper Strip, 1259 × 1259 (3.2 mm. × 3.2 mm.), double glass covered, two tons.—S. J. Barnett & Co. Ltd., Barkingside Metal Works, Mossford Green, Barkingside, Ilford, Essex. Telephone, Valentine 2201. 1290

HEATING Elements: All types Mica Elements wound to specification. Standard Iron, Toaster, Kettle, etc., Elements ex stock.—Hurcomb & Skinner Ltd., 76, Forest Lane, Stratford, E.15. MAR. 1685. 7284

HEAVY Duty Arc Welding Plants, 300 amps. Price £44 15s. complete. Also Spot Welders, £59.—John Steel, Bingley. Phone 1066. 50

HOBART Converter, 200/230 v. A.C., s/ph., 50 c., input 7½ v. D.C., output 100 amps., price £45.—Universal Electrical, 221, City Rd., London, E.C.1. 1449

HOME or Export. Considerable quantities of Electric Motors, Generating Units, Oil Engines, etc., available.—British Engineering Products, 33, Hornton Street, Kensington, W.8. WES. 6855/6932. 196

HOUSE Meters, 200/240 v. A.C., s/ph., 50 c. Price 17s. 6d. plus 1s. carriage.—Universal Electrical, 221, City Road, London, E.C.1. 129

HOUSEHOLD Electrical Appliances a speciality. A variety of 1-kW and 2-kW Electric Fires (portable and inset types), Artificial Coal Fires, Boiling Rings and other Portable Heaters and Cookers; Hot Plates, Radiators, Convector Heaters, Kettles; a variety of Electric Irons; Table Lamps and Shades, Radios, Moving Coil Pick-ups, Fans; Accessories, Flexibles, Switches, Torch Cases and Lighting Batteries; Vacuum Cleaners, various makes; Fluorescent Fittings, good variety with fluorescent tubes; Wash Boilers, actually in stock. New articles added to list weekly. Lists and illustrations on application.—Brooks & Bohm Ltd., 90, Victoria Street, London, S.W.1. Phone, VICtoria 9550/1411. Inland Telegrams: Beebatts, Sowest, London. 66

HUTS, Nissen type, 30' × 16' and other sizes. Also other industrial buildings. Suitable for workshops, canteens, site offices, clubs, etc. No licence required. Write, phone or call (open Saturday afternoons).—J. Thorn & Sons Ltd., Box 80b, Brampton Road, Bexleyheath, Kent. Phone, Bexleyheath 305. 47

IMMEDIATE delivery of brand new 5-9-kVA Petrol or Diesel Alternator Sets, 230/1/50, self-contained units complete in every detail, from £145; also brand new 7½-kVA (will develop 10 kVA), 400/3/50, 4-wire Petrol Alternator Sets, self-contained, with switchboard and all accessories, with a sheet steel cover, price £265 net, ex our works.—Hampson Industries Ltd., Union Street, West Bromwich. 1181

IMMERSION Heaters, "Grubb," 2 kW and 3 kW, standard voltages, all lengths from 13" to 36". Also "Grubb" Thermostatic Controls. Guaranteed 2 years. Immediate delivery can be given. Export enquiries invited. For lists and trade terms write distributors—John Owner & Co., Springfield Road, Birmingham, 13. Tel. SPR. 2939. 7295

IMMERSION Heaters, 3.25 kW, side entry, twin flat blades, complete with "Otter" thermostat, fully guaranteed, £5 12s. 6d., c.w.o.—Winco Industries, 17, Stretford Road, Manchester, 15. 190

INDUSTRIAL Lighting Fittings by Benjamin Electric Co., 14" dia., green enamelled shades with white reflectors, fitted with "X" type E.S. lamp holders. Large quantities in excellent condition. Can be inspected at—Cox & Danks Ltd., Electrical Dept., Faggs Road, Feltham, Middx. 1242

JUNCTION Electric Irons, complete with stand, switch connector and flex, again available. Very prompt deliveries. Beautifully chromium-plated. The finest electric iron of its kind in the world. A.C. and D.C. in all voltages. With rich range of other household electrical appliances. Distributors—Brooks & Bohm Ltd., 90, Victoria Street, London, S.W.1. 66

LADDERS, single and extension, from—Ramsay & Sons (Forfar) Ltd., Forfar. 5961

LAMINATIONS, .014" Stalloy, 4A, 23A, 35A, 37A, 39A, 41A; .018" Lohys, 35A, 41A; .018" Medium, 160A; also 32 to 12 s.w.g., Bicolon, Lumex, Enamel and Enamel Paper Wire.—British Power Transformer Co. Ltd., Queensway, Ponders End, Middx. Howard 1492 (Ext. 10). 1344

LARGE number Meadows Petrol-driven Generating Sets, outputs 6/8 kW for 100/220 v. D.C., also 230/240/1/50 and 400/440/3/50 A.C. Export enquiries particularly invited.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. Tel. B.S. 1000/1. 152

L.D.C. 25-h.p., 400/440-v., 3-phase, 50-c. Motor, 1,450 r.p.m. (A.E.M.T.A. guarantee), slipring, B/B, with automatic starter, £197 10s.—Universal Electrical, 221, City Road, London, E.C.1. 1061

LEAD-covered Telephone Cable, 1 pair 10, G.P.O. spec.; fifty-two ¼-mile sealed drums available immediately.—Burleigh, Alpine Rink Works, Wembley, Middx. Phone 0211. 7301

LESLIE Dixon & Co. for Dynamos, Motors, Switchgear, Chargers, Telephones, etc.—214, Queenstown Road, Battersea, S.W.8. Telephone, MACaulay 2159. 18

LIGHTING Cable, flameproof, new, in coil, 0/012 and 6/018, cheap.—Stamford Metal Co., 54a, Newington Green, London, N.16. 7176

L-Scott 3½-h.p., 220-v. D.C. Motors, 2,200 r.p.m. (A.E.M.T.A. gtd.), B/B, totally enclosed, £32 10s. each.—Universal Electrical, 221, City Rd., E.C.1. 1060

MANUFACTURERS. We can give you immediate delivery of Slydlok fuses, 100 amp, 60 amp, 30 amp, etc., rotary and toggle switches of various types. Ironclad fuse boxes, 15 amp, 5-way, S.P. and neutral with Niphan outlets. Satchwell thermostats, type W.O. rotary convertors in case, input 110 volts, D.C., output 230 volts, A.C., 200 watts. Fuse holders and cartridge fuses. Rectifiers. Muirhead slow motion drives. Thousands in stock. List available.—Wilkinson, 204, Lower Addiscombe Rd., Croydon. 93

MERCURY Arc Rectifiers: 10 400/3/50, 50-a., 110-v. D.C. output; 8 400/3/50, 18-a., 110-v. D.C. output; 5 230/1/50, 18-a., 110-v. D.C. output; 18 230/1/50, 17-a., 110-v. D.C. output. All above unused Hewittic and Nevelin.—Oldfield Engineering Co. Ltd., 96, East Ordsall Lane, Salford, 5. 1066

MICA Pressings and Cuttings to individual requirements. Washers, Commutator Segments, Condenser Plates, etc. Send precise details.—Hurcomb & Skinner Ltd., 76, Forest Lane, Stratford, E.15. MAR.1685. 7283

MODERN A.C./D.C. Switchgear from stock, or built to customers' requirements. Any voltage. All equipments tested and guaranteed for 12 months. Prompt delivery.—George Cohen, Sons & Co. Ltd., Wood Lane, London, W.12; and Stanningley, Nr. Leeds. 1347

MONOMARK. Permanent London address. Letters redirected. 5s. p.a. Write—BCM/MONO53, W.C.1. 68

MOTOR Converters, 1,500 and 2,000 kW, manufactured by G.E.C., Bruce Peebles and Brush Electric. A.C. input 10,750 v., 3-phase, 50 cycles, D.C. output 440 to 585 v., 500 revs., complete with starting panels, resistances, field rheostats, etc.—John Cashmore Ltd., Eagle Works, Great Bridge, Staffs. Tel. Tipton 1101/3. 95

MOTOR Generator Sets and Convertors, all sizes and voltages from ¼ kW up to 500 kW in stock.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, City Road, London, N.1. Telephone, Clerkenwell 5512, 5513 & 5514. 28

MOTORS: A.C., 25-h.p. Slipring, ball bearing, 750 r.p.m., 400/3/50; A.C., 17½-h.p. Slipring, ball bearing, 1,450 r.p.m., 400/3/50; A.C., 20-h.p. Squirrel Cage, ball bearing, 1,450 r.p.m., 400/3/50; also a number of 400-v. D.C. Motors from 2 to 7½ h.p.—Electric Repairs (Nottingham) Ltd., Bulwell Forest, Nottingham. 1342

MOTORS, Squirrel Cage, 1 to 12½ h.p., 400/440 v., 3-ph., 960 and 1,450 r.p.m. Brand new.—Box 1266.

MOTORS, 5 3-h.p. vertical or horizontal mounting, 480 v. D.C., with contactor starters, Metro-Vick. Just off work; £15 each.—S. & H. Ltd., 5, Buckingham Street, W.C.2. TEM. 5063. 1283

NAMEPLATES, Engraving, Diesinking, Stencils.—Stilwell & Sons Ltd., 153 Far Gosford St., Coventry. 14

NEW A.C. Motors, 400/440/3/50, from ¼ h.p. upwards. Keen prices, prompt deliveries. May we have your enquiries?—Wilson Engineering Co., 18, High Street, Dysart, Fife; & 41, Creighton Avenue, Muswell Hill, London, N.10. 119

NEW B.T.H. 1-h.p., 440/480-v. D.C. Motor, 1,500 r.p.m., B/B, £29 19s. 6d.—Universal Electrical Co., 221, City Rd., E.C.1. 1452

NEW Met-Vic. ¾-h.p., 400/440-v., 3-ph., 50-c., 2,850-r.p.m., T/Enc. B/B, £9 5s. each.—Universal Electrical Co., 221, City Rd., E.C.1. 1453

NEW Squirrel Cage Motors, 400/3/50, protected type, 2 h.p., 950 r.p.m., and 4, 5 and 6 h.p., 1,425 r.p.m.; also 4 h.p. at 720 r.p.m. Other sizes reconditioned and guaranteed, including 5 h.p. and 22 h.p., single-phase, 200-400 v. All for immediate delivery.—Abelson & Co. (Engineers) Ltd., Coventry Road, Sheldon, Birmingham (Phone, Sheldon 2424); 333, Station Road, Harrow; and 94/96, Grosvenor Street, Manchester, 1. 1372

NEW ½-h.p., single-phase G.E.C. Motors, 200-250 v., 50 cycles, capacitor start, drip-proof, with resilient mountings, continuously rated, B.S.S.170. Available in large lots for immediate delivery.—Box 977.

NEW ½-h.p. Capacitor 1-ph. Motors, 1,420 revs., 230 v., £14 2s. 6d. each; 35 available.—Electric Machinery Co. Ltd., Union Works, Ancoats, Manchester. 1064

NEW 1-h.p., 400/3/50 A.C. Motors, 1,420 revs., £16 each.—Electric Machinery Co. Ltd., Union Works, Ancoats, Manchester. 1065

ONE brand new Stuart Turner 2½-kW Lighting Plant, 230 v. A.C., suitable for land use, fitted with built-in radiation, supplementary to requirements. Price £175.—Holden Automotive & Marine Co. Ltd., Naval Architects, Marine & Electrical Engineers, 317, Regent's Park Road, N.3. Finchley 5143. 179

ONE D.C. Generating Set complete. Morris 4-cyl. petrol engine with automatic governor, 25 h.p., direct coupled to a Mawdsley generator, 220 v., 57 amps., in continuous rating.—Commercial Structures Ltd., Staffa Rd., Leyton, E.10. 177

ONE "Efco" Furnace, type F.2624, 40 kW. max. temperature 550° C., complete with temperature recorder. Apply—Commercial Structures Ltd., Staffa Works, Staffa Road, Leyton, E.10. 193

ONE Generating Set comprising 1 single-cyl. horizontal diesel oil engine, 29 h.p., 350 r.p.m., by Blackstone, with air receiver, pipework and cooling tanks; 1 50-cycle, 3-phase, 400-v., 15-kW, belt-driven G.E.C. alternator and exciter; 1 control switchboard with instruments and regulator. In perfect running condition, recently overhauled. Surrey.—Box 1411.

ONE Portable Vacuum Cleaner by B.V.C., model T3, for factory use, with all equipment; 3 only, 200-amp., 500-v., Triple-pole & N. Steel-clad Sw., with H.R.C.; 1 only, 100-amp, T.P. ditto.—Henry R. Lockley Ltd., Market Place, Hinckley. 1110

ONE secondhand 200-h.p. compound wound D.C. Motor by Mawdsley, wound for 480/520-v. supply. Normal running speed as a motor 1,300/1,400 r.p.m., as a generator giving 150 kW. Completely overhauled and armature rewound.—Holden Automotive & Marine Co. Ltd., 317, Regent's Park Road, N.3. Finchley 5143. 69

ONE Step-down Transformer, input 400 v., 3-phase, 50 cycles, capacity 75 kVA. Any range between 400 v. and 190 v. Apply—Commercial Structures Ltd., Staffa Works, Staffa Road, Leyton, E.10. 194

ONE 40-kVA Alternator, 400 v., 3-phase, powered by Hercules petrol engine, new; one 22-kVA Alternator, 400/350 v., complete with control panel, voltage regulator, etc., powered by Lister diesel engine; one 3-cylinder Alternator, Lister diesel engine, 22 kVA, 3-ph., 400 v.; four 9-kVA Alternators, 230 v., on pneumatic-tyred trailer; one Mobile Welding Plant, 110 v., 218 amps., mounted on pneumatic-tyred trailer, secondary circuit for lighting, a totally enclosed unit; two Mobile Welding Plants, 110 v., 79 amps., mounted on pneumatic-tyred trailers, secondary circuit for lighting, a totally enclosed unit.—Boyd Gibbins, 285, Romford Road, Forest Gate, E.7. 87

ONE 99-h.p. Slipring Motor, E.C.C., No. 27520, 2-bearing, 725 revs., 122 amps., 400/3/50, with starter, together with inverted tooth, centre guided Renold chain for 4' centres approx 21 T. pinion, 78 T-wheel, with chain case and oil pump complete, £300 the lot.—Taylor, Livesey & Co. Ltd., Ramsden Mills, Linthwaite. 1410

OVER 100 Plating and Anodising Generators from 200 to 1,600 amps. D.C. or A.C. motors can be supplied for most sizes.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. Tel. B.S. 1000/1. 153

PETROL Electric Generating Sets, 115 v., 250 watts D.C.; 125 v., 3-kVA, 3-phase, 50 cycles; also 5-kVA, 6.3-kVA, 7.5-kVA, 25-kVA sets, and 400-v., 3-phase, 50 cycle, 5-kVA sets.—Scottorn Limited, 173, Kingston Rd., New Malden, Surrey. Telephone, Malden 3633. 132

PLASTIC Domes, blue, yellow, clear, suitable for lighting fittings; Lampholders, E.S., B.C. and S.B.C.; Flash and Dynamo Bulbs; 60-amp. Slydlok Fuses.—Universal, 68, Gt. Eastern St., E.C.2. BIS. 6777. 1104

PLATING Generator, ball bearings, enclosed ventilated, 10 volt, 1,600 amp., 1,000 r.p.m., with or without 220-v. D.C. driving motor and C.I. bedplate.—Max Electric, 190, Thornton Rd., Croydon. THO. 4276/7/8. 163

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 & Sons (Liverpool) Ltd., Fort Rd., Seaforth, Liverpool, 21 (Bootle 2697); or Dacre House, Victoria Street, London, S.W.1 (Abbey 4017). 63

PLATING and Depositing Generators, 0/12 v., 600-1,200-2,000 amps. Motorised any voltage to suit customers' requirements. Prompt delivery of equipments, which are modern, practically unused, and guaranteed.—George Cohen, Sons & Co. Ltd., Wood Lane, London, W.12; and Stanningley, Nr. Leeds. 1345

POWER and Lighting Sets complete, 33, 50, 70 kVA, 400/3/50, and 2½, 5, 9 kVA, 230 v., single-phase.—Commercial Structures Ltd., Staffa Rd., Leyton, E.10. 200

PYROVAC Immersion Heaters and Kettle Elements with the finest heating element in the world. Large stocks. Immediate delivery.—Cestrian Electrical Co., Northgate, Chester. Phone 455. 1224

QUANTITY of 3-way, S.P. and Neutral, 500-v., 15-a. I/C Fuseboards; also quantity 80-watt reprocessed Fluorescent Tubes, d/b or w/w, guaranteed 500 hrs., 15s. each.—Moss Bros., 53 Goodge St., W.1. MUS. 5385. 189

QUICKSET Burning Rack. A precision tool with normal spacing (60 slots) for rapid and accurate work. £10 10s., or details from—B.T.A., 246, Cavendish Road, London, S.W.12. Tel.: Balham 6691/2. 58

REBUILT Motors and Generators. Long deliveries can often be avoided by purchasing rebuilt secondhand plant. We can redesign or replace surplus plant of any size. Send us your enquiries. Over 1,000 ratings actually in stock here.—Dynamo & Motor Repairs Ltd., Wembley Park, Middlesex (Telephone, Wembley 3121, 4 lines); also at Phœnix Works, Belgrave Terrace, Soho Road, Handsworth, Birmingham (Telephone, Northern 0898). 26

RECONDITIONED Time Switches in perfect condition. Well-known makes, fully guaranteed.—J. W. & R. E. Hughes (Clockwork Engineers), 58, Victoria Street, London, S.W.1. Phone, VIC. 0134. 128

REYROLLE 3-h.p., 400/440-v., 3-phase, 50-c., 2,800-r.p.m., Doubled-ended Polishing Motors, £38 17s. 6d. each.—Universal Electrical Co., 221, City Rd., London, E.C.1. 1451

RHEOSTATS, Govt. surplus, new, geared, sliding, Isenthal, 0.45 amps., 290 ohms, .5 amps., 300 ohms, 16s. each; 2.8 amps., 60 ohms, 40s. each; also Zenith, 10 amps., 5 ohms, and 8 amps., 17.5 ohms, 20s. each.—Firenheat Ltd., 5 Buckingham St. W.C.2. TEM. 3866. 1284

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

S.H.E.F.I. Moving Coil Pick-up is now available for both Home Trade and Export. It combines for the first time high fidelity with high output voltage, enabling it to directly replace normal moving iron pick-ups without any extra amplification. It has an exceptionally clean response with no undesirable resonances, thereby reducing needle scratch. In walnut and black plastic finish, 40s. each retail, including Transformer, plus 10s. 4d. purchase tax; in ivory finish, 43s. 8d., plus 11s. 7d. purchase tax. Wholesale and retail inquiries invited. Illustration sent on request.—Brooks & Bohm Ltd., 90, Victoria Street, London, S.W.1. 105

SINGLE-phase Motors, new, from stock: 500 E.E.C., Newman, B.T.H., ¼ h.p., split-phase, 1,425 r.p.m., price £7 each; 200 G.E.C., S.E.M., Westinghouse, ½ h.p., capacitor start, 1,430 r.p.m., price £14 2s. 6d. each.—Stewart Thomson & Sons (L'pool) Ltd., Seaforth, Liverpool. Tel. Bootle 2697/8. 1377

SIX unused Met-Vick, outdoor type, pole mounting, oil-cooled Transformers, continuously rated, 10 kVA, 3,300/400 v., 3-phase, 50 cycles and neutral.—Oldfield Engineering Co. Ltd., 96 East Ordsall La, Salford 5. 1152

SOUNDLY-constructed Composite Boxes of ½" wood and plywood. Can be used time and again between warehouse and branches; also suitable for export packing. Sizes: 16½" long × 15" wide × 11½" deep; 13" long × 12" wide × 7½" deep; 10" long × 9" wide × 6" deep. Consult us about your requirements.—Box 1442.

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

SQUIRREL Cage Motor, 140 h.p., 3,000 r.p.m., 400/3/50, with auto transformer starter. Well-known make, secondhand, good condition. Particulars from—British Central Electrical Co. Ltd., 6 & 8, Rosebery Avenue, E.C.1. Tel. Terminus 2525 (Ext. 17). 1348

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

STARTERS, automatic direct-on and star-delta, new, suitable for 5-10-h.p. A.C. motors. Delivery 3 to 4 weeks. Prices from manfs.—Machine Tool Electrics Ltd., London Road, Leigh-on-Sea. 943

SUBSTANTIAL quantities Enamelled Copper Wire, 32, 26, 23, 22, 20 s.w.g.—Champion, 43, Uplands Way, London, N.21. LAB. 4457. 7271

SUMMER or winter it's Winter for all types of Fluorescent Fittings. We carry a complete range of 3', 4' and 5' fittings and spares in stock. Your enquiries are invited.—Winter Trading Co. Ltd., 6, Harrow Road, Paddington, London, W.2. Tel. Paddington 3271. 107

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

SURPLUS stocks: 300-w. Lamps; 3-core T.R.S. Conduit Fittings and sundries; L.V. Transformer Lighting Units complete. Lists from—Boulton Paul Aircraft, Wolverhampton. 1414

SWITCHPLUGS, Bakelite, 15 amp., 3-pin. We are now accepting orders for delivery February/March; large quantities available. Price on application. All other types of accessories held in stock. Write for our 1948 price list.—Direct Electric Lamp Co. Ltd., 81, City Road, London, E.C.1. CLE. 5546/7. 164

SURPLUS stock for disposal; Approx. 10 cwt. 22½-s.w.g. F.D.C.C. Wire; approx. 3 cwt. 26-s.w.g. F.D.C.C. Wire. Offers to—Box 7288.

TANKS: 3 750-gall. Rect. Oil Storage, brand new.—Box 1354.

THERMOSTAT Switches, 250 v., 5 a., by air temp., adjustment allows contacts open or close between 30 and 85 Fah.; well made.—Box 7196.

TRANSFORMER, 100 kVA, 10,750/440 v., 3-phase, 50 cycles, 4-wire, by Johnson & Phillips. H.T. and L.T. circuit breakers forming complete unit.—Ellis & Ward Ltd., 179, Corporation St., Birmingham 4. Central 6107. 7272

TRANSFORMERS, new and guaranteed, up to 60 kVA, any phase or voltage, good delliveries ranging from six weeks, manufactured to customers' requirements.—Box 1183.

TRANSFORMERS, new (200), ex-W.D. stock, for use with 16-mm. type "A" sound projector; input, 3 tappings from 200-250 v.; output, 800 watts with 3 tappings 100-125 v., auto wound; at 87s. 6d. each.—Wade, Smith & Co. Ltd., Star St., Bradmore, Wolverhampton. 1062

TRANSFORMERS, single-ph., shell type, with guarantee, 1 to 8 kVA, voltages to your specification. Delivery 30 days. All new, no ex-W.D. Special offer: 2½-kVA Auto-Transformers, totally enclosed, ironclad, 115-230 v., £12.—Tait, 103, Estcourt Road, Gloucester. 7297

TRANSFORMERS, two (new), 250 kVA, 11,000/550 v., 3-phase, 50 cycles, oil-cooled, makers English Elec. Co.—Box 1412.

TRANSFORMERS, 100/110 v., s./ph., 50 c., input 200/230 v., A.C., s./ph., 50 c., output 1 kVA, £9 15s.; 2 kVA, £12 10s.; 2½ kVA, £15 15s.—Universal Electrical Co., 221, City Road, London, E.C.1. 202

TUNGAR Valve Rectification Charging Plant, suitable for input supply of 230 v., single-phase, and output 75 v., 12 amps.—Commercial Structures Ltd., Staffa Works, Staffa Road, Leyton, E.10. 122

TURNER/G.E.C. Diesel Alternators, brand new, 7½ kW. output 230/1/50, with large control panel complete with A.V.R. Price £375 complete.—Stewart Thomson & Sons (L'pool) Ltd., Seaforth, Liverpool. Tel.: Bootle 2697/8. 1378

TWENTY-four 4-h.p. Hopkinson S.C. Motors, 400/3/50, speed 1,440 r.p.m.; twenty 3-h.p. Brook & Hopkinson ditto; thirty 1½-h.p. Mackfield & Hopkinson ditto; fifty 1-h.p. Tilling Stevens or Mackfield ditto; one hundred ¾-h.p. Tilling Stevens or Brook ditto; eighty ½-h.p. Newman totally enclosed ditto.—Stewart Thomson & Sons (L'pool) Ltd., Seaforth, Liverpool. Bootle 2697/8. 1375

TWO 2½-kW Heater and Fan Units, 240/250 v., single-phase, 1,200 r.p.m., 10.5 amps., G.E.C., £12 10s. each.—D.C. Engrg. Co. Ltd., Sherborne, Dorset. 1355

TWO 20-kVA Diesel Generating Sets, for delivery two weeks; two 100-kVA, 3-bearing type Alternators, Exciters and Switchboards, for delivery February, 1948.—The Horseshoe Supply Co. (Spalding) Ltd., Horseshoe Road, Spalding. Phone 2535. 48

TWO 20-kVA and two 15-kVA, 230-v., single-phase Alternators by Mawdsley, with Lister diesel prime movers, as new but been exposed, minor parts are missing, £1,400 the lot.—Northern Diesels Ltd., 3, Waterloo Street, Leeds Bridge, Leeds, 10. Phone 29098. 986

TWO 55-kW McLaren-Brush 400/3/50 Diesel-engined Alternator Sets, complete, new and unused. Delivery ex stock.—Abelson & Co. (Engineers) Ltd., Coventry Rd., Sheldon, Birmingham (Sheldon 2424); 333, Station Rd., Harrow; and 94/96, Grosvenor St., Manchester, 1. 1373

TWO 100-kVA new unused Diesel Alternator Sets, 400/440 v., 3-phase, 50 cycles, by Davey Paxman. Will separate. Phone Howard 1212 (Ext. 5) or write—Belling & Co. Ltd., Bridge Works, Southbury Rd., Enfield. 1109

UNUSED Ford Petrol-driven Generating Sets for plating and battery charging, 400/800 amps., 15/7½ volts.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 155

UNUSED Plating or Battery Charging Generators, 200/400 amps. at 15/7½ v., direct coupled to new A.C. 440/3/50 motors.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 154

UNUSED Portable Petrol-driven Welding Sets, by Meadows, with switchboards and resistances. Suitable for electrodes sizes 6 to 14.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. Tel. B.S. 1000/1. 151

USED Double Flanged Wooden Bobbins, 1,500 gross, approx, measurements 3¼" overall, 3" traverse, 2¼" diameter flange, suitable wire winding. Will sell all or part.—Box 103.

WE can solve your lighting and power problems. For immediate disposal: 50-kVA Sets, 400 v., 3-ph., 230 v., single-phase, directly coupled as one self-contained unit to Leyland diesel engine, complete with all accessories; also complete 27½-kVA Units, 33-kVA Units and 30-kVA Units. The above sets can be installed at your own convenience; also all electric installation work carried out. Large stocks electric motors, switchgear, etc., for immediate delivery. Contact—G. L. Murphy Ltd., Menston 307. 1350

VACUUM Impregnating Plant by Browns Dryers Ltd., 400/440 v., 3-ph., 50 cy., electrically oil heated, 36" × 18". Complete in every respect and ready for use.—Electrical Equipments (Cardiff) Ltd., Dumballs Rd., Cardiff. 7276

WEE Megger Testers, 500 v., in case, £13 16s. 3d.; Record 500-v. Test Set, £12 7s. 6d., C.O.D. (new).—Robins, 222 West End Lane, N.W.6 HAM 0879 82

WELDING Equipment from stock: Transformer, Motor Generator and Spot Welders to suit every requirement. All equipments tested and guaranteed for 12 months.—George Cohen, Sons & Co. Ltd., Wood Lane, London, W.12; and Stanningley, Nr. Leeds. 1346

WELDING Sets, D.C., petrol-driven, will weld with No. 8 to No. 14 rods, up to 200 amps.; offered about ⅓ list price at £165; new Diesel Sets available.—Hampson Industries Ltd., Union St. West Bromwich. 1182

WINCO Silent Fluorescent Chokes, 230 v., 26s. ea.; Tapped, 200 v./250 v., 29s. 6d. ea.; Glow Switch Starters, 6s. 9d. ea.; Power Factor Condensers, 9s. 6d. ea.; 60-amp. Arrow D.P. Switches, 21s. ea. Bakelite accessories, switchgear, distribution boxes. Send for lists.—Winco Industries, 17, Stretford Rd., Manchester, 15. 191

1 Paterson Hughes 5-ton Electric Overhead Traverse Hoist, type U.H., load 5 tons, lift 20 ft., 440 volts, 3-phase, 50 cycles, 10-h.p. rating, ½ hr., 14.7 amps., with 4-h.p. traverse motor, complete with 80 ft. of 16" × 6" runway only. Condition as new.—C. J. Rice, 137, Mayplace Road West, Bexleyheath, Kent. Bex. Hth 3282. 25

11-kVA Petrol-driven Alternators, comprising 230-v., 4 single-ph., 50-cycle, 3,000-r.p.m. alternator driven through twin "V" belts by 412-c.c. air-cooled J.A.P. petrol engine; 1½-kVA Petrol-driven Alternators, comprising 230-v., single-phase, 50-cycle, 1,500-r.p.m. alternator direct driven by 8-h.p. Ford Industrial petrol engine, mounted on common baseplate. Complete with built-in control panel and accessories. Further details may be obtained from—Cox & Danks Ltd., Plant & Machinery Dept., Faggs Rd., Feltham, Middx; Langley Green, Oldbury; Frederick Rd., Manchester, 6; Wadsley Bridge, Sheffield. 1245

2 brand new Lister 21-kW Diesel Alternator Sets, direct coupled, rad. cooled, switchboard and A.V.R., 400/3/50, 4-wire; also 2 brand new G.M. Diesel Alternator Sets 60 kW, rad. cooled, switchboard, electric start., fuel tank, 400/3/50, 4-wire. Above sets are for immediate delivery from stock at makers' list prices, fully guaranteed.—Greenwoods, Engineers, Brooklands Avenue, Burnley, Lancs. Tel. 4979. 7177

2-pin, 2-amp. Flush Type Plugs and Sockets, 15s. a dozen. Delivery ex stock.—Hobson & Partners, 7a, Old Road, Linslade, Leighton Buzzard. 1285

2 tons 7/19 Bronze Aerial Wire, in unwrapped coils, ex-Admiralty. Price 1s. 8d. per lb.—J. Fraser (Metals) Ltd., Station Chambers, High Street North, London, E.6. Grangewood 4244. 1136

2 3-stage Turbo-Alternators, 340 kW, 400/230-3-50/60, by American G.E.C., new, in packing cases; 2 75-kVA, 400/230-3-50 Meadows McFarlane Diesel Sets, new; 2 15-kVA, 230/1/50 Lister Diesel Sets; 1 15-kVA, 230/1/50 Alternator only, with separate exciter.—Harold W. Worboys (Sales) Ltd., Eastern Works, By-Pass Road, Barking. Phone, Rippleway 1173. 7201

3 Mather & Platt Alternators, 2,300 kVA, 11,000/3/50, C/W switchgear; Reactors and Switchgear for use as synchronous motors developing 3,000 r.p.m. Offers invited.—Box 1416.

3 Metal Plate Rectification Battery Charging Sets, each complete with switch panels and suitable for 230-v., single-phase input, and with output of 36 v., 56 amps.—Commercial Structures Ltd., Staffa Works, Staffa Road, Leyton, E.10. 123

5-ft. Fluorescent Fittings, ceiling, and half-round reflector type, white stove enamelled, complete with gear and tube (daylight or warmwhite), £4 15s. each. Also Cold Cathode Fittings in stock. Send for leaflets.—Parkinson & Worden Ltd., 49, King Street, Blackburn. Tel. 5432. 1360

7 Crompton Parkinson T.A.P., oil-immersed, automatic fuse type Circuit Breakers on floor stands, 11,000 v., 100 amps., 3-phase, complete with 5 Crompton ring main units, for currents up to 300 amps. (main), 100 amps. (tie-off), 11,000 v., 3-phase; 1 Ferguson Pailin 6,600-v., 300-amp., 3-phase Floor Mounting Feeder Panel. For further particulars and inspection, write—F. W. Langley Ltd., Hanley, Stoke-on-Trent. 1380

9-kVA new Switchboards, 230 v., 1-phase, with instruments, switches and regulators; also Isenthal Automatic Voltage Regulators.—Midland Counties Electrical Eng. Co. Ltd., Grice Street, West Bromwich. 169

15-amp., 3-pin Switched Sockets. Robustly constructed of cast aluminium, box measuring approx. 4¾" × 3¾" × 2¾", with florentine bronze finish face plate, box finished cream with 4 knock-outs for ¾" conduits. Special terms to exporters.—Scemco Ltd., 6 & 7, Soho Street, London, W.1. GER. 1461-2-3. 166

11 Power Factor Correction Condensers, 84 kVA, 400/3/50. Offers invited.—Box 1415.

15-amp., 3-pin Switchplugs, 16s. 6d. each; 15-amp., 3-way, double-pole Fuse Boards, 30s. each; Cordgrip Lampholders, 15s. doz.; ¾" Lampholders, 18s. doz.; 5-amp., 2-pin Plugs and Sockets, 21s. doz.; 5-amp., 1-way Tumbler Switches, 24s. doz. Large stocks for immediate delivery. Orders in strict rotation. To avoid delay send remittance with order.—Homeshade Co. Ltd., 99, Baker Street, London, W.1. 1383

21 400/440-volt, 3-phase, 50-cycle Squirrel Cage Motors for fitting to Extractor Fans, continuously rated 1 h.p., 460 r.p.m., makers Woods of Colchester. Accept low price for clearance of lot.—Oldfield Engineering Co. Ltd., 96, East Ordsall Lane, Salford, 5. 1195

30-amp. Fused Mains Switches, 2 and 4-way Splitters and Consumer Units; 2 to 12-way, 15-amp. Distribution Boxes, D.P. and S.P.&N. Deliveries from stock. Send for lists.—Winco Industries, 17, Stretford Road, Manchester, 15. 192

40 Philora 400-watt Mercury Lamp Chokes and Condensers mounted in galvanised iron box, £3 each.—4, Elmer Street South, Grantham, Lincs. 7290

45-h.p., 725, 400/440/3/50, S.R., B.B., oil-immersed control gear, stock; 6-h.p., 1,440, 220/3/50, S.R., B.B., and control gear, stock; 100 ½-h.p., 1,440, 400/3/50, S.C., B.B.; 100 ½-h.p. ditto, stock; 5-h.p., 1,440, 400/3/50, S.C., B.B., new, stock; 20-h.p., 720, 400/3/50, S.C., B.B., and starter, stock.—Electropower, 3, Retreat Close, Kenton, Middx. Wordsworth 4923. 1299

61 G.E.C. Mercury Vapour Lamps complete with chokes and all fittings, ready for use, 125 watts, 220/230 v. Excellent condition. Offers to—Box A407, L.P.E., 110, St. Martin's Lane, W.C.2. 1371

62 Tubular Heaters, flameproof (3 ft.), 20s. each, or best offer for lot.—4, Elmer St. South, Grantham, Lincs. 7294

100 off Mawdsley D.C. Motors or Generators, 6½ kW or 9 h.p., 65-85 v., 1,750-2,900 r.p.m., 105 amps., shunt and compound wound with interpoles, ball-bearing, drip-proof enclosures with standard bare shaft, in excellent condition. Further details from—Cox & Danks Ltd., Electrical Dept., Faggs Rd., Feltham, Middx. 1244

200-amp. Glasgow Rex rewirable D.P. I/C Switch Fuses and D.P. 60-amp. I/C Isolating Switches at full wholesalers' discount.—Box 7306.

250-kW Rotary Converters (2), with transformers and switchgear, input 6,600 volts, 3-phase, 50 cycles, output 420/210 volts; also A.C. and D.C. Motors, Switchgear, Generating Sets, Welders, etc.—Midland Counties Electrical Engineering Co. Ltd., Grice Street, Spon Lane, West Bromwich. 36

250-kW Steam Generating Set, 220 v. D.C.; 400-kW Steam Generating Set, 440 v. D.C.; 34-kW Steam Generating Set, 220 v. D.C.; 20,000 gallons C.I. and Steel Sectional Tanks; 2 22½-kW, 130-v. Petrol Generating Sets.—Harry H. Gardam & Co. Ltd., Staines. 60

400-440-v. Push-button Oil-cooled Starters, new, £10; Onan, 12 or 6-v. D.C. Generating Set, 126 amps., new, £40.—Winslade, 27, Highfield Gardens, Aldershot. Phone 427. 1374

2,000 unused Heavy Duty Panel Mounting Sliding Resistances, offered at less than ½ to-day's price, in three sizes only: Size 1, max. current 5 amps., max. ohms 70, max. dissipation 1.75 kW, price ex works £2; Size 2, 10 amps., 12 ohms, 1.2 kW, price £1 15s.; Size 3, 20 amps., 5.4 ohms, 2.16 kW, price £1 12s.—P. W. & Co. Ltd., Davenset Electrical Works, Leicester. 83

ARTICLES WANTED

A.C. Motors, all h.p., urgently wanted. Burnt-out machines acceptable.—Max Electric Co. Ltd., 190, Thornton Road, Croydon. 12

ACCUMULATOR Plates (old) and lead Peroxide; as actual smelters we pay top price. Also old storage batteries, transformers and whole installations purchased.—Elton, Levy & Co. Ltd., 1/4, St. Ermin's (West Side), Caxton Street, S.W.1. Whitehall 9621/2/3. 39

BUSBARS, English Elec. Co., 3-phase and neutral, 9/16" copper rod, 12 ft. lengths, completely cased in. Any quantity, any condition; also Switchgear. Spot cash.—Box 146.

D.C. and A.C. Switchboards for machines 3, 5 and up to 20 kW output.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 1406

EIGHT Fractional Horsepower Flameproof Motors, approx. ½ h.p., speed 1,420 r.p.m. (can be either 230 v., single-ph., or 400 v., 3-ph., 50 cycles).—Box 1294.

ENAMELLED Copper Wire, 38, 39, 40, 41 and 42 s.w.g. Any quantity purchased. Particulars to—Signcrafts Ltd., Cobourg Wharf, Cobourg Road, S.E.5 (RODney 4433, Ext. 7). 133

EXPORTERS require a 250-kW Alternator, 220 volts, 3-phase, 50 cycles, 1,000 r.p.m., new or secondhand, with or without switchgear.—Box 7273.

EXPORTERS require slip-ring squirrel cage Motors. A.C., 230 or 440 volts, 3-phase, 50 cycles for export to India. Horse powers ranging from 5 to 50.—Henderson Agencies (1945) Ltd., 5, Oswald St., Glasgow, C.1. 1046

MACHINE Shop Equipment wanted: Centre Lathe, 7" to 12"; Shapers, 12" and 18"; Horizontal Miller; Herbert Capstan, 2" bar; Swarf Centrifuge. Would purchase (small) complete plant.—Box 1397.

NUMBER Motors, ½ h.p., 110 v., and 1 h.p., 220 v. D.C. —Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 1404

ONE only, 300-h.p., 1,500-r.p.m., 440-volt, 3-phase, 50-cycle Squirrel Cage Motor, with starter, preferably of the auto-transformer type. New machine preferred.—M.E.D., 19/21 Farringdon St. E.C.4. Central 9042/3. 1327

ONE Squirrel Cage Motor, 60 h.p., 4-pole, 400 v., 3-ph., 50 cycles, with ball and roller bearings; one Slipring Induction Motor, 75 h.p., 4-pole, 400 v., 3-ph., 50 cycles, without brush lifting or short circuiting gear and with ball and roller bearings. Please state condition, age, make and price to—London Brick Co. Ltd., Africa House, Kingsway, W.C.2. 1368

ONE 4½-5-h.p., 400/3/50, squirrel cage, B/B, screen protected Motor, 570 r.p.m., and star/delta starter.—Burdette & Co. Ltd., 150 Clapham Manor St. S.W.4. 1238

ONE 250 or 300-kVA, indoor type Transformer, 20,000/2,300 volts, 3-phase, 50 cycles. Would consider transformer suitable for rewinding to the above voltage.—Deans Elec. & Eng. Co. Ltd., 44, Nottingham Street, Rotherham. 1438

SECONDHAND Time Switches (especially 1 and 5 amps.) wanted. In or out of order.—J. W. & R. E. Hughes (Clockwork Engineers), 58, Victoria St., London, S.W.1. Phone: VIC. 0134. 199

TRANSFORMER Steel, Sheets, Offcuts and Laminations, any quantity purchased. Particulars to—Signcrafts Ltd., Cobourg Wharf, Cobourg Road, S.E.5 (Phone, Rodney 4433, Ext. 7). 134

TWO 3-h.p., totally enclosed, continuous duty, commutator type Variable Speed Motors, for 400/3/50, with output speed range from 200/300 r.p.m. Maximum h.p. required at bottom speed. (For own use, not for resale.)—Box 37.

URGENTLY required, Electric Motors, 380/420 v. A.C., 50 cycles, 3-phase, ½, ¾ and 1 h.p., for attachment to machinery destined for export; also 1/6th to ½ h.p., 110 v., 50 cycles, 3-ph., 1,400 revs.; also ½ to 5 h.p., 190/380 v., 3-ph., 50 cycles; also 220 v., 3-ph., 50 cycles, 1,400 revs. Any quantities acceptable. Must be new.—Henderson Agencies (1945) Ltd., 5, Oswald Street, Glasgow, C.1. 1409

URGENTLY wanted, one 150-kW Diesel-driven Generator Set suitable for 110 volts, preferably of the marine type.—Box 1187.

WANTED, D.C. and A.C. ball-bearing Motors. Full details to—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 29

WANTED for export, several Travelling Workshops, trailer or self-propelled,—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 1407

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

WANTED for prompt cash, Ferrous and Non-Ferrous Scrap; also plant for dismantling. Buyers of second-hand machinery and plant for re-use.—W. & H. Cooper Ltd., 176, Brady Street, Bethnal Green, E.1. 142

WANTED, in first-class condition, Bruce Peebles Motor Convertor, 500/750-kW D.C. output at 480/520 D.C. voltage with on-load regulation, input voltage 3,000/3,300 A.C., 50 cycles, 3-phase preferred. 6,000/6,600-v. La Cœur converters would be considered. Offers to—T. A. Martin & Co., 71, Queen St., London, E.C.4. 1207

WANTED urgently, A.C. Motor, 450 h.p., 400/3/50, medium speed, with starter; also oil-cooled Transformer, 150 kVA, 11,000/415 v., with breaker. Details to—Box 1330.

2 400-v., 3-phase, 50-cycle, screen protected type Squirrel Cage Induction Motors, 100 h.p., 1,450 r.p.m. Must be fitted with ball and roller type bearings. Motors for direct coupling will be considered. To be complete with control gear. Offers of motors only and starters only will be considered. 1 10/15-h.p. Swinging Field Type Dynamometer for use on 240/480-v. D.C. supply.—Oldfield Engineering Co. Ltd., 96, East Ordsall Lane, Salford, 5. 1151

6 Duplicate D.C. Crane Motors, about 18 h.p., 220 volts, 650 revs., enclosed ball bearing. Send full particulars and drawing to—Box No. L.11, Kidds Advertising, 48, Albert Road, Middlesbrough. 1326

150 pre-payment Meters, 230 volt, A.C., 5 amp. long range, or 230 volt, A.C., 10 amp. rated 2d. per unit. Alternatively, Electric Timer to give 3 hours for 1s., 230 volt, A.C.—Robert Neill & Co. (Sheffield) Ltd., 28 & 30, Trippet Lane, Sheffield, 1. 1437

WORK WANTED AND OFFERED

A.C. and D.C. Machine Rewinds and Repairs. First grade work and service. Nothing too small or too large.—Max Electric Co. Ltd., 190, Thornton Road, Croydon. 161

ARMATURE Rewinding Service. Speciality, vacuum cleaners, portable tools, hood dryers, etc. Satisfaction assured, and prompt service.—Milverton Electric Co., 20, Heath Terrace, Leamington Spa. Tel. 18. 7237

ARMATURE Rotor and Stator repairs and rewinds to the trade, domestic and industrial machines of all types, from fractional h.p. to 100 h.p. Capacity available for machine wound armatures in quantity.—Walter Crane, Greencoat Works, Wakefield. Phone 2172. 7169

ARMATURE, Rotor and Stator Rewinds and Repairs, fractional to 100 h.p. Prompt deliveries.—T. A. Boxall & Co., Horley, Surrey. Phone 654. 652

ARMATURE, Stator, Rotor rewinds and conversions, ⅛th to 50 h.p. Specialists in motor reconditioning. Capacity available for repetition winding.—Hurst Electrical Industries Ltd., 75A, Well Street, E.9. Tel. AMH. 4166. 7167

ARMATURE Winding, large and small, 100 h.p. to small tools. Quick delivery. Self-starters a speciality. —Armature Service Co. Ltd., Haddington Street, Hove, Sussex. Telephone, Hove 6465. 942

ARMATURES. Vac., Gramo. and Dryer Armatures rewound and returned in seven days. Special terms for quantities.—Streatham Transformer Co. Ltd., 68, Streatham High Road, S.W.16. Streatham 7626. 118

AUTOMATIC Capacity available up to ¾" diameter, three operations. Export, or work of national importance preferred.—Southern Junior Aircraft Co., Precision Engineers, 89, London Road, Brighton, 1, Sussex. 918

CAPACITY available for Light Assembly, London area. Some machining.—Box 79.

CAPACITY available for Shot Blasting, Metal Spraying and Paint Spraying. Prompt and efficient treatment. Let us have your enquiries.—Surfacings Dept., Staffa Works, Staffa Road, Leyton, E.10. 112

CAPACITY available for Stove Enamelling. All types of finishes. Prompt delivery on large or small contracts. Competitive prices. Enquiries invited.—Nicholson Motors, Nicholson Road, London, E.17. 7126

CASTINGS. Fisher Foundries Ltd., Greet, Birmingham, have capacity for Brass, Gunmetal and Soft Grey Iron Precision Castings in large quantities, suitable for plate and machine moulding. Weight 1-50 lb. Delivery by road. 181

CHORLEY Precision Engineering Ltd., Engineers and Electroplaters, have capacity available on Surface Grinding up to 5', 16" deep (special terms for domestic iron soleplates). Oxy Acetylene Welding, Electric Welding, Nickel Plating, Chromium Plating, Black Plating on Steel or Zinc.—Avenue Works, Longworth Street, Chorley, Lancs. Tel. Chorley 2617. 11

DIECASTINGS, Pressure, in Mazak Zinc Alloy under strict metallurgical control. Immediate capacity for castings up to six ounces; capacity shortly for castings 12 ounces weight.—Western Diecasting Ltd., Leigh St., Easton Road, Bristol, 5. 1250

ELECTRIC Motor repairs and rewinds, etc., 1/20 h.p. to 50 h.p., A.C. and D.C.—Radelec Receiving Depot, 28, Danbury St., London, N.1. Phone, Can. 4187. 7309

ELECTRICAL Measuring Instruments skilfully repaired and recalibrated.—Electrical Instrument Repair Service, 329, Kilburn Lane, London, W.9. Lad. 4168. 1057

ENGINEERS, Precision, South England, seek manufacture of electrical, mechanical or domestic assemblies or components. Press tools, gauges, small stampings, capstan turning, also Internal and External Grinding. Write—Metal Components Ltd., Arundel Place, Brighton, 7. 74

FLUORESCENT Lighting. Specialty fittings designed to your own requirements and specifications. Estimates and sketches submitted free of charge of genuine enquiries. Apply—Scemco Ltd., 6 & 7, Soho St., London, W.1. Gerrard 1461 (3 lines). 121

IMMEDIATE capacity for finest Toolmaking, Hand and and Power Presswork, Machining, Assembling, Plating, etc. Complete manufacturing undertaken.—Box 1398.

INSTRUMENT Design and Production Consultant in London and West Country is desirous of undertaking further commitments relating to management and equipment for test routine, research, development and design, at home and overseas. Specialisations: test and research administration, particularly for industrial and aircraft instruments, automatic control and servo systems, Electronic and magnetic amplifiers (transductors) for special purposes (supersonics, medical, vibration analysis, sound recording, etc.), precision frequency control, crystal clocks, watch rate recorders and oscillographs, strolioscopic equipment. Write—" BM/3AT, W.C.1." 7312

POTENTIOMETER Rheostats, wire wound, 6 watts, 50 to 20,000 ohms. Enquiries invited, any quantity.—Beacon Manfg. Co., 140b, Wednesbury Rd., Walsall. 7279

INDEX TO ADVERTISERS

(*Continued on page* 80)

PRECISION Engineering, capstan and centre lathe work, welding, spot welding, tube bending, finishing, assembly, experimental work, product improvement, complete production runs. All enquiries to—Herbert W. Baker (Engineering) Ltd., 2a, Kilburn La., W.10. LAD. 4006. 75

REPAIRS to Time Switches, Clocks, Electric Clocks, and all kinds of clockwork and electric mechanisms.—J. W. & R. E. Hughes (Clockwork Engineers), 58, Victoria Street, London, S.W.1. Phone, VIC. 0134. 126

RUNBAKEN Electrical Repairs. Rewinding to trade. Fractional h.p. motors a speciality, A.C. and D.C. Prompt service. Guaranteed work.—45, Oxford Road, Manchester. Tel. Ard. 2507 (3 lines). 106

WORK wanted by manufacturing electrical engineers. Electrical assembly work, assembling or manufacture. Workshop available, lathe, drills, etc. Skilled mechanics and fitters. Anything considered.—Box 1421.

22/6, Cleaner Type Armatures rewound; 67/6, Split-phase Motors rewound. One to three-phase conversions. Three to one-phase conversions. Carriage paid one way over £5.—J. B. Electric Limited, Broadheath, Altrincham, Cheshire. 183

AGENCIES

A firm manufacturing a well-known Electric Timepiece and Alarm offer their sole rights for Great Britain to any firm that can guarantee selling 50,000 p.a.—Box 1239.

A well-connected firm of electrical engineers in Salisbury, Southern Rhodesia, wishes to establish agencies for reputable British firms in the following lines: Motors. Mercury Arc Rectifiers. Transformers. Switchgear and associated electrical products.—Ellisons' Electrical Engineers Ltd., P.O. Box 1839, Salisbury, Southern Rhodesia. 1088

ACTIVE London company desires represent progressive electrical manufacturers, old or newly established.—Box 81.

ADDITIONAL Agencies required for South of England, including London: (a) Cables and Flexibles; (b) Small Switchgear; (c) Transformers, and any lines suitable for distributing through wholesalers.—Box 40.

EXCEPTIONAL opportunity offered to agent with personality calling at electrical wholesalers. Repeat business assured. Extensive existing accounts given over. Districts required: Scotland, Yorkshire and East Anglia, S. England and Wales, N. Ireland and Eire.—Box 1393.

EXPORT or close down. Manufacturers—that is your choice! Through E.M.S.A. you can begin export operations immediately—your goods sold under your name at your price. Shipping on non-profit basis. Write for 16-page booklet to—The Export Manufacturers' Service Association, 8, Park Mansions Arcade, Knightsbridge, London, S.W.1. 184

LANCS and Yorks. Manufacturers' Agents, well established, five reps., own cars, require additional appliances, commission or buying.—Box 1332.

MANUFACTURERS of proved high quality Record Players, Amplifiers, Public Address Systems, appointing exclusive area agents. Liberal commission to those with estab. connections, wholesale, retail, municipal.—Box 7289.

MANUFACTURERS' Agents, covering the whole of Great Britain and Colonies, are desirous of contacting manufacturers with a view to sole selling rights (either commission or buying).—Box 23.

OLD-established firm of Industrial and Street Lighting Fittings manufacturers wish to appoint agents covering (1) Norfolk, Suffolk, Cambs, Hunts and Lincoln; (2) Beds, Bucks, Berks and Oxon. Strong existing connections in both areas.—Box 1370.

SOUTH Africa. Agents with resident representative in South Africa solicit further lines for export.—Box 1337.

WELL-known old-established firm of manufacturers' agents, covering London, South of England, requires additional agencies: (1) Brass Accessories, Switchplugs, etc.; (2) Conduit and Fittings, etc. Advertisers have contacts with every wholesaler in territories mentioned. Immediate turnover can be guaranteed on either commission or buying basis.—Box 64.

BUSINESS OPPORTUNITIES

LEEDS. Showroom space available in centre of Leeds for manufacturers' products. Selling staff can handle sales on commission basis, under personal attention of director of small limited company. All replies will be treated in strict confidence.—Box 1340.

SCEMCO Ltd., Fluorescent Lighting and Electrical Component Specialists, wish to contact manufacturers of 5-amp., 10-amp. and 15-amp. Switch Plugs and other Switchgear accessories. Full co-operation given for Sole Distribution Rights. Illustration and write-up will be inserted in "The Scemco Export" Bulletin. Apply to—Managing Director, Scemco Ltd., Scemco House, 6 & 7, Soho Street, London, W.1. Gerrard 1461 (3 lines). 167

PARTNERSHIPS

WORKING Contractor, London, wishes to join another small business, or offers working interest in own old-established. Capital not required or offered.—Box 7270.

BUSINESS PREMISES

FACTORY Extensions, Warehouses, Canteens, etc., erected complete. Plans and licence applications prepared. Consult—The Universal Housing Co. Ltd., Rickmansworth. 109

BUSINESSES FOR SALE AND WANTED

ELECTRICAL Manufacturing business (Transformers, etc.) in South London for sale by Receiver. Price £14,000 or offer. For particulars apply—Box 1341.

MANUFACTURER of Electrical Appliances, such as coffee percolators, irons, fires, toasters, fan heaters, etc., private limited company, for sale. Factory North London. Excellent profits. Price £12,000 as going concern. —Business Brokers Ltd., 46, St. James's Place, London, S.W.1. Regent 4720. 1420

OBTAIN the best price for your business by getting amongst substantial buyers. We have them and effect quick sales with strict confidence and high ethical standards.—Commercial Development Co., 199, London Road, Sevenoaks, Kent. 114

OLD-established Electrical Engineers and Contractors, S.W. London area, with showrooms on main street. Good agencies. Turnover over £20,000, showing excellent profits; £5,000, s.a.v. Principals only.—Box 7243.

OWNERS of old-established businesses wishing to retire should consult in confidence Business Brokers Ltd., 46, St. James's Place, London, S.W.1 (Regent 4720). Many buyers available, particularly for large propositions. Advice as to value given free of charge. 197

PATENT NOTICES

THE United Imperial and American Patent Service (Patents, Designs, Trade Marks). M. E. J. Gheury de Bray, A.M.I.E.E., Registered Patent Agent (London), Chartered Electrical Engineer; J. J. Wittal, LL.B., Patent Attorney and Counsellor-at-law (New York). 102, Bishopsgate, E.C.2. Telephone: Clerkenwell 1131, Chancery 8579, London Wall 2121. Booklet free on application. Preliminary interview free by appointment. Telegraphic Address: "Imperatrix, Cent, London." 88

MISCELLANEOUS

A skilled team of Engineers and Fitters available for outside erection or dismantling, survey, inspections, etc., of large power plant of any description. For details write to—G.P.U. Ltd., Service Division, Wembley. 1331

ALL Electrical Engineering firms requiring technical staff should consult—Kingston Appointments Bureau, 1, Surbiton Crescent, Kingston 0165. 156

BROOKS & Bohm Ltd. announce that they are exhibiting at Stand No. 82, Household Appliances Section, Ground Floor, Grand Hall, Olympia, a very large range of Electrical and Radio Appliances and a variety of novelties in these lines, at the Ideal Home Exhibition, from 2nd to 25th March, 1948. 1369

EDUCATIONAL NOTICES

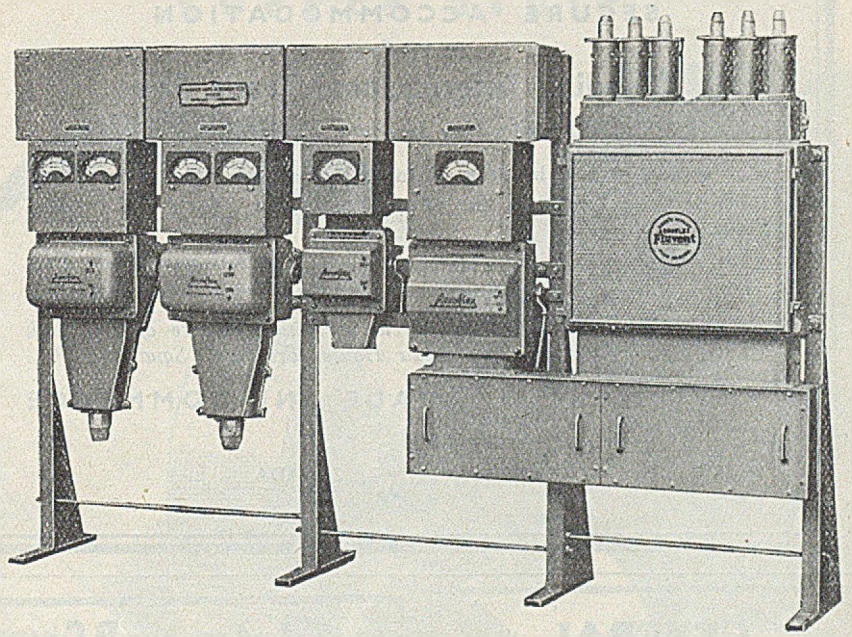
ENGINEERING Careers and Qualifications. Both Government and industry have announced and emphasised that young men with technical knowledge and qualifications must receive every chance of rising to the highest posts within their capacity in post-war engineering and allied industry. Write to-day for "The Engineer's Guide to Success"—200 courses—free—which gives particulars of the first-class training supplied by The T.I.G.B. for the A.M.I.E.E., A.M.Inst.C.E., A.M.I.Mech.E., A.F.R.Ae.S., A.M.I.P.E., B.Sc.(Eng.), C. & G., etc., examinations in which T.I.G.B. home-study students have gained over fifty first places. The Guide covers careers in all branches, Electrical, Mechanical, Radio, Aeronautical, etc.—The Technological Institute of Great Britain, 35, Temple Bar House, London, E.C.4. 77

LATEST A.M.I.E.E. Results. In the examination held by the Institution of Electrical Engineers 646 candidates sat who had taken B.I.E.E. courses. Of these 620 were successful in passing the examinations. We believe this record of 620 successes out of 646 entrants has never before been approached by any oral or correspondence tutorial organisation, and indicates the very high efficiency of the modern system of technical training which we have laid down. The B.I.E.T. tutorial organisation is waiting to assist you either with a short specialist course or complete training for a recognised examination. We have available a large full-time staff of instructors, while the efficiency of our extensive organisation is a byword among engineers. We guarantee—"No pass—no fee." May we send a copy of "Engineering Opportunities"? Containing a great deal of useful advice and detailed information on over 200 home-study courses and examinations, this handbook is of very real value to the ambitious engineer. Our highly informative handbook will be sent free and without obligation on request.—British Institute of Engineering Technology (established 1927—over 200,000 students), 12, Shakespeare House, 17, 18 & 19, Stratford Place, Oxford Street, London, W.1. 33

INDEX TO ADVERTISERS

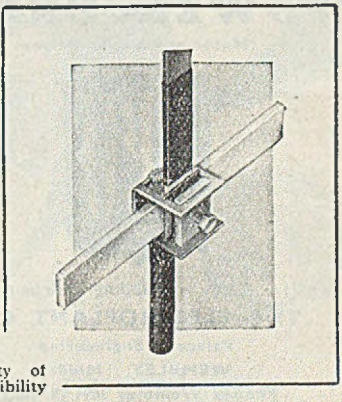
(Continued from page 78)

UNIT TYPE SWITCHBOARDS



This system provides separate busbar unit chambers which are fabricated from pressed steel parts and cadmium plated for rust-proof finish.
These parts are made flat, and consequently can be stocked in large quantities.
Standard Units may thus be produced quickly by bending and welding.
Each Unit is fitted with a bushed insulating barrier at each end and all connections pass through similar insulation rendering each unit substantially separate. Moulded busbar supports are also provided.
Connections either of copper bar or cable are made to the busbar by clamps.

See descriptive brochure reference UB-46-1



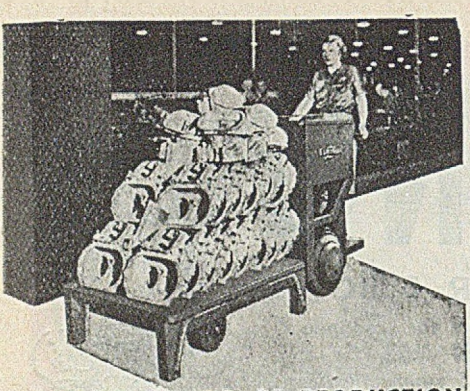
Aeroflex universal connector clamp: avoids necessity of drilling, ensures negligible voltage drop and affords flexibility of arrangement.

PARMITER HOPE & SUGDEN LTD.

Longsight, Manchester 12 London, Victoria St., S.W. 1
Glasgow, 162 Buchanan Street, C.1

Aeroflex
HOPE'S PATENTS

dm. PH. 16b



RAISE THE TEMPO OF PRODUCTION

Switch to 'Electricars' for works haulage and keep material flowing swiftly from process to process. These handy trucks cost only a few pence a day to run and last for many years. Remember, too, one youth or girl with an 'Electricar' can do seven men's work.

ELECTRICAR

INDUSTRIAL TRUCKS

CROMPTON PARKINSON LIMITED

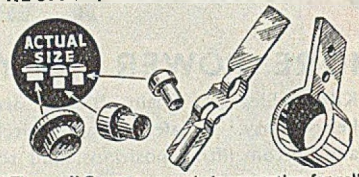
Sales Office ASTOR HOUSE, ALDWYCH, LONDON, W.C.2.

[Phone: CHAncery 3333 Telegrams: Crompark, Estrand, London]

"Thessco" REGD

ELECTRICAL CONTACTS

IN PRECIOUS, SEMI-PRECIOUS & BASE METALS



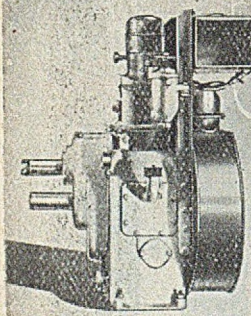
"Thessco" Contacts owe their reputation for reliability both to the intimate fusion of the contact metal (often Silver) with the cuprous base and to their exactness in size.
Contacts are made to any design from the smallest "rivet" type to the largest "finger" for high amperage contactor panels and controllers.

The Sheffield Smelting Company Limited

LONDON · SHEFFIELD · BIRMINGHAM

ARMSTRONG SIDDELEY

5hp



AIR COOLING

COMPACT DESIGN

PRESSURE LUBRICATION

LOW FUEL CONSUMPTION

A compact

POWER UNIT

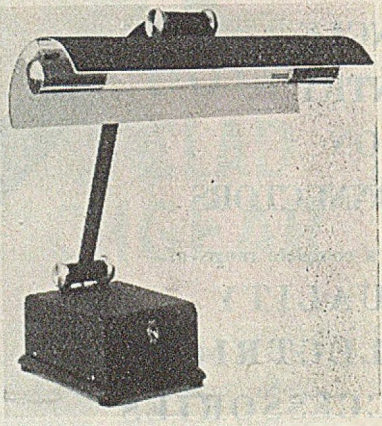
A unique compression ignition engine, for fixed and portable use, available 5, 6 or 7 h.p. Its numerous applications include driving electric generators, air compressors and pumping water or sewage. Other features—easy cold starting, simplicity of operation.

Write for descriptive literature

ARMSTRONG SIDDELEY MOTORS LTD., COVENTRY

Branch of Hawker Siddeley Aircraft Co. Ltd. RPI5167

For LOCALISED Lighting



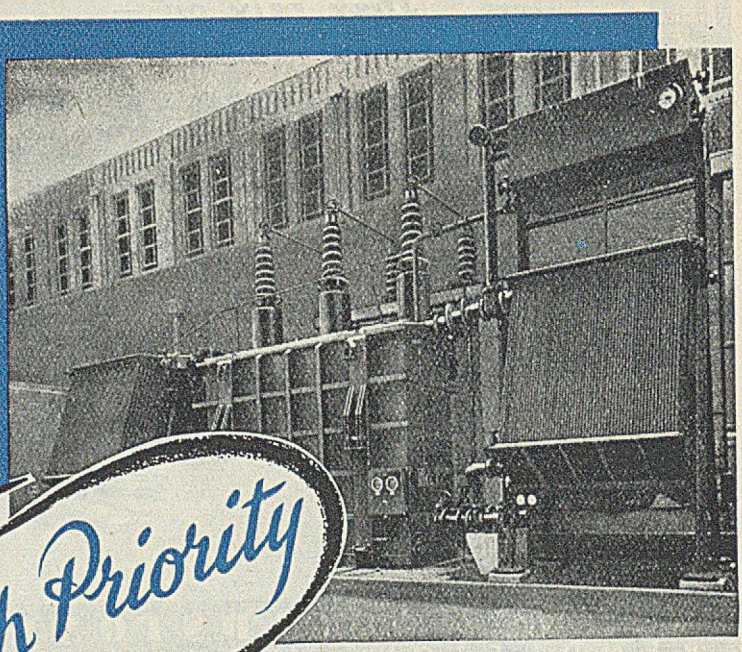
FLUORESCENT INDUSTRIAL UNIT

Sole Manufacturers:

WEMBLEY ELECTRICAL APPLIANCES LTD.

Exhibition Grounds, Wembley Park, Mdx.

Telephone: Wembley 3738-9



High Priority

First on the Prime Minister's list of priorities is plant for generating stations—vital necessity of the nation in its struggle towards recovery.

The Hackbridge and Hewittic Electric Company Ltd. are proud that their transformers are playing an important part in meeting this fundamental need.

The illustration shows one of three 65,000 kVA. 11.6/146 kV. 3-phase, type ON/OFB Hackbridge transformers, for Hams Hall 'B' Power Station, Birmingham—one of the Hackbridge installations carrying high priority.

HACKBRIDGE
TRANSFORMERS

HACKBRIDGE and HEWITTIC ELECTRIC CO. LTD.
WALTON-on-THAMES, SURREY
Telephone: Walton-on-Thames 760 (8 lines) *Telegrams:* 'Electric,' Walton-on-Thames

Printed in Great Britain at THE CHAPEL RIVER PRESS, Andover, Hants, and published by ELECTRICAL REVIEW, LIMITED, at Dorset House, Stamford Street, London, S.E.1.