

ELECTRICAL REVIEW

FOUNDED
1872

Vol. CXXXIX. No. 3597

NOVEMBER 1, 1946

9d. WEEKLY



127



“and with
regard to
LIGHTING...”

I must say the Mazda people were tremendously helpful. Qualified engineers from their Lighting Advisory Service took voluminous notes of the number of people to be employed; the class of work they will undertake; the arrangement of the machines to be installed, etc., etc. Later they submitted the finest lighting plan I have ever known.”

MAZDA

**LIGHTING
ADVISORY
SERVICE**

All who are concerned with the installation or renewal of lighting are invited to communicate with our Lighting Advisory Service, Bridle Path, Watford. Phone 7701



LAMPS AND MAZDALUX FITTINGS

The British Thomson-Houston Co. Ltd.

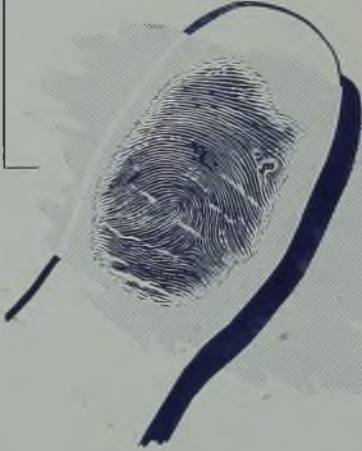
Crown House, Aldwych, London, W.C.2



M4064



For Purposes of Identification



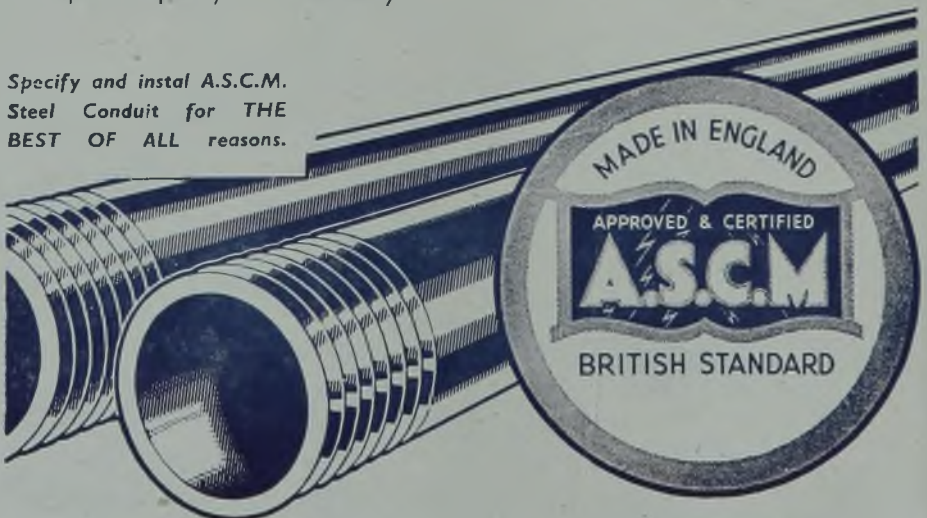
No man can alter the marks of his identity; his own finger-prints distinguish him from his fellows, thus giving him individual status.

In the same way, A.S.C.M. Conduit is a "Marked" Conduit—marked in a visible way to proclaim its marked advantages in superior quality and durability.

*Specify and instal A.S.C.M.
Steel Conduit for THE
BEST OF ALL reasons.*

A.S.C.M. STEEL CONDUIT IS MADE BY:

ALMA & CRANMORE TUBE CO. LTD.
BARLOW, H. J. & CO. LTD.
ELECTRICAL CONDUITS LTD.
GENERAL ELECTRIC CO. LTD.
GRIFFITHS, ISAAC & SONS
HILDICK & HILDICK
McDOUGALL, JAMES LTD.
SIMPLEX ELECTRIC CO. LTD.
Comprising:
Credenda Conduits Co. Ltd.
Perfecta Tube Co. Ltd.
Simplex Conduits Ltd.
Stella Conduit Co. Ltd.
METALLIC SEAMLESS TUBE CO. LTD.
STEEL TUBE & CONDUIT CO.
(Middlesbrough) LTD.
TALBOT-STEAD TUBE CO. LTD.
TIPPER BROTHERS (Bilston) LTD.
WALSALL CONDUITS LTD.





WHO'S *been looking through my eyes?*



A maintenance man in an Electricity Department doesn't have much time for reflection in these days of shortage in materials and labour.

It's always seemed to me as if Heatrae planned the design of their Water Heaters from MY point of view and to save my legs from repeated journeys.

My experience is that HEATRAE are so nearly breakdown-proof that they need minimum attention from me.

Being only human, I appreciate that point.



leaders in electric water heaters

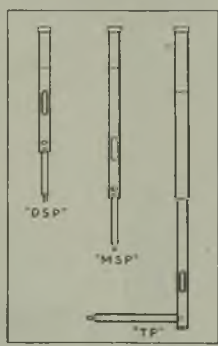
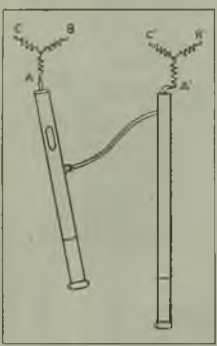
HEATRAE LTD., NORWICH

GRAMS : HEATRAE, NORWICH

PHONE : NORWICH 25131

IS IT ALIVE?

PHASING RODS **VACUUM TUBE DETECTORS**
to locate interconnections between two A.C. systems Range 6,600 to 35,000 V.



Sole Makers of:—

"WESTMINSTER" PATENT VACUUM TUBE DETECTORS } No earth Connection required
"PARTRIDGE" DETECTORS }
EARTHING RODS

The WESTMINSTER ENG. Co. Ltd.

Victoria Road, Willesden Junction, N. W. 10

Telephone : Elgar 7872 (2 lines).

Telegrams : "Regency, Phone, London."

A

SOUND TERMINAL WITHOUT SOLDER



Suitable for Telephone Lines

FOR CABLES AND WIRES OF ALL KINDS



SIZES FROM 1/4" to 3/4" HOLE

ROSS COURTNEY & Co. LTD.
ASHBROOK ROAD, LONDON, N.19

CLUTCHES



to the specific requirements of our customers

Makers of all types of repetition products from the bar in all metals



M.C.L. AND REPETITION LTD.
POOL LANE - LANGLEY - BIRMINGHAM.



TRANSFORMERS

for Every Class of Service

For Power Distribution Schemes and Industrial Applications including:—

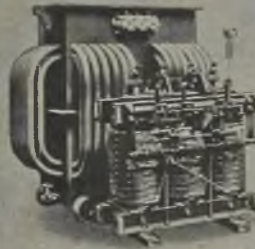
Indoor and Outdoor Sub-Station and Pole Mounting Units, On-Load Voltage Regulating Equipments, Testing Transformers, Reactors, Extinction Coils, Welding, Furnace, and Mining Transformers.

The thousands of Peebles Transformers in successful operation to-day constitute a reliable guide in selecting transformers to meet the demands of to-morrow.

PROVED IN PRACTICE
ALL OVER THE WORLD



15000 K.V.A. 132,000/11,000 volt
50 cycle 3-phase G.N. Outdoor
Transformer with "On Load"
tap-changing gear in service on
the British Grid.

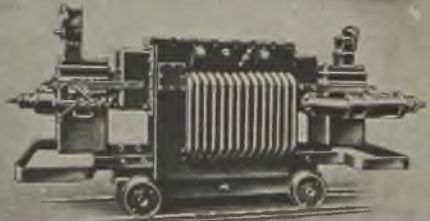


250 K.V.A. 11,000/400 volt
50 cycle 3-phase Indoor
Transformer fitted with
"Off load" tapping switch.



15 K.V.A. 33,000/500-250 volt
50 cycle single-phase Pole
Mounting Transformer.

75 K.V.A. 3,300/450 volt 50 cycle
3-phase Transformer Sub-station
for use in mines.



BRUCE PEEBLES & CO. LTD., ENGINEERS, EDINBURGH.



THE SMALLEST TRIPLE POLE SWITCHFUSE
 EMINENTLY SUITABLE FOR MACHINE TOOLS
 (RNL) RADETE. 10 AMPERES. 500 VOLTS. CATALOGUE N°Q1438

BILL SWITCHGEAR LTD
 ASTON LANE, PERRY BARR
 BIRMINGHAM 20

LONDON A WZELLE
 73 CT PEYER ST
 WESTMINSTER SW.1

MANCHESTER GLASGOW
 BELFAST
 BURTON-ON-TRENT

PHONE BIRCHFIELDS 5011. CRAW'S BILSWITCH BHAM

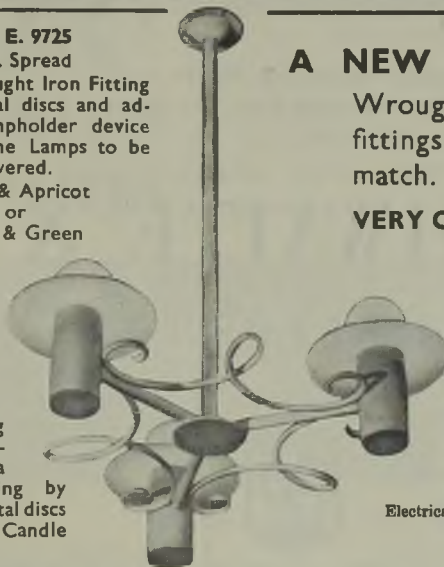
No. E. 9725

13in. Spread

3-Light wrought Iron Fitting
 with 3 metal discs and ad-
 justable Lampholder device
 to enable the Lamps to be
 raised or lowered.

Ivory & Apricot
 or
 Ivory & Green

This Fitting
 can be con-
 verted to a
 Candle Fitting by
 removing metal discs
 and adding Candle
 Shades.



A NEW LINE

Wrought Iron ornamental
 fittings with Table Lamps to
 match. Offered at
VERY COMPETITIVE PRICES

You are invited to inspect a
 selection of modern orna-
 mental fittings, Table Lamps,
 etc., at our Showrooms in
 LONDON, MANCHESTER,
 and BRISTOL.



Telephone :
 Bishopsgate
 4356 (7 lines)

101 DEAN STREET,
 OXFORD STREET, W.1

THE WHOLESALE FITTINGS CO., LTD.

50-52 COMMERCIAL STREET, LONDON, E.1

142 KING STREET,
 HAMMERSMITH, W.6

MANCHESTER 4: 78-80 HIGH STREET

9 STATION PARADE,
 BALHAM, S.W.12

Telegrams :
 "Calottes, Edo,
 London"

BRISTOL 1 :
 53 FROGMORE STREET

STRUCTURAL STEELWORK



*Electricity Generating Station built
in Steel Frame Construction*

BRAITHWAITE & CO ENGINEERS LTD



Temporary London Office :

Telephone WHItchall 3993

KINGS HOUSE HAYMARKET S.W.1

UNIPLATE

Rectifiers

STANDARD Engineers once again make a great contribution to progress with their latest development of the SenTerCel principle: the miniature UNIPLATE rectifier. Built in the form of light, oval plates, they can readily be suspended in the wiring. Their working areas are of various sizes and thus are suitable for a wide range of frequencies and uses. They can be matched for use in balanced circuits, assembled as bridge rectifiers with single or multi discs in each arm or in series, parallel or series/parallel arrangements, and so on.

In use, UNIPLATE rectifiers are exceptionally stable, even under conditions of varying temperature.

SenTerCel
REGISTERED TRADE MARK

**SELENIUM
RECTIFIERS**



For full particulars apply to


Standard Telephones and Cables Limited

(Rectifier Division)

OAKLEIGH ROAD, NEW SOUTHGATE, LONDON, N.11

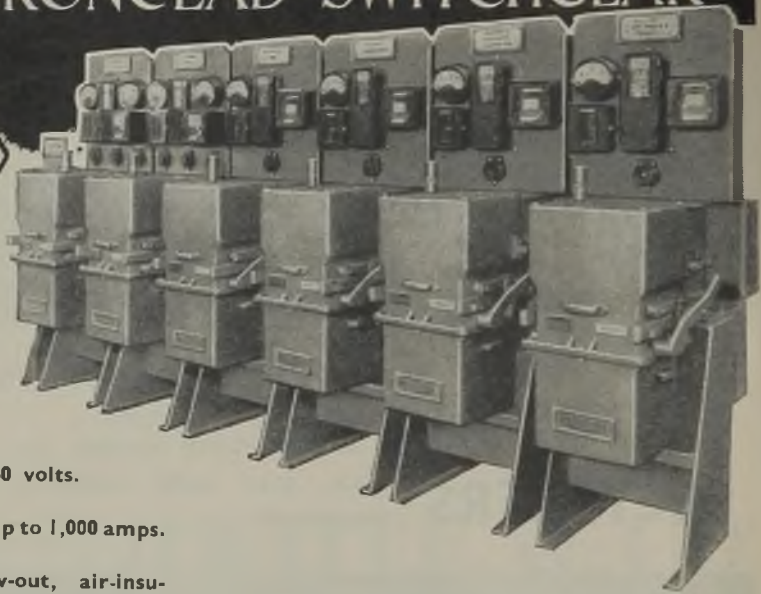
Telephone: ENTerprise 1234

Telegrams: "Estteecee, Telex, London"



Industrial Type

IRONCLAD SWITCHGEAR



- For use up to 660 volts.
-
- Current ratings up to 1,000 amps.
-
- Horizontal draw-out, air-insulated, oil-break pattern.
-
- One frame size for all ratings.
-
- Fully interlocked mechanically.
-
- Supplied in single units or in switchboards of uniform appearance.
-

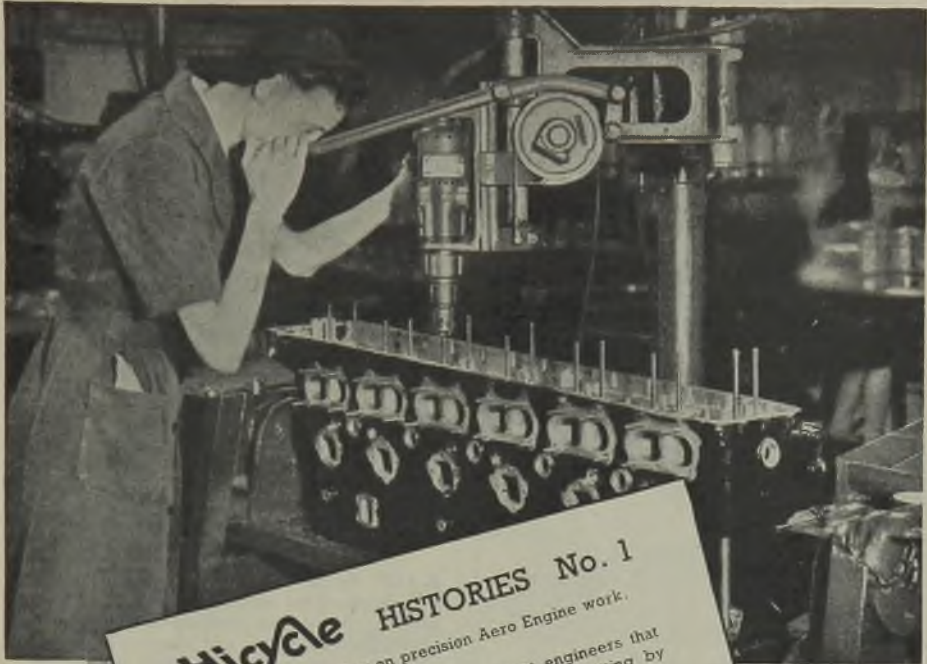
Photograph shows a typical Metrovick SF22 switchboard

METROPOLITAN
Vickers
 ELECTRICAL CO. LTD.
 TRAFFORD PARK --- MANCHESTER 17.



F/K601

Switch to **METROVICK** *Lighting* when daylight fades



Higale HISTORIES No. 1

PROBLEM: Studsetting on precision Aero Engine work.

CASE REPORT.

The recommendation by our development engineers that *Higale* studsetters could replace individual setting by skilled craftsmen was eventually adopted on new assembly lines. Success was immediate. Relatively unskilled female operatives fixed studs at least 5 times the previous speeds and to even closer limits. *Higale* made possible the production of 30,000 Aero Engines in this one factory alone — and the performance of those engines makes further recommendation unnecessary!

CONCLUSION.

Greater speed in production with the same precision and accuracy as was obtained by skilled manual operation and all studs driven to definite pre-determined torque loading — these *Higale* advantages open up new possibilities for the application of portable tools as year-in, year-out production tools.

This advertisement describes a problem solved by Ⓢ in the Aero Engine industry. You also will have production problems which can be solved by Ⓢ engineers.



**CONSOLIDATED PNEUMATIC
TOOL Ⓢ CO. LTD.**

231 DAWES ROAD

LONDON

S.W.6

AIR COMPRESSORS · PNEUMATIC TOOLS · ELECTRIC TOOLS · DIESEL ENGINES · VACUUM PUMPS
CONTRACTORS' EQUIPMENT · ROCK DRILLS · DIAMOND DRILLS · OIL WELL TOOLS

C.P.7

THE BEST WORK DEMANDS THE BEST LIGHT



THE D & G GIRDER FITTINGS

- Gives Concentration of Light on the JOB.
- Shielded from operator's eyes.
- Horizontal or Vertical Mounting.
- Single, Double or Three Arm Extension.
- Illustrated Catalogue sent on request.

**DRAKE & GORHAM
WHOLESALE LTD.**

77 LONG ACRE, LONDON, W.C.2

Telephone: TEMple Bar 3993

MANCHESTER—29 Piccadilly.
BRIGHTON—24 Marlborough Place.
GLASGOW—182 St. Vincent Street.
BRISTOL—2 & 4 Church Street, Temple.
DUBLIN—2 Church Lane, College Green.

Midland Representative:

W. T. BCWER, 184 Jockey Road, Sutton Coldfield

Fusing Facilities No. 2



No "Screws" Outside

NOR inside either, other than those necessary for mounting and cable connecting. Hence no cemented-over screw heads, back or front, and thus no leakage paths or unsightly depressions or projections. In fact, any component may be withdrawn and replaced or the complete base and fuseholder dismantled and re-assembled, without dismantling, "just like that." You won't need to do this, of course, as maintenance of the New SLYDLOK FUSE is merely a matter of spare fuse-wire and even this is supplied with (concealed inside) each fuseholder.

THE NEW

SLYDLOK



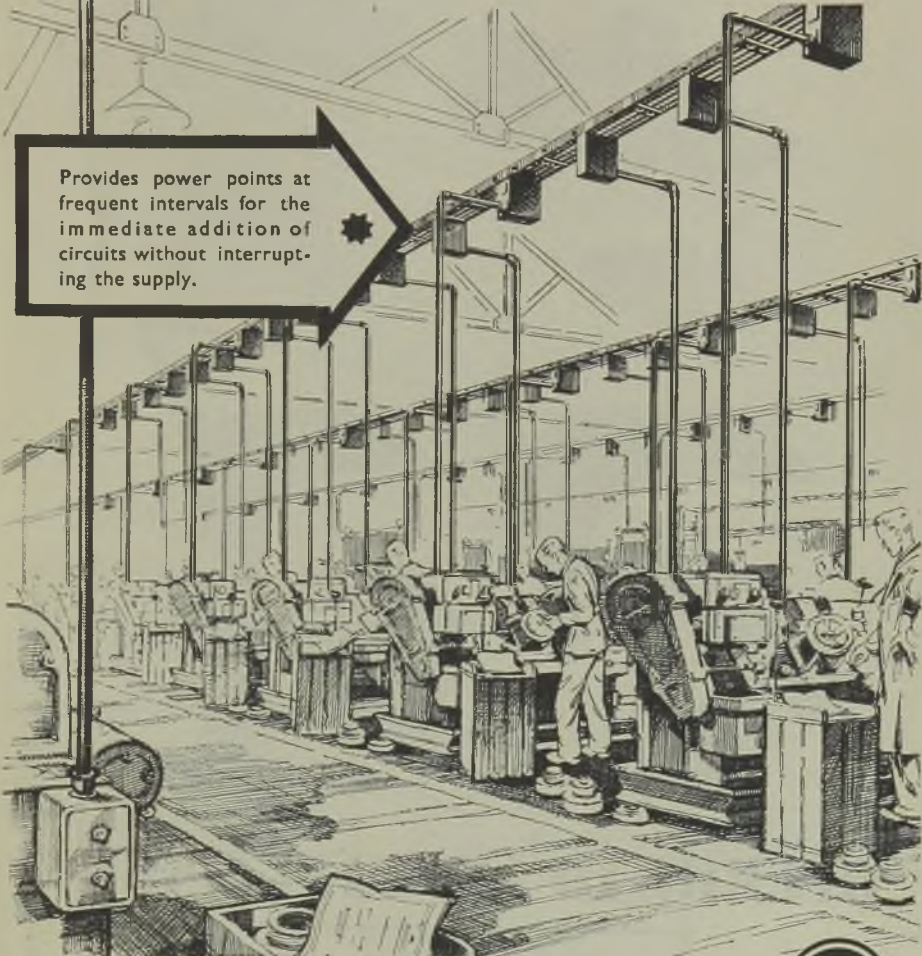
THE FUSE YOU WILL
EVENTUALLY USE

EDWARD *Wilcox* & CO LTD.

Sharston Road, Wythenshawe
Manchester,

EFFICIENCY

BUILT ON "ENGLISH ELECTRIC" BUS-BARS



Provides power points at frequent intervals for the immediate addition of circuits without interrupting the supply.

* Write for information to Fusegear Dept. Stafford



THE ENGLISH ELECTRIC COMPANY LIMITED

LONDON OFFICE: QUEEN'S HOUSE, KINGSWAY, LONDON, W.C.2

WORKS: **STAFFORD-PRESTON-RUGBY-BRADFORD-LIVERPOOL**

EXAMPLES FROM THE COMPLETE RANGE OF P.G. OVERHEAD LINE FITTINGS

Cone type Tension Clamp for solid or stranded copper conductors.

Cone type Mid-span Tension Joint for solid or stranded copper conductors.

Cone type Mid-span Tension Joint for galvanised steel conductors showing sealing screw for grease or compound filling.

Tinned Bronze Parallel Grooved Clamps for copper conductors. Also supplied as Bridle Clamps with grooves serrated.



OVERHEAD LINE FITTINGS

PIRELLI-GENERAL

MANUFACTURERS OF EVERY KIND OF ELECTRIC CABLE

POLYPHASE METERING *by* FERRANTI



SMALL BULK
LOW WEIGHT
SOUND CONSTRUCTION
ACCURATE
RELIABLE

A scientific and practical recognition of the requirements of the USER and the NATION. Its compactness conserves material resources.

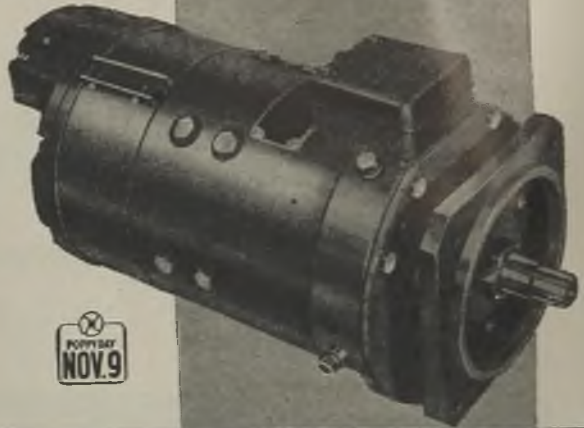
*By ALL means
conserve material resources*

FERRANTI LTD., HOLLINWOOD, LANCs.
London Office: Kern House, Kingsway, W.C.2.

NEWTON-DERBY

AIRCRAFT GENERATORS AND ROTARY TRANSFORMERS

108,215 of these machines were manufactured by us for War purposes and 231,200 by other firms working to our drawings and designs. We have been designing and manufacturing aircraft electric generators since 1917.



NEWTON BROTHERS (DERBY) LTD.

HEAD OFFICE & WORKS: ALFRETON ROAD, DERBY. TELEPHONE - 4286/7. TELEGRAMS: DYNAMO, DERBY
LONDON OFFICE: IMPERIAL BUILDINGS, 56 KINGSWAY W.C.2.

*Available NOW - limited capacity
for bakelite MOULDED parts*

Many simple but important components can be moulded speedily and satisfactorily today, (for instance, complete motor housings as illustrated have been moulded in bakelite for one of our standard products and there are many other examples). Part of our capacity is available for general moulding work, and we shall be glad to have your enquiries.



1082

NELCO Moulded Electrical Components

NELCO LTD. SHALFORD, GUILDFORD, SURREY.

*That's fine —
Henley's
again.*



— and
C.M.A.
Grade
too!

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

Landmarks of Britain

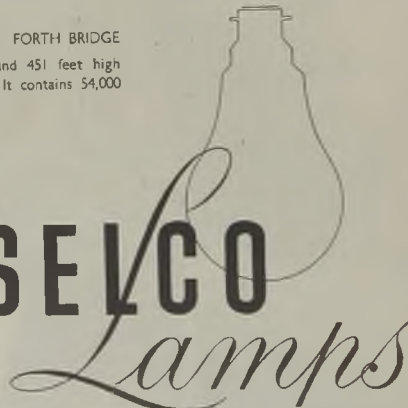


FORTH BRIDGE

The bridge is $1\frac{1}{2}$ miles long and 451 feet high and was opened March 1890. It contains 54,000 tons of steel

CRYSELCO

MADE IN ENGLAND



FIFTY YEARS OF
QUALITY & SERVICE

Branches

BIRMINGHAM
BRIGHTON
BRISTOL

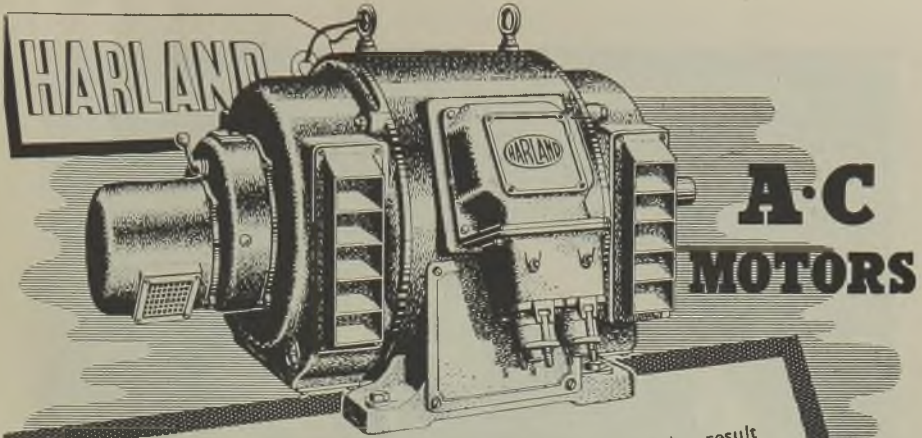
BURY ST EDMUNDS
CARDIFF
GLASGOW

LEEDS
LEICESTER
LIVERPOOL

LONDON
MANCHESTER
NEWCASTLE



CRYSELCO LIMITED, KEMPSTON WORKS, BEDFORD



The discerning buyer wants facts—then study these figures, the result of tests on M.F.R. slip ring motors—150 h.p. at 1470 r.p.m.

	Full load.	$\frac{3}{4}$ load.	$\frac{1}{2}$ load.
Efficiency ...	93.2	92.5	91.2
Power Factor92	.90	.84

They prove that our claim for efficiency in Harland A.C. motors is well-founded—the figures mean lower running costs for you, while reliability and continuous high performance are assured. Harland Motors are built to last, they have big high-tensile steel shafts, large bearings, robust construction. Our manufacturing standards are high—precision machining, skilled assembly, balancing, testing, painstaking inspection, all play their part—that is why they are always "on-the-job" when there's real hard work to be done.

May we send you some details to keep by you?

★ We illustrate an M.F.R. 60 slip-ring motor, 150 h.p., 960 r.p.m., with drip-proof protection.

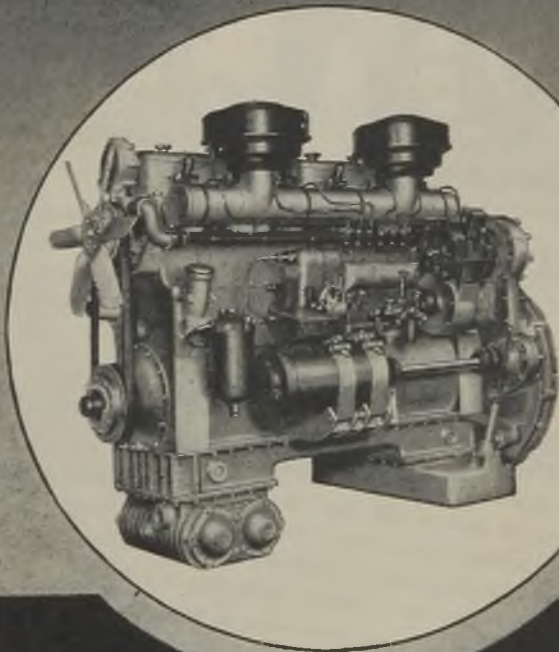
6-337

HARLAND MOTORS & PUMPS

★ Branches at
 Manchester, Glasgow,
 Birmingham, Bristol,
 Hull, Leeds, Newcastle,
 Nottingham, & Swansea.

**THE HARLAND ENGINEERING
 COMPANY LIMITED**
 WORKS: ALLOA · SCOTLAND
 LONDON OFFICE: HARLAND HOUSE, 20 PARK ST., W. 1
 TELEPHONE: GROSVENOR 1221

AUTOMOTIVE • INDUSTRIAL • RAILCAR • MARINE



AUTOMOTIVE
MODEL

130 b.h.p. AT
1900 r.p.m.,
LENGTH ONLY
50½"

ACCESSORIES ON
EITHER SIDE TO SUIT
RIGHT HAND OR
LEFT HAND DRIVE

MEADOWS

"630" SERIES

OIL ENGINES

HENRY MEADOWS LTD • FALLINGS PARK ENGINE WORKS • WOLVERHAMPTON
TELEGRAMS: "OUTPUT" WOLVERHAMPTON. TELEPHONE: FALLINGS PARK, 31041 AND 31641



RUBBER INSULATED CABLES

The results of unrivalled research and manufacturing experience are embodied in B.I. Callender's post-war types of rubber insulated cables now at the service of the electrical industry.

BRITISH INSULATED CALLENDER'S CABLES LIMITED
NORFOLK HOUSE, NORFOLK STREET, LONDON W.C.2

POSITIVE PROTECTION *with* Metrovick Relays



Indispensable for protecting motors driving high inertia loads taking a high and prolonged starting current, but invaluable for all motors where protection is desired against:—

- MECHANICAL OVERLOADS
- SINGLE PHASING
- STALLING
- TWO AND THREE PHASE SHORT CIRCUITS
- FAULTS TO EARTH

Type
TFE

*For all problems in
protection—consult —*



G H 601
**METROPOLITAN
Vickers**

ELECTRICAL
TRAFFORD PARK MANCHESTER 17.
CO., LTD.

Switch to **METROVICK**

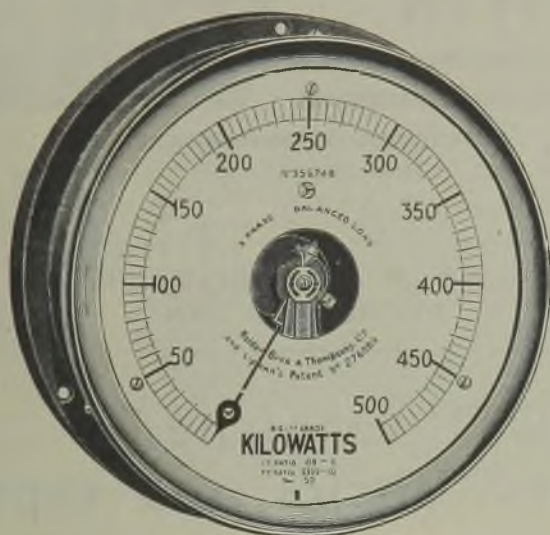
lighting

when daylight fades

NALDERS



LONG-SCALE INSTRUMENTS



The Wattmeter shown is typical of N.C.S. Long Scale Induction Instruments for the measurement of alternating currents, Ammeters and Voltmeters being sold at the same prices as moving iron types for equivalent scale lengths. Sizes range from 2½" to 20" diameter dials, every instrument being strong, accurate, efficient and well finished, its performance fully guaranteed by Nalders' experience and reputation.

Write for details and prices

NALDER BROS. & THOMPSON LTD.
DALSTON LANE WORKS, LONDON, E.8

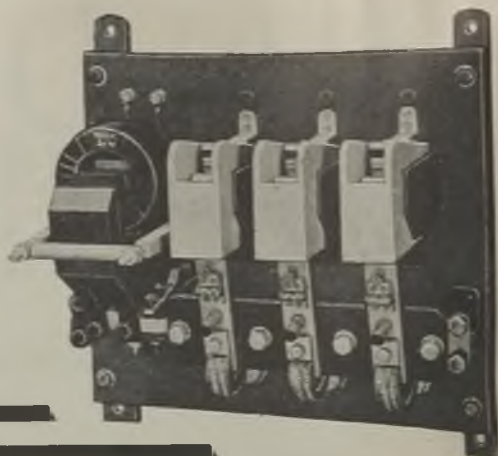
Telephone : CLIssold 2365 (3 lines)

Telegrams : " Occlude, Hack, London "

ELM

SWITCHGEAR

POWER



HEAVY DUTY A.C. CONTACTORS. UP TO 600 AMPS. AIR BREAK.
Mechanically held in, but with 'NO VOLT' protection suitable for push button or thermostat control.

PHONE :
4031

MILNE & LONGBOTTOM L^{TD}.
ROCHDALE · LANCS.

GRAMS :
ELM

IOCO varnished glass fabrics and tapes

VARNISHED GLASS FABRICS and TAPES . . .

- Build smaller and more efficient motors by using Ioco varnished glass fabrics and tapes. They are specially designed to resist high voltage at elevated temperatures.

We also manufacture INSULATING AND OILED FABRICS
FOR CABLE WORK. SWITCHBOARD RUBBER MATS.
AND ELECTRICIANS' RUBBER GLOVES

IOCO LTD. Annlesland **GLASGOW**

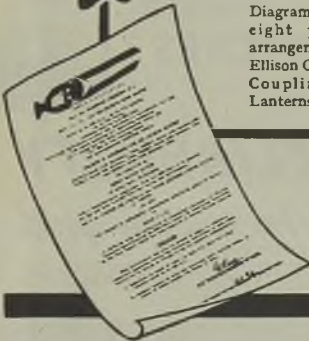
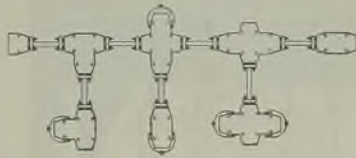


ELLISON LIGHTING FITTINGS IN A LEICESTERSHIRE COLLIERY



Lanterns are available in two sizes, for 60 watt and 100 watt lamps. Cable ends are supplied separately or bolted together to form two-, three- or four-way cable couplings. Extensions can be made easily.

Diagram showing eight possible arrangements of Ellison Cable End Couplings and Lanterns.



TRADE MARK

GEORGE ELLISON
LIMITED
BIRMINGHAM 22B ENGLAND



BURN TESTED SUPER-STEEL **CONDUIT**



Burn " Tested Super Steel Conduit, the outcome of a century's experience in the manufacture of tubes, embodies the quality, consistency and finish vitally necessary to a good job. Every Tube tested, passed and branded to British Standard Specification 31, and the "Bee" on every tube is your security—and ours.

BURN
 GEORGE
BURN
 LIMITED

CITY TUBE AND CONDUIT MILLS
 SMETHWICK, BIRMINGHAM

Telephone: Smethwick 1511 (5 lines)
 London: 70 Finsbury Pavement, E.C.2
 Liverpool: Caledonian Bldgs., 14 Tithebarn St. 2

W

Y

L

E

X"

SWITCHES

for

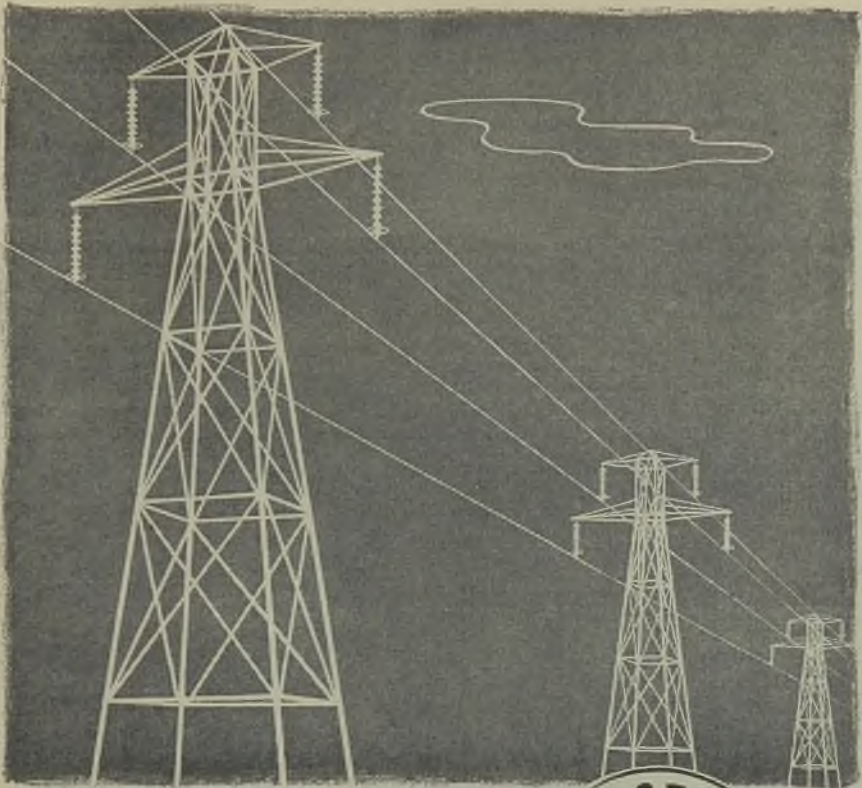
RELIABILITY

'Wylex must be good'

**GEORGE H. SCHOLES
 & CO. LTD.**

Wylex Works, Wythenshawe
 MANCHESTER





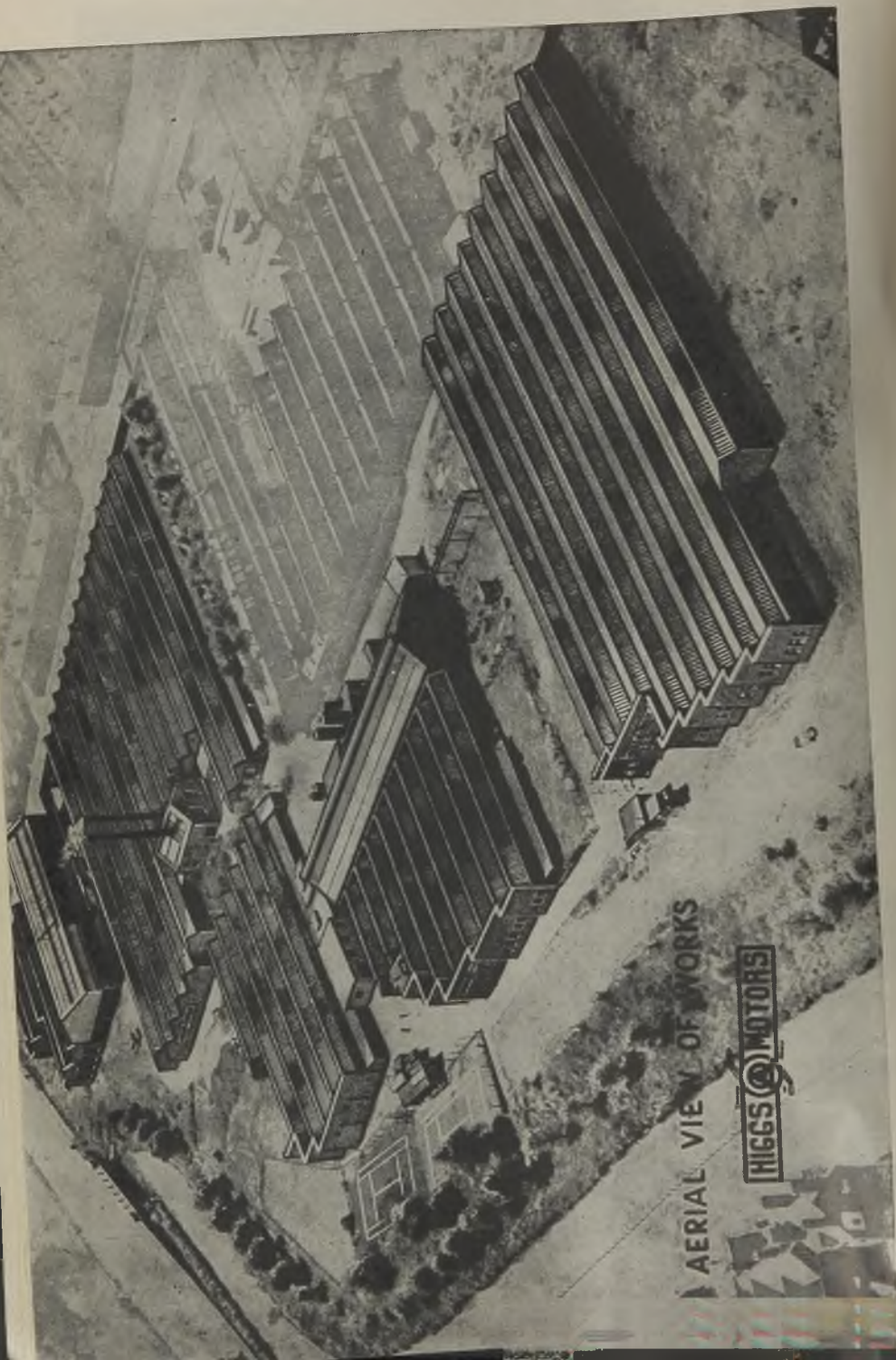
FOR EVERYTHING ELECTRICAL—

ELO offers a range of plastics products, and a specialised production service to meet all requirements in the electrical field. Send ELO your enquiries.



- mouldings for industry
- moulding powders
- resins solid, powdered or in solution, for all classes of bonding work
- insulating varnishes
- cements and lacquers
- anti-friction resins for fabric bearings
- casting resins
- capping cements
- paint resins
- filling compounds
- sealing fluids

Full information and data from:—SALES DEVELOPMENT DEPARTMENT
BIRKBY'S LTD., LIVERSEDGE, YORKSHIRE, ENGLAND



AERIAL VIEW OF WORKS





Eleco planned street lighting service is now again available. A consultation costs nothing. Eleco fittings are available for tungsten, sodium or mercury discharge lamps. Each type of fitting embodies the improvements suggested by Eleco's 40 years experience. Catalogues on request.

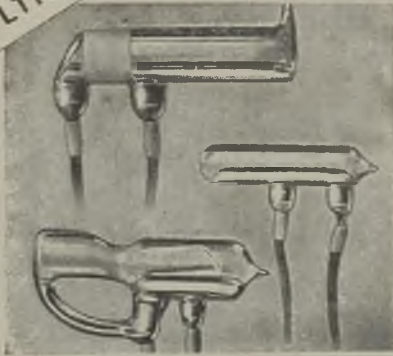
ENGINEERING & LIGHTING EQUIPMENT CO. LTD.

DEPT. W.S., SPHERE WORKS, ST. ALBANS, HERTS. 'PHONE 2258/9



TILTING TYPE

MERCURY SWITCHES



For instrument work, domestic and industrial apparatus and power control plant. Standard switches available or designed to any individual requirement. Write for catalogue or technical advice.

THE MERCURY SWITCH MANUFACTURING CO. LTD.
WEST DRAYTON : MIDDLESEX



From magnetic pole to magnetic pole, wherever magnetic circuits have to be designed for high efficiency, more and more manufacturers are specifying ★ "Ticonal" permanent magnets.

★ Mullard "Ticonal" magnets are anisotropic, i.e., they possess greatly increased properties along the preferred axis. They were the first anisotropic magnets commercially available: they are still the best.

"TICONAL" (Registered Trade Mark)

PERMANENT MAGNETS MADE BY MULLARD

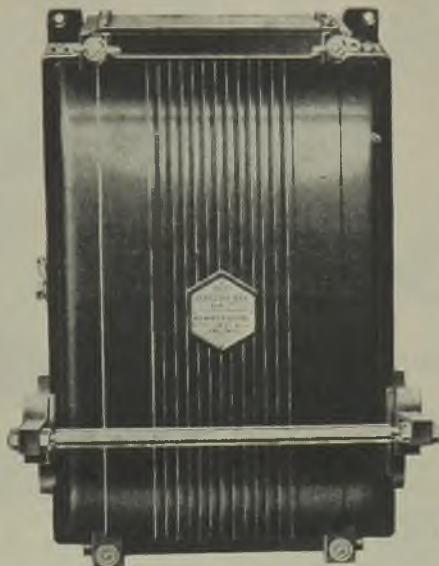
THE MULLARD WIRELESS SERVICE CO. LTD.,
 CENTURY HOUSE, SHAFTESBURY AVE., LONDON, W.C.2

PRECO

**MOULDED AND EXTRUDED
 PORCELAIN INSULATORS
 AND REFRACTORIES**

PRECISION EQUIPMENT CO
 (CERAMIC DEPARTMENT)
 175 BEDFORD AVE · SLOUGH

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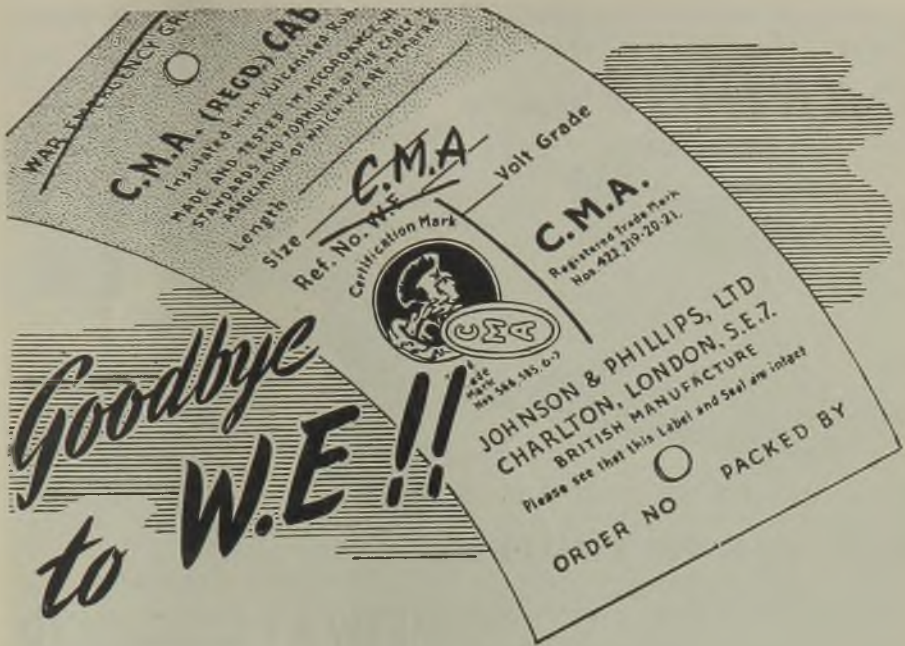


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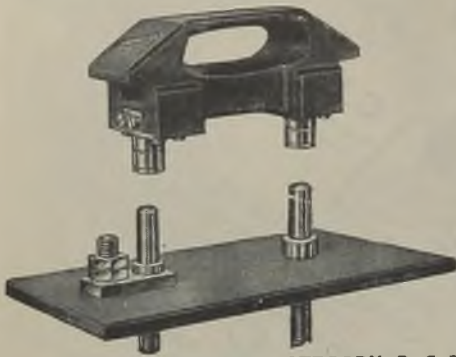
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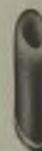
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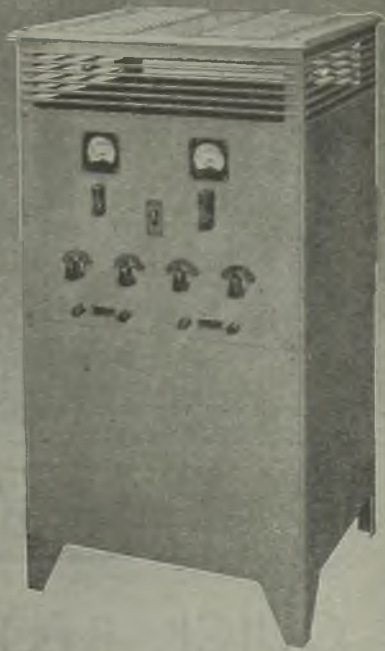
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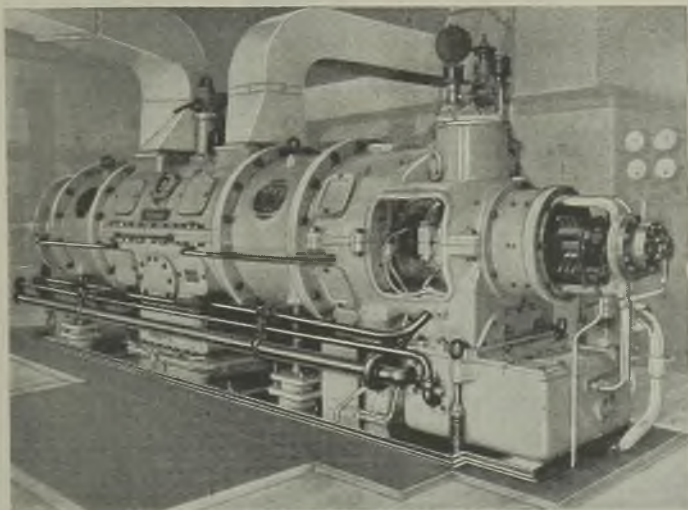
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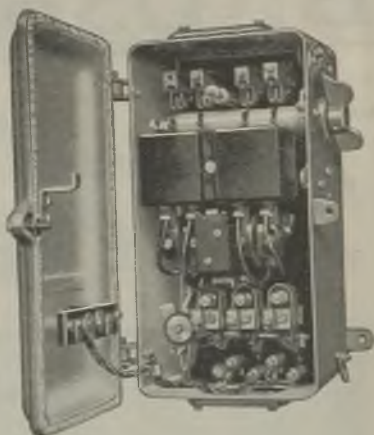
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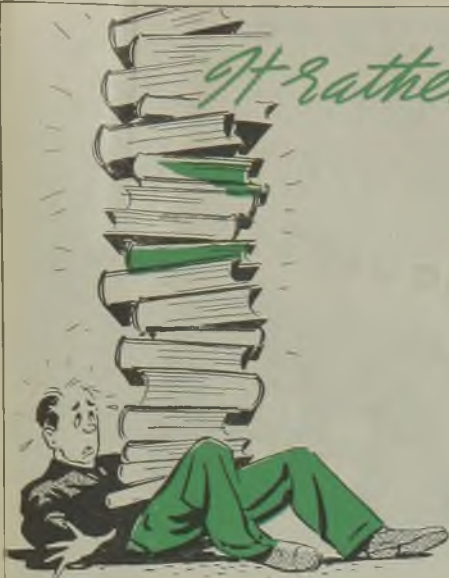
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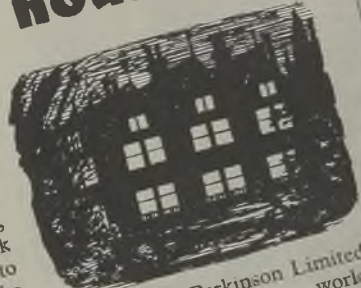
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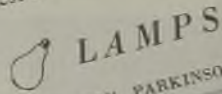
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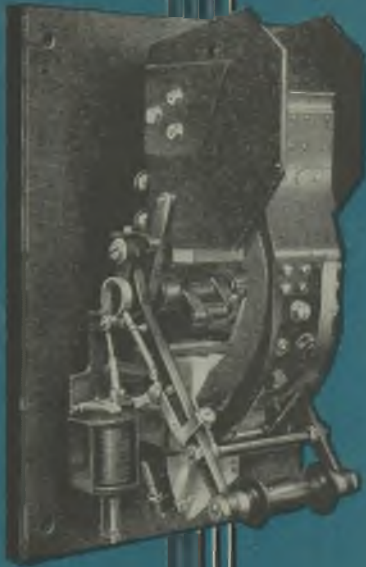
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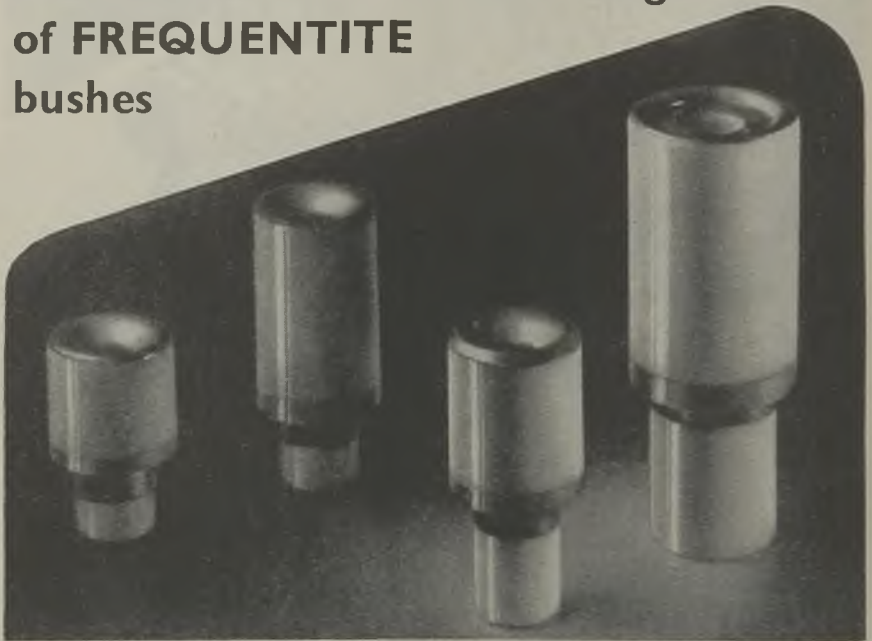
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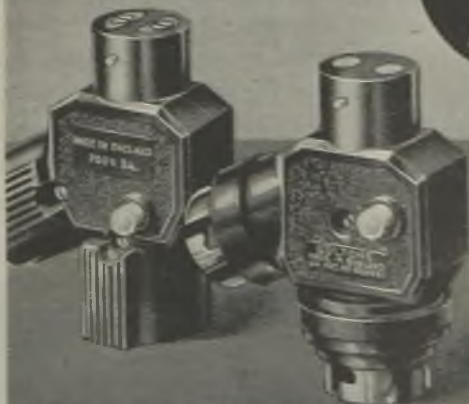
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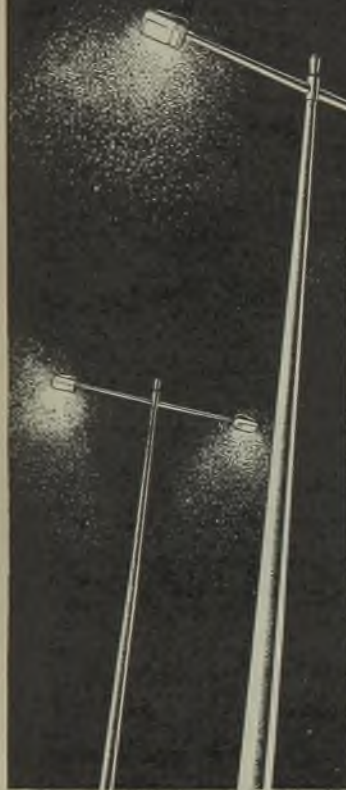
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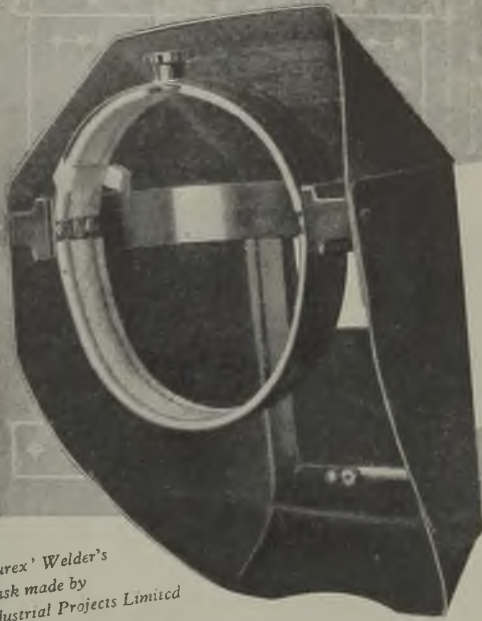
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November 1, 1946

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ELECTRICAL REVIEW

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Railway Electrification

Strong Case for Early Action

ALTHOUGH a session was allocated to railways and another to shunting locomotives during the recent conference on "Fuel and the Future," none of the papers that were then presented restated the case for what is probably the most promising single method of saving coal. That is the change over of the entire railway system of this country to electrical operation. It is only a coincidence, of course, that the ten million tons of coal required, according to some estimates, to meet the present annual deficit of mining output in relation to home requirements is approximately the amount which would have been saved through implementing the recommendations of the Weir Committee of 1931. Had these been followed, however, there would not now be the same reason for disquiet about our fuel stocks. Fifteen to twenty years were allowed for the completion of the scheme, so the benefit expected from the economies (i.e., in regard to denser traffic) would have become available by this time.

Release of High-Grade Fuel

Second only in importance to the quantity saved is the quality of the coal that could have been released for other uses. In order to permit of such a release to-day, though in a minor degree only, a number of steam locomotives are to be equipped for burning imported oil at a price two and a half times that of the coal. The comparison of oil with coal burned in power stations is even less favourable since, as Mr. R. W. Biles informed the Western Centre of the Institution of

Electrical Engineers, the latter has a true value of only some 70 per cent of the national average price.

The probability of permanently higher fuel costs and scarcity of the right kind for steam traction, although strongly reinforcing the argument for main-line railway electrification, does not by any means provide the only basis for its claims. In his chairman's address to the I.E.E. Mersey and North Wales Centre, Mr. R. Varley showed that the effect of the increase in capital costs since 1931 (which he considers could be appreciably alleviated by the general adoption of the third-rail system) would be very much more than offset by the higher fuel charges; these were apparently taken at about 18s. per ton by the Weir Committee.

Other Advantages

Forty-three years of experience of the Mersey Railway after its conversion from steam indicates that the lessons to be learned from the success of the Southern Railway and also of the other companies which have electrified parts of their systems are of extended application. The Weir Report established its case on economic grounds. Even so, financial estimates based upon previous traffic conditions have generally been falsified in a favourable sense by results. Those results have been achieved as a result of the very great increases in the number of passengers carried owing to the attractions of electrified service. Social consequences, to which exact monetary values cannot be assigned, have followed, such as dispersal

of population, cleanliness of the air and the inculcation of a travelling habit akin to that found in some other countries. While there are many demands upon the country's resources that must be met in the immediate future, plans should be worked out in detail now for the super-session of steam by electricity as soon as circumstances allow.

Overseas Trade It is apparent from the Board of Trade returns of overseas trade that the electrical industry is doing

as much as any other to bring about the increase in export trade necessary to this country's economic life. During the first nine months of the year exports of produce and manufactures of the United Kingdom as a whole were about 80 per cent above the 1938 level. At the same time exports of electrical goods, apparatus and machinery were up by 118 per cent. This was achieved in spite of the increased demands from the home market for electrical equipment of all kinds. Exports in 1946 have been at the rate of about £41 million a year, but it is considered that a figure of £65 million is attainable. Care has to be taken, however, that the export of equipment does not handicap the rehabilitation of home industries which themselves contribute to the export trade.

Swiss Tariffs RECOMMENDATIONS of a committee appointed by electricity supply undertakings in Switzerland, reported on another page, show that there, as in Great Britain (e.g., by the Tariff Committee recently set up by the Electricity Commission), the simplification of charges to domestic consumers on a standard two-part or block tariff basis is being actively investigated. The fixed component furnishes the greatest problem in both countries. Here the E.R.A. is undertaking extensive correlative studies of this aspect.

Safe Landing ALTHOUGH radar and blind-approach radio have increased the possibility of safe all-weather operation of aircraft throughout the twenty-four hours, ground lighting is still required and will, indeed, be desirable, if only as a check, even with entirely automatic blind landing. Since air transport is international the increasing standardization of

ground lighting and associated facilities should be also. It is therefore appropriate that the British Standards Institution should have issued, as mentioned in this issue, an up-to-date guide with a view to enabling pilots to understand, among other things, the purposes of the lights. The especial appropriateness lies in the functioning of its Aviation Lighting Committee as a sub-committee of the National Illumination Committee, which forms the British Committee of the International Commission on Illumination.

International Communications THE recommendation made at Moscow by technical representatives of the five Powers that world conferences on telecommunications should be convened in 1947 and 1948 marks an important step forward. Need for such action furnished the dominant theme of the presidential address of Sir Stanley Angwin (who led the British delegation) to the Institution of Electrical Engineers three years ago. During the war each country tended to develop independently in regard to both line and radio telephony, which are inextricably inter-related. Moreover the increasing use of wireless for a number of purposes has created obstacles to efficient working that call for an early allocation of frequencies. Technical requirements should provide the basis for international co-ordination, but political considerations will no doubt have the final word. The latter are likely to be all the more reasonable because of the preliminary collaboration between telecommunication engineers.

Anti-Social PUBLIC resentment of smoke emission, as Mr. Herbert Morrison told the National Smoke Abatement Conference, ought to be directed against offending residential chimneys as well as against their factory counterparts. Actually the former are the worse because more widely dispersed and because sentiment in favour of burning solid fuel is not an obstacle to electrification that confronts the industrialist. Their products are airborne for miles to pollute the countryside also. Smokeless zones are not everywhere feasible. In the City of London, for instance, their creation is prevented at present, as Sir George Elliston pointed out, by smoke from railway stations and from steamships in the Port.

Glass Insulation

Electrical Applications to the Processes of Manufacture

EVER since our pre-war visits to some of the motor manufacturers, when we heard it "whispered" that the threads of the new glass insulating materials were "turned" from glass marbles, the exact method of manufacture of this somewhat revolutionary development has remained rather a mystery to us. We therefore welcomed a recent opportunity to see how the material is produced at the Firhill and Possilpark, Glasgow, works, and at the weaving sheds, of Fibreglass, Ltd., at Strathaven.

This material is supplied in the form of threads, tapes, braidings and cloths for the insulation of, *inter alia*, motor-armature and electro-magnet windings and cables, and one can readily imagine a whole host of electrical uses to which the

type of glass which is quite free from alkaline metal oxides.

This particular glass is actually produced at the company's St. Helens factory, where the constituents are melted in a tank and the molten glass is caused to flow in a steady stream from which exact weights are cut off



The nine pieces of the bushing are fused together . . .

or sheared in appropriate amounts. The pieces of molten or soft glass fall into cups which deliver their charges to the spiral grooves in a pair of rollers. As the rollers rotate the glass passes along the grooves from one end of the rolls to the other, by virtue of the spirals, and the glass is delivered from the rolls in the form of marbles, each



... after which the nipples are gradually built up by depositing small amounts of platinum and then pressed to shape and drilled

material might be put.

A word of explanation as to why a special glass is used may first be advisable. The presence of alkali

in the glass may

render the glass itself a conductor in the presence of moisture, and to overcome these difficulties, use is made of a boro-silicate

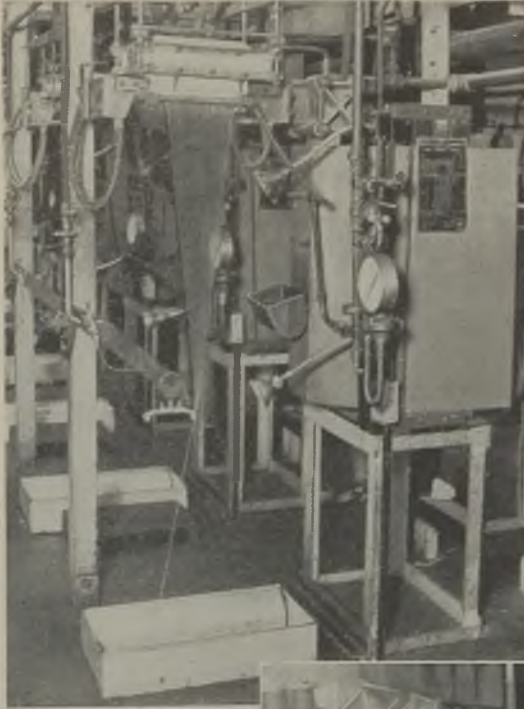


... Finally the bushing is placed in a framework of refractory bricks and the whole assembly, constituting the furnace, is held in a metal frame

of about $\frac{3}{4}$ inch in diameter, and the marbles constitute the essential raw material for the Glasgow factories.

The marbles are fed automatically into a small platinum crucible or bushing, which is electrically heated by virtue of its own

is required throughout the whole length of each bushing, and platinum is used for the construction of the bushing because of its



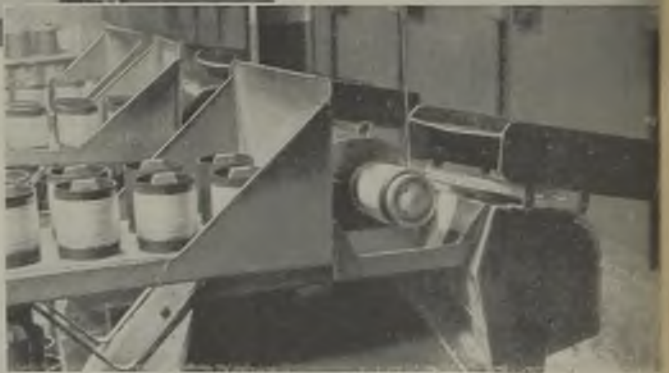
From the furnace the filaments are drawn down and bunched at a point where they pass over a sizing pad

resistance, a very heavy current at low voltage being passed through it from end to end by means of lug end terminals which are essentially part of the structure. The bushing is provided with a large number of specially constructed orifices in the bottom plate, and the molten glass flows through these orifices in fine streams or filaments.

The bushings are made by a special department at the factory, and to the electrical mind, at any rate, they constitute the most outstanding feature of the whole of the processes. Absolutely uniform temperature

resistance to the corrosive action of glass at high temperatures, and because of the ease with which it can be machined and built up, by comparison with certain alloys which might have the other desired properties. The platinum is received from the manufacturers in sheet form of the requisite thicknesses, and the necessary shapes and sizes are cut and fused together to form the bushing. This is trough-like and V-shaped towards the flat bottom, and it measures about 9 in. long, $3\frac{3}{8}$ in. wide at the top, $\frac{1}{2}$ in. wide at the bottom, and 5 in. high. All told, nine pieces go into the making of a bushing, and they are fused together by an oxy-hydrogen flame jet. The electrical terminal lugs are fused into the body of the bushing in the same way during the construction.

The most important operation is the formation of nipples on the flat bottom of the bushing. If the holes were just drilled in the bottom plate the molten glass would flood across from one hole to the next and so



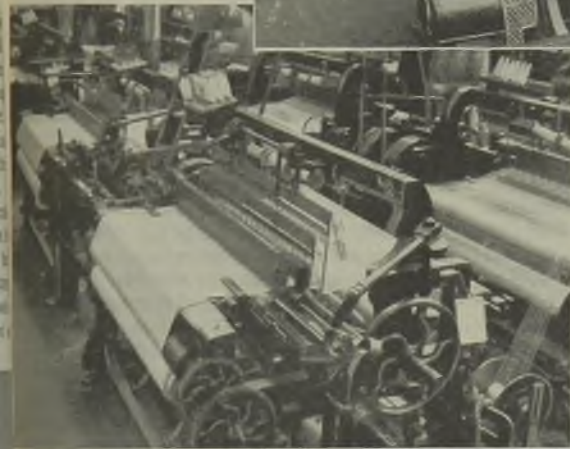
Immediately below the furnace unit the loose strand is wound on to a bakelite tube

result in one coarse fibre instead of two or more fine fibres. To obviate this the nipples are gradually built up on the bottom plate by depositing, successively, small amounts of platinum melted off on a length of wire. These nipples are then pressed to shape, and they are finally drilled out to the required size. The bushings are tested for leakage before

they are passed on to the factory proper, and this is effected by inserting the bushing terminals in the heavy copper water-cooled clamp terminals of a testing unit which includes its own 12-kVA transformer (B.E.T.) by which current is supplied to the bushing at about 2 V.

issue from the orifices in the bottom of the crucible in actual production are attenuated into fine filaments, each measuring 0.00025

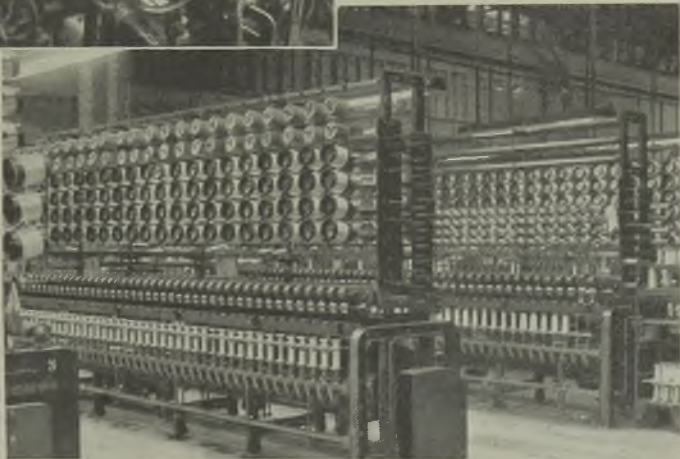
Right and below: In the weaving sheds the yarn is woven on standard textile looms into tapes and cloths



inch in diameter, by being wound on to a bakelite tube at a speed of over 6,000 ft per minute. More than 100 miles of filament are produced from one of the marbles, and the strand which is wound on the bakelite tube contains more than 100 filaments, while each lb of the strand contains more than 90,000 yards of filament.

On their way down to the winding tube from the furnace

Glass is not actually melted in this test, for which some other medium, which will detect leaks just as well, is used. After it has passed its test the pushing is placed in a framework of refractory bricks, specially shaped on site to fit the bushing, which heat insulate it, and the whole assembly is held in a metal frame. The unit formed in this manner constitutes the complete furnace



On standard textile machines the filaments are twisted and doubled into standard yarns

which is mounted at the top of the furnace unit in the actual production flow line. The fine streams of molten glass which

the filaments are grouped together at the point where they converge and pass over a pad to which a textile sizing agent is applied.

This sizing agent lubricates the fibres and protects them against mutual abrasion. In some subsequent operations, however, such as in the formation of low-pressure laminates with thermal-setting resins, this size is a

wheel projections. This wheel is driven by a tiny motor which transmits through a Crofts gear which reduces the speed from 1,425 to 70 r.p.m. Both the tube and the wheel motors are operated by Igranic pedal switches which actuate Allen West contactors.



Battery retainer mats are produced from a coarser fibre: laying out and spraying before drying

The tubes containing the filament are placed on the creels of standard textile machines on which the filaments are twisted and doubled into standard yarns. Generally speaking, the yarns which are to be used for wire covering are wound on cheeses in multiple parallel ends, while for other purposes, such as cloth weaving, the yarns are supplied on bobbins and cones, as desired. The yarn from the doubling departments in the Glasgow factories is passed on

to the weaving sheds at Strathaven where it is woven on standard textile looms, driven by Brook motors, into tapes and cloths. In these forms it is ready for dispatch to the insulator manufacturers who apply the actual insulation, namely, varnish. It is as well to stress here that, in common with the papers and fabrics, etc., used in connection with other insulating materials, the glass cloth or tape is merely the carrier, but the point of outstanding importance is that the fibre glass will stand up to any temperature that any known varnish can withstand, and that the basic material is non-hygroscopic.

Closely associated with this insulating medium are retaining mats which are placed against the active materials on the plates of electric accumulators. These mats are produced from a coarser fibre which is spread on tables in gauze-like laminations until, in each case, a mat of suitable thickness is built up. This mat is then sprayed with a starch solution or other binding material, and after drying it is cut to the required sizes and peeled to the necessary thicknesses. It seemed a very logical thing to find that most of the motors in the Glasgow factories are glass insulated and we noticed one glass-insulated motor which had been on a high-duty life test for seven years running 96 hours a week.

We are indebted to Fibreglass, Ltd., for permission to visit the factories and to publish this article, and to Mr. J. Boyd, managing director, Mr. R. C. B. Anderson, assistant to the managing director, and Mr. N. McPhail, technical assistant, for their help.

The continued melting and tube-winding process is essentially a long-term continuous one, because of the lengthy time required to heat up the bushing and because of the risk of crystallization of the glass as the result of varying the bushing temperature. Each furnace unit has its own 12-kVA single-phase B.E.T. transformer, which affords a supply at about 2 V by an Igranic three-stage, 10-point tapping switch by which the voltage is varied according to the temperature requirements. The very heavy busbar connections from the transformer to the furnace are water-cooled. The tube components of each winding machine is driven by a 0.95-H.P., 2,880-r.p.m., B.T.H. motor, and belt transmission from the motor to the tube results in a final speed of 4,000 r.p.m.

As the strand of filaments is wound on the tube it is traversed first from one side to the other of the tube by means of a wheel which revolves in almost the horizontal plane and has projections from its periphery which bear intermittently on the strand. Because, however, the tube is deliberately placed out of alignment with the filament stream, the strand traverses the tube in the opposite direction when it is released by one of the

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Can You Send a Man Out?

Notes on Motor-Starter Troubles

IN the course of a lifetime spent with all types of switchgear and motor control gear, the writer has found investigation of "troubles" of every kind not the least interesting part. Many of the complaints received turn out to have nothing to do with the starter at all, but somehow the latter seems a favourite target for criticism.

At the outset the writer would stress one thing: Hear all that is to be said in the way of information, but go out with an absolutely open mind. It is fatal to try to settle what is the cause of the trouble (in many instances) before seeing the job. Not infrequently a garbled tale is told which proves to have scarcely any real foundation, while one always has to be on the look-out for a so-called "electrician," who having done something silly or wrong, tries to cover himself by any means fair or foul, causing delay in getting at the real trouble. The great majority of electricians and men in charge are, however, not guilty in this way and are generally very grateful for help given—even if it means putting right some faulty ideas of their own.

Readers may like to solve the following problem. A small d.c. starter regulator of the faceplate type with no-volt and overload releases (before the days of under-voltage and overcurrent devices) was found, so far from reducing speed, actually to increase it. The motor was in order; so were all connections on the starter. The solution is given at the end of the article.

Earthed-Negative Circuits

In early days industrial equipment was sometimes connected to a 550-V traction circuit with earthed negative and many were the flashes and breakdowns to earth experienced between live parts and cases. Slotted covers were often used—the flash coming through the slot and scaring the operator. Automatic starters of the solenoid switch type (before the days of contactors) did much to enliven life and had their own peculiar troubles.

Lamps of various voltages and candle powers were mounted on top of the starter to give suitable resistances. An urgent call, necessitating a night journey, disclosed that the electrician, seeing the 220-V lamps were

By "Time Lag" only glowing red, substituted 110-V lamps, completely up-setting the interlock and the temperature of the coils. Another long night journey with only a voltmeter and a screw-driver was to attend to a large printing press. In spite of assurances from the borough electrical engineer that all connections were in order and had been checked again and again, the writer found the heavy series field was opposing the shunt, so that piling up the amperes on the controller produced no appreciable increase of torque—merely tripping the breaker.

Faults in A.C. Gear

Turning to a.c. gear, complaints seem more or less to group themselves, depending on the type of gear and also on the method of starting adopted. At one end of the scale are complaints of tripping that are due to nothing more serious than an omission to put any oil in the dashpots, although clear instructions had been given. In other cases oil has been omitted from oil-immersed switchgear, which has been operated in this state for many years without anyone knowing about it.

A switch blew up after the customer had overhauled it and given it a fresh filling of oil. The drum from which the oil had been taken was tracked down in the yard and found half full with an inch or so of water resting on top of the oil! Lubricating oil has also been used on occasion—the results not being good.

One of the most common complaints is that of tripping during starting; this applies more particularly to starters of the "loose-handle" type. In many cases all that is required is that the attendant should stay a little longer on each starting contact, thus reducing the current rush to the intended values on subsequent contacts.

Many starters are put into service without those responsible for their installation looking into the setting of the overload and time limit. The maker has to set these for something, but obviously adjustments are there to be used, according to the conditions of a particular installation. In general the overload setting should be kept as low as possible (in terms of percentage of full-load current),

relying on a high time-lag setting to take care of starting currents which do no harm for a short time.

In the opinion of the writer "single-phasing" is an over-rated bogey and with reasonable maintenance should rarely occur. It is often due to a fuse being on the small side or having deteriorated or been nipped, if of the wire type, by a careless wireman. Starters with anti-single-phasing devices no doubt do their job, but the writer's experience has been that, for all practical purposes, a good magnetic overload with a good time lag gives the requisite protection. Notwithstanding abnormal currents in the windings of a three-phase motor under fault conditions, if the customer sets the overload as low as possible consistent with the starting conditions and takes full advantage of the time-lag setting, he need not worry much about single-phasing. A setting of 20 or 25 per cent overload can often be used and, whilst not perhaps theoretically perfect, gives immunity from this trouble in any number of works. There are, of course, exceptional cases where it is not possible, by reason of load conditions at starting, to adopt so low a setting.

Too Much Soda

Liquid starters if properly selected and installed are excellent devices, simple and reliable and giving little trouble. It is not uncommon, however, for an electrician unfamiliar with their use to have the notion that they need a far stronger soda solution than is really required. The soda is piled in, often in solid form, and the resulting heavy-current rush trips the breaker and possibly brings a request "Can you send a man out?" Often the first things the "man" does are to empty the tanks, nearly fill them with plain water and add little by little equally to each tank a solution of soda made by dissolving the crystals in hot water in a separate receptacle. The merit of a liquid starter is that by such gradual adjustment it may function under a wide range of rotor-current, voltage and starting conditions. The density of the solution should be such that a reasonable starting current is passed, compatible with not too heavy a current rush on moving into the final short-circuiting contacts at the end of the travel of the electrodes.

Years ago interlock and auxiliary contacts used to be responsible for an infinity of trouble; now they are far less likely to fail. One case the writer recalls is that of the

refusal to function of a big slip-ring motor which had been installed by a local contractor. The motor makers begged the starter firm to pay a visit together with the wiring contractor. In a few minutes the wireman was frantically pedalling back to his stores to fetch a length of v.i.r. and some tubing. He had forgotten to wire up the interlock connection between the switch on the brush-lifting and short-circuiting gear and the starter. The consequence was that the no-volt coil was not energized and the starter, being loose-handled, would not function.

Here is one last word: Make certain the "juice" is really off. On one occasion, instead of having the very desirable interlocked isolator, the user had put up a very cheap and nasty triple-pole switch on the wall. This had been persuaded, it was thought, to open, but a nasty shock on starting to work on the starter proved otherwise. It was then found that one pole of the triple switch was too tired to come out with the handle in the off position.

Solution to problem stated earlier in the article.—First, the motor load was so light that the series resistance had hardly any effect in dropping the volts to reduce speed; secondly, the field current was abnormally high. A normal no-volt coil for a very small current was fitted to the starter; its resistance was so high that it actually weakened the field current to such an extent as to cause a slight increase in speed. A new no-volt coil was fitted together with a series resistance of lower ampere capacity suited to the actual load and with of course a much higher ohmic value.

Light and Plant Growth

"Artificial Illumination in Horticulture Critical Résumé" is the title of a report Ref. W/T11, by Dorothy Brandon, M.Sc. which has been prepared for the British Electrical and Allied Industries Research Association (4s. net). It gives a short account of the physiological principles underlying the effects of artificial illumination upon plants, the processes chiefly affected being photosynthesis and photoperiodism. A survey of experimental work in the field of plant irradiation from early experiments to the present day is followed by an account of the applications of the results of this work. Although much data have accrued, results are not easy to interpret owing to the small scale and varying conditions of most of the experiments and to the inadequate light sources used. Further research would clarify the position.

Views on the News

Reflections on Current Topics

OF the views, grave and gay, expressed at the Faraday House dinner, the most momentous for the immediate future was probably that of Mr. F. Smith in regard to young engineers released from the Forces. These men, he urged, should be given opportunities to gain the practical experience of which their service to the country has deprived them. Their conditions of engagement will no doubt often have to pay more regard to their potential value to industry than to their present normal earning capacity. A national scheme, of which particulars will shortly be available, has been worked out; it remains for employers, public and private, to give it full effect. The need will be, as Sir Noel Ashbridge said, for active engineers rather than for those whose main interest lies in securing office jobs.

* * *

Although many towns are being forced to put up their electricity charges there are still a few where the reverse is the case. One of these is Brighouse, and on reading the account of the proposed reductions in the local press I expected to find congratulatory remarks by the members of the Council. In point of fact, however, the policy was stigmatized as "Let us eat, drink and be merry, for to-morrow we may be nationalized!" Several members challenged the recommendation and an amendment was moved for its reference back. The dissatisfaction seems to have emanated from those parts of Brighouse not within the undertaking's area, on behalf of whom it was said that the reductions would aggravate the difference in charges. After the chairman of the Electricity Committee had, in his reply, described this as a "dog in the manger" attitude, the proposed reductions were approved.

In the electricity (and gas) rationing schemes put forward during the war one proposed penalty for excessive consumption was the cutting-off of the offender's supply. It was probably this as much as anything which killed the schemes, for such drastic action would have caused much despondency and alarm. Yet Mr. J. R. Struthers, general manager of the Sheffield Electricity Department (according to a local paper) thinks that

only drastic action can assure the 10 per cent economy for which Mr. Shinwell has called. He mentioned that such a method proved successful in Rome during the war when consumers were *permanently* cut off if they exceeded a certain quota. It has been tried in Eire, too, but in this case I am not sure that it went further than the threatening stage.

* * *

Fulham's lead in the matter of the sale of radio sets by its Electricity Department is being followed by a number of London municipal electricity authorities and the movement seems to be spreading beyond the Metropolitan limits. Ilford Corporation has placed an order for fifty sets for sale to the public and the Dartford Council has also adopted a scheme. The "Civic Concord" sets which Fulham and others are selling cost the public between £15 and £20. Specifications have been invited for television sets to cost between £60 and £70 exclusive of purchase tax. Naturally radio retailers are not pleased but as electrical retailers discovered long ago there is not much they can do about it.

* * *

In Belfast, municipal trading has received a set-back. A proposal that the Electricity Department should undertake the sale and installation of electrical appliances was recently rejected by the City Council, although only by a narrow majority. The proposal was to be included in a Parliamentary Bill; the 1926 Act, Clause 48 of which gave undertakings in Great Britain general powers for the sale and installation of "electric lines, fittings, apparatus and appliances," does not apply to Northern Ireland, of course.

* * *

Referring to my remarks last week about his salary, Mr. T. H. Carr, city electrical engineer of Bradford, tells me that I made a mistake with regard to the present figure. I said that in April last his salary was increased to £2,000. Actually, as from April 1st last the figure has been £1,700, rising to £2,000 after three years. The salary payable under the agreement arrived at by local authorities and their chief electrical engineers is £2,371 per annum.—REFLECTOR.

NEW BOOKS

Securing High-grade Production. Atomic Structure in Metallurgy.

Quality Through Statistics. By A. S. Wharton. Pp. 62; 19 graphs and tables. Philips Lamps, Ltd. Price 6s.

That a second edition of this practical handbook should be called for so soon after its original publication (reviewed in April of last year) is an indication of the interest now being taken in the subject as an aid to high-grade production of all manners of goods. The new edition has been revised in some respects in the direction of further simplification, still confining its scope to the more elementary aspects that are within the grasp of those with little or no statistical knowledge; mathematical formulæ are avoided as far as possible. The Philips tables have been extended to include $\frac{1}{2}$ and 3 per cent controls and also batch sizes up to 250,000, after which division into smaller sections should be considered. For those requiring more advanced knowledge of the subject a brief bibliography of other works on quality control is given.—C.O.B.

Atomic Theory for Students of Metallurgy. By William Hume-Rothery. Pp. 286; figs. 124; index. The Institute of Metals (Monograph and Report Series No. 3), 4, Grosvenor Gardens, London, S.W.1. Price 7s. 6d.

That branch of physics which deals with the structure of matter has undergone revolutionary changes during the past 20 years. Until comparatively recently the student of metallurgy often completed his training with very indefinite ideas on the inner structure of the metals and as a result his knowledge of physical metallurgy was based largely on empiricism rather than on that exactness which is the symbol of true science. The development of new ideas on atomic structure is now leading for the first time to a proper understanding of the properties of metals and alloys, and the present or future student of advanced metallurgy, for whom the book under review was primarily written, can no longer consider himself fully qualified in his subject if he has failed to acquire this new fundamental knowledge.

Dr. Hume-Rothery has undertaken the formidable task of collating the available data on atomic structure into a single volume and has produced a book which should make a special appeal to any enthusiastic metallurgist. He has dealt with a complex subject on a carefully conceived and thoughtfully executed plan, and it is indeed difficult to imagine any way in which the arrangement and presentation of the subject matter could have been improved.

It would be very easy for a monograph of this nature to assume a form that could be appreciated only by the mathematically minded, but the author, being fully conscious of this

danger, has constantly borne in mind the needs of the non-mathematical reader and has endeavoured to present his subject accordingly. In a study of this nature some knowledge of wave mechanics and of the quantum theory is essential to its proper understanding, but the author takes nothing for granted and any science student who is well grounded in physics should have no difficulty in following the very fascinating arguments which he puts forward. Moreover, reading is simplified by the numerous helpful diagrams with which the text is illustrated. The book cannot, in fact, be too highly recommended to anyone who desires enlightenment on current ideas on atomic structure, and provided the reader does not embark on his task too lightly he should derive both enjoyment and a fund of valuable information from its perusal.—J.W.C.

Starting a New Industry. By A. Laszlo, M.I.Mech.E. Pp. 54. Emmott & Co., Ltd., 31, King Street West, Manchester, 3. Price 2s. 6d.

The siting, staffing, starting-up and developing of new factories are among the subjects covered by this practical work. Achievements and failures in practical engineering work in different fields and countries over many years are analysed, and advice is given as to how to avoid the many pitfalls with which new enterprises are beset.

Books Received

Principles of Direct Current Electric Traction. By D. W. Hinde and H. E. Ingham. Pp. 248; figs. 179; illus.; index. George Newnes, Ltd., Tower House, Southampton Street, W.C.2. Price 15s.

Questions and Answers on Alternating Current Work. By E. Molloy. Pp. 144; figs. 98; index. George Newnes, Ltd. Price 5s.

Marconi 1939-1945—A War Record. By G. Godwin. Pp. 127; illus. Chatto & Windus, 40-42, William IV Street, London, W.C.2. Price 10s. 6d.

Electric Traction for Cranes. By Richard A. West. Pp. 86; figs. 28; index. Sir Isaac Pitman & Sons, Ltd., Parker Street, London, W.C.2. Price 15s.

Electricity in the Building Industry. By F. C. Orchard, M.I.E.E., A.M.I.Mech.E. Pp. 232; figs. 104; illus.; index. Chapman & Hall, 37, Essex Street, London, W.C.2. Price 15s.

Wave Propagation in Periodic Structures. By Leon Brillouin. Pp. 247; figs. and index. McGraw-Hill Publishing Co., Ltd., Aldwych House, London, W.C.2. Price 20s.

Electricity in Switzerland

Trends in Domestic Tariffs

IN Switzerland, the bulk of the electricity supply for domestic purposes has hitherto been transacted on the basis of multiple tariffs, with up to six meters in a single household. Moreover, meters are often of the two-rate type, requiring an additional time control. While the differentiation of charges according to use⁽¹⁾ and particularly the variation between day and night and between summer and winter, have had a beneficial effect on the load curves of undertakings, there is a growing tendency towards simplification. This is reflected in the revival two years ago of the Tariff Committee of the Association of Swiss Electricity Supply Undertakings and the setting up of two sub-committees, to consider the question of all-in tariffs, for urban and rural conditions separately. At a recent general meeting of the Association the position was reviewed by the committee chairmen concerned⁽²⁾.

Urban Areas

The sub-committee on urban conditions has not yet completed its report, but favours all-in tariffs in the two-part form, without, however, excluding the block form. In considering the kWh-charge component, it tends to recommend that the charge be made equal to the present cooking rate during day-time and to the present water-heating rate during night-time. The main difficulty is, of course, encountered in the fixed-charge component. This is unambiguously regarded as an equivalent of the loss due to the reduction of the present lighting flat rate, and not as a share in the standing costs of supply.

In order to find out which of the possible fixed-charge bases has the highest correlation with the lighting consumption, the sub-committee has arranged for numerous questionnaires to be sent out and an analysis to be made of the coefficients of correlation between this consumption and (a) number of main rooms, (b) lighted floor area, (c) annual

By "Electricus" rent, (d) total number of rooms, (e) number of main rooms plus rent, and (f) floor area plus rent. In all cases, a correlation coefficient of the order of 0.5 resulted, i.e., none of the several bases showed a significant superiority. It has, therefore, been decided to choose the simplest basis, but the considerations are not yet concluded.

Rural Areas

The sub-committee on rural conditions has already issued a first report. In this it recommends the following formula for assessing the fixed charge: Living rooms and bedrooms—counted as one room each; bathroom and servant's room, counted as half a room each; all other rooms (together), as one room in flats and as two rooms in houses. It further recommends a kWh charge of about 1d. during day-time and half the amount during night-time, with possible additional seasonal variation. This sub-committee, too, prefers the two-part tariff, but without deprecating an equivalent block form. Neither sub-committee excludes the provision of a special meter for the water-heating circuit, with special charges.

In comparisons with conditions in this country, it must be borne in mind that in Switzerland electric space-heating does not constitute a major factor, the proportion of flats is much higher, and (except for a few communities that levy a special tax on the rent of dwellings) no information equivalent to "rateable value" is readily available. A noteworthy feature is the insistence on charge differentiation between day and night, with a view to encouraging true off-peak loads.

Mining Electrical Engineers

THE president of the Association of Mining Electrical and Mechanical Engineers attended the opening meeting of the South Midland Sub-Branch for the 1946-47 session at Ashby-de-la-Zouch. Mr. J. H. TOWNEND, the new branch president, in his address, said that the extended use of new and improved methods, both for the production of coal and its preparation for the market, would in future involve the use of much electrical and mechanical equipment of a specialized nature, requiring for its maintenance and safe operation the services of trained and skilled men.

(1) In *Electrical Review*, August 30th, 1946, p. 344, the following average revenues per kWh were given: Lighting, 4.9d.; cooking, 0.9d.; water-heating, 0.4d.; miscellaneous thermal appliances, 1.4d.; etc.

(2) *A.S.E. Bulletin*, 1946, Vol. 37, p. 165.

PARLIAMENTARY NEWS

By Our Special Reporter

IN the House of Commons last week Lieut.-Col. Sharp asked the Minister of Supply if he would state the recent monthly production figures of powered hand-tools, such as electrically driven hand-saws and drills, which could be used in house building; to what extent supplies were augmented by imports or reduced by exports; and what action he was taking to increase the available supply.

Mr. Wilmot said that powered hand-tools were produced in a wide range of different types and sizes, and records of production, exports and imports were not maintained in sufficient detail to distinguish those which were suitable for use in house building. The supply position was at present being examined by his Department, in consultation with the Ministry of Works, with particular reference to the requirements of the housing programme.

Retail Stocks

On October 22nd Mr. R. Adams asked the Minister of Works, if satisfactory arrangements had now been made for retail stockists to receive supplies of electrical equipment surplus to W.B.A. requirements.

Mr. Tomlinson said that present production did not permit of the accumulation of stocks, and he was not aware of any need for special steps to divert additional supplies to the retail trade.

Usk Valley Amenities

On October 23rd Mr. Skeffington-Lodge asked the Minister of Town and Country Planning whether he had now considered the report of the local inquiry held about the proposal to erect an electricity generating station at Llanover in the Usk Valley; and whether he would make a statement.

Mr. Silkin said he had considered the report of the local inquiry and had come to the conclusion that the use of the proposed site for this purpose would be open to serious planning objections. In his view, it had not been established that no alternative site could be found where these objections would not arise. He had, therefore, recommended to the Electricity Commissioners that the proposed site should not be used for a generating station. The Commissioners had informed the South Wales Power Co. accordingly and had suggested that the company, in consultation with the Central Electricity Board, should endeavour to find a suitable site in some other locality.

Wireless Licences

On October 24th Sir John Mellor asked the Assistant Postmaster General whether he had now revised the wording of Form T273W, concerning the renewal of wireless receiving

licences, so as to make clear to addressees that they were not under any statutory obligation to reply.

Mr. Burke said that the text of form T273W had been revised and the new print would be brought into use very shortly. The revised wording contained nothing to imply that the addressee was under any statutory obligation to reply.

Plug Standardization

Mr. Erroll asked the Minister of Supply what progress was being made towards the standardization of a domestic electric socket and plug, in view of the urgency of the housing programme; whether a standard specification had been issued, and whether the principal manufacturers had agreed to its adoption.

Mr. Wilmot said that the majority of manufacturers had been using the British Standards Institution specification for some considerable time.

Mr. Erroll then asked if the Minister had knowledge of a new standard plug and socket under consideration.

Mr. Wilmot replied in the affirmative.

I.M.E.A. Notes

THE Council of the Incorporated Municipal Electrical Association is making representations to the Electricity Commissioners regarding the inadequate allocations of lead for the manufacture of cables for the electricity supply industry. The matter was raised at a recent meeting of the Council by Mr. E. A. Mills, chairman of the I.M.E.A./C.M.A. Joint Liaison Committee, who called attention to the fact that unless the allocation to manufacturers was increased there would be serious delays in providing electricity supplies to a number of housing schemes.

War Damage.—The *I.M.E.A. Journal* says it is understood that if time can be found in the legislative programme the Public Utilities War Damage Bill will be introduced in the forthcoming session of Parliament.

Centre Representation on Council.—The following Centre representatives have been appointed to serve on the Council of the Association for 1946-47: Central England, Mr. G. W. Clarkson; Mid-East England, Mr. F. Nicholls; North-East England, Alderman M. Bloom and Mr. T. E. Daniel; North-West England and North Wales, Mr. G. C. Milnes; South-East and East England, Mr. W. Affleck; South-West England and South Wales, Mr. Dawson Thomas; and Scottish Centre, Mr. W. J. Cooper and Councillor W. Gerrard.

CORRESPONDENCE

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

Motor Time Ratings

IN the article entitled "Choosing Electrical Machines" published in your issue of October 25th, "Works Engineer" refers to the momentary overload capacity of totally enclosed motors as being 100 per cent in torque for 30 sec. This applies only to short-time rated totally enclosed motors. Continuously rated machines of this type develop 50 per cent overload in torque for one minute and 100 per cent for 15 sec: normally works use this continuous rating, so that it is important to remember this limitation.

Chislehurst, Kent. A. N. D. KERR.

Unsafe Installations

IN his letter last week "Rational" asks: "What is to be gained by those so-called safe installations?" The answer is simply this: Satisfaction to the contractors and to the users. So far as insurance companies are concerned, the present principle seems to be that if one company will not accept a risk, another will.

The "Death on the Road" argument is played out and I repeat what I have previously stated that if one death is caused by a faulty installation that is one too many. Those who are doing all in their power to achieve compulsory registration of contractors and operatives are doing so without selfish interests and "Rational's" standpoint appears to be like many others, namely, to retard a much-needed reform. Such people are stumbling-blocks to progress and that is the reason (to use the Editors' words) why we have a "hard row to hoe."

Glasgow, C.2. ALEX. MILNE, Sen.

Power-Factor Correction

WITH reference to Mr. H. Neale's letter in your issue of September 27th, whilst first principles must come first, there are one or two points on which clarification will be welcome to the potential user and designer of power-factor correction capacitors.

1. It is not mentioned under which conditions the necessarily higher cost would be justifiable, if as suggested the power factor of a motor is corrected to the same

value at all loads instead of with a view to limiting the kVA demand: it may be the lowest power factor. Moreover the danger of occasional leading power factor when it is theoretically corrected to a figure near unity is not easy to avoid, as under such conditions the power factor also depends on fluctuations of the supply voltage and frequency.

2. Case B is based on the assumption that the reactive load and the kilowatt load of a motor vary approximately in proportion. If this were so the uncorrected power factor could not vary with the loads, the vector diagrams for the various load conditions being similar with identical angles. Furthermore it is not clear how under such conditions one and the same capacitive load—as given by the equation—could be corrected to the same power factor at different loads.

H.P.	Efficiency per cent at:			Uncorrected p.f. at:			Corrected p.f. at:		
	4.4	3.4	1.2	4.4	3.4	1.2	4.4	3.4	1.2
	load			load			load		
60	90	89	87	.83	.77	.63	.95	.935	
15	88	85.5	87	.81	.75	.63	.90	.87	.80
12	85	84	80	.80	.75	.65	.94	.92	.915
5	81	79	75	.82	.79	.75	.88	.87	.86

which would mean compensating reactive components of different values (namely, kW ($\tan \phi = \tan \phi_c$) whereby kW varies whilst ϕ and ϕ_c are constant according to the assumption).

The actual conditions could best be seen from a few values referring to motors of a well known make as shown in the accompanying table.

London, W.4. Z. M. RAHT.

School Lighting

REPLYING to Mr. Downer's letter in your issue of October 25th, I am in complete agreement with his suggestion that light of too high an intensity and injurious character is being very wrongly advised as necessary in many spheres. There are many who must agree that increased light intensity far above the normal 4 to 5 ft-candles acts as an irritant to the optic nerve, even apart from lighting which has the power of creating a stroboscopic effect.

The B.S. Code of Practice for Schools

mentions the need for maintaining a 12 ft-candle light area at 2 ft 9 in. above the floor level and favours fluorescent lamps as the illuminating factor. After studying the effects of diffused lighting in many large civil and industrial undertakings working to capacity with little or no effect upon the workers' eyesight, one may ask who are the gentlemen responsible for the publication of the B.S. Code of Practice for Schools.

The many controversies which have arisen over the introduction of fluorescent lighting have still to be proved, but the necessity of proof surely does not have to be in the form of an experiment carried out upon school children.

Orpington, Kent.

G. C. WATT.

[The Codes of Practice Committee, which was initiated in 1942 by the Minister of Works, is composed of nominees of principal technical institutions and other bodies who have special knowledge and experience of the subject under consideration in each case.—EDITORS, *Electrical Review*.]

Rapid Retirement

WITH demands for reduction in working hours occupying a large part of the front page to-day, it must come as a pleasant surprise to the staff of public utility undertakings to find that one undertaking has "gone the whole hog" by reducing the working life to nil. Candidates for appointment as draughtsmen at Gravesend will note with considerable interest that having passed their medical examination (which is presumably before taking up their posts) they will thereupon be *superannuated*. What could be nicer?

Norwich.

W. G. WESTON,

Chief Administrative Officer,
Norwich Electricity Department.

Electricity Nationalization

THE Minister of Fuel and Power (Mr. Emanuel Shinwell) stated on Tuesday that the I.M.E.A., the Conference of Joint Electricity Authorities and Joint Boards, the E.T.U. and the E.P.E.A. had indicated their willingness to co-operate in the carrying out of the Government's policy of nationalization.

Asked by Mr. Palmer (Wimbledon) whether it was not a fact that the electricity companies alone had refused co-operation in carrying out the decision of the nation to bring electricity under complete public ownership, Mr. Shinwell said it was not quite clear that they had refused co-operation; they had said something about it, but it had got to be analysed.

Municipal Reports

Portsmouth.—Mr. R. H. Coates, who succeeded Mr. B. Handley as engineer and manager during the year under review, reports that the main feature of 1945-46 was the firm evidence of the consumers' desire to increase greatly their use of electricity. In spite of the continued scarcity of apparatus, energy sales rose by 16 million kWh during the year; this increase is more than the total sales were in 1926.

While the number of consumers now connected is less than in 1940, the consumption has risen by nearly 50 per cent. Last year sales, excluding bulk supplies of 55 million kWh, aggregated 157.1 million kWh. Of this total 104.2 million kWh was for lighting and domestic purposes, 43.6 million for industrial power, 7.7 million for traction, and the remainder for public lighting. The Department itself generated 236.3 million kWh. Mr. Coates mentions that during last winter it was necessary to reduce the output of the generating station on one or two occasions owing to stocks of coal reaching a dangerously low figure—on March 31st last they had only just over one week's supply in hand.

The accounts show a gross revenue of £1,077,815 against £988,888 in 1944-45. The gross profit was reduced from £157,266 to £103,726 and on the net revenue account there was a deficit of £9,245 compared with a profit of £32,776 in the preceding year. (Last year's accounts, however, include an additional expenditure item of £14,471 for adjustments to previous years' trading). Including capital expenditure defrayed out of revenue, the deficit charged to the reserve fund was £24,626 (against a surplus of £29,278).

Plymouth.—The past year's report of the city electrical engineer (Mr. H. Midgley) is the first to be published since 1939, and it therefore contains a survey of the intervening years. As a result of the destructive raids on the city the number of consumers fell during the war by more than 10,000, but there has since been a gradual increase as progress has been made with the conversion of houses into flats. Although the number at March 31st last (51,627) was still well below the pre-war total of 58,468, sales of electricity during the past year reached the record figure of 68.9 million kWh compared with 50.8 million in 1939-40. Despite the many difficulties, including a direct hit on the station which destroyed a large section of the main switchgear, two plant extensions were carried out during the war with very little delay beyond the scheduled dates of commissioning. The output of the generating station last year was 160 million kWh, compared with 75.3 million in 1939-40.

During the years 1941-43 there were trading losses on the undertaking of £41,617 and £42,224, respectively, but in the ensuing three years profits have been recorded, the surplus for 1945-46 being £11,991.

Smoke Abatement

IN a written communication to the annual conference of the National Smoke Abatement Society, held at Brighton from October 24th to 26th, Mr. HERBERT MORRISON assessed the yearly cost of atmospheric pollution in Great Britain that is caused by 3 million tons of smoke at £50 million (apart from such matters as ill-health). In addition there was the waste caused by unburnt gases. The Department of Scientific and Industrial Research had shown that black smoke from an industrial chimney might waste 10 per cent of the heat of the coal. Smoking domestic chimneys were also anti-social. The Ministry of Fuel had reduced the emission of SO_2 and smoke by 10 per cent in a single year.

In his presidential address to the 200 representatives of municipal authorities and other interests present SIR GEORGE ELLISTON said that $2\frac{1}{2}$ million tons of coal (5 cwt per family), were wasted annually as smoke, at a cost in damage to buildings and property which had been conservatively estimated at £2 million per week. This tonnage was equivalent to the work of 10,000 miners in addition to a greater number of people employed in making good the damage. The City of London had recently secured statutory authority to require all new fuel-burning installations to be approved by the Health Department and was awaiting a report on district heating in its bomb-shattered areas.

MR. C. GANDY (chairman, Executive Committee), said that soot deposits in rural areas averaged at least 10 tons per sq mile per annum. Two-thirds of the 3 million tons emitted in solid form was too fine to descend by gravity. Carried upwards to the lowest temperature inversion (33,000 ft), some 40,000 tons usually hovered over the whole country cutting off light and causing a loss in agricultural productivity of 20 to 30 per cent.

Jerusalem Supply Case

UR Jerusalem correspondent reports that as a result of stoppages of electricity supply through breakdowns in the plant of the Jerusalem Electric & Public Service Corporation, Ltd., an action for damages was recently brought against the Corporation by the firm of Bernard Joseph & Co.

The Jerusalem Magistrates Court ordered the Corporation to pay nominal damages of £20, with costs, "for non-fulfilment of its duty in cutting off the supply of electricity to the plaintiff's office in Jerusalem on December 3rd and 11th, 1945. Giving judgment, Mr. Yedid-Levi said that both parties considered the action as a test case. Defendants contended that an interruption on December 3rd had been caused by a breakdown, while the stoppage on December 11th was made to avoid a major breakdown. Mr. Yedid-Levi stated that it was evident that part of the defendants' plant, in the winter of 1945, was old and that breakdowns

occurred periodically. They could thus not be considered either unforeseen, fortuitous or unexpected. From 1939 to the end of 1945 no plant was received, and not until 1944 were orders placed for new machinery. No substantial orders were placed for spare parts before the end of May, 1944. Spare parts, though less efficient and more expensive than in Britain, were then being produced locally.

It appeared from the evidence, Mr. Yedid-Levi said, that the interruptions resulted from the defendants' failure to maintain the plant properly: defence witnesses had admitted that through lack of spare parts the plant could not be kept in efficient running condition. The negligible orders placed during the war for spare parts contradicted the assertion of the general manager, Mr. Campbell Brown, that every effort had been made to obtain spares and to maintain the plant to cope with the increasing consumption of electricity. It had not been beyond the power of the defendants to try to improve the situation by approaching the Palestine Electric Corporation with a request for co-operation. Mr. Campbell Brown had agreed that such co-operation could be worked out. The Corporation is to appeal.

Whale Factory Ship

UP to 85,000 lb per hr of steam required for boiling whale meat and extracting oils in the whale factory ship *S.S. Balaena* is obtained from the exhaust of a back-pressure geared turbo-generator instead of from independent low-pressure boilers—the first instance of its kind.

The turbine runs at 5,000 r.p.m. and drives a 1,500-kW 550-r.p.m. 220-V d.c. generator. Full load is obtainable with back pressures up to 80 lb per sq in. (gauge) as determined by the back-pressure governor setting. Steam conditions are normally 200 lb per sq in. (gauge) and 530 deg F (but 730 deg is permissible). If more steam is required than that corresponding to the electrical load, the balance is obtained by by-passing the turbine through a reducing valve. The same normal steam conditions are employed for a 75-kW two-crank compound steam engine which exhausts against a back pressure of 15 lb per sq in. or into a vacuum of 26 in. Hg.

On the whaling ground the output of the turbo-generator will depend upon the demand for process steam. It will run in parallel with two 300-kW six-cylinder four-stroke vertical 410-r.p.m. Diesel sets having jackets cooled by fresh water provided by means of a self-contained heat exchanger, which gives up its heat to salt water provided by a vertical motor-driven pump with a capacity of 12,000 gal per hr.

The starting air bottles are charged from either a Reavell compressor or from a Hams-worthy "Distar" set driven by a Lister Diesel engine. All the main plant and other accessories were constructed by W. H. Allen, Sons & Co.

Forthcoming Events

Monday, November 4th.—BIRMINGHAM.—James Watt Institute, Great Charles Street, 6 p.m. I.E.E. South Midland Centre. Informal meeting. "Rehabilitation of Electricity Supplies—Italy," by Col. W. M. Lapper.

Tuesday, November 5th.—LEEDS.—Corporation Electricity Department, Whitehall Road, 6 p.m. I.E.E. North Midland Centre. "Rural Electrification: the use of the Single-Phase System," by J. S. Pickles and W. H. Wills.

LONDON.—At E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, W.C.2, 7 p.m. Electrical Power Engineers' Association (London Local Group). "Flue-Gas Treatment," by Dr. W. Francis.

Oddfellows' Hall, 186, Hammersmith Road. 7 p.m. Association of Supervising Electrical Engineers (West London Branch). "Post-War Utilization," by W. Gilchrist.

GLASGOW.—Gordon Restaurant, 7.30 p.m. Electrical Society of Glasgow. "Fluorescent Lighting," by H. R. Ruff.

Wednesday, November 6th.—LONDON.—Institution of Electrical Engineers, Radio Section, 5.30 p.m. "The Pulse Testing of Wide-Band Networks," by D. C. Espley, E. C. Cherry and M. M. Levy.

At the Institution of Mechanical Engineers, Storey's Gate, Westminster, S.W.1. 6 p.m. Institution of Heating and Ventilating Engineers. Special meeting. "Ventilation and Cooling in London's Tube Railways," by S. C. Mount.

I.E.E. London Students' Section, 2.30 p.m. Visit to the works of the Metal Box Co., Ltd., North Circular Road, Palmers Green, N.13.

MIDDLESBROUGH.—Cleveland Technical Institute, 6 p.m. I.E.E. Tees-side Sub-Centre. Address by T. M. Ayres.

Thursday, November 7th.—LONDON.—Institution of Electrical Engineers. 5.30 p.m. "The Extinction of Arcs in Air-Blast Circuit-Breakers," by A. Allan and D. F. Amor. "The Influence of Resistance Switching on the Design of High-Voltage Oil Circuit-Breakers," by H. E. Cox and T. W. Wilcox.

TAUNTON.—Corporation Electricity Department's Theatre, The Parade, 3 p.m. I.E.E. Devon and Cornwall Sub-Centre. "Street Lighting," by E. C. Lennox.

Friday, November 8th.—LONDON.—Institution of Electrical Engineers, Measurements Section, 5.30 p.m. Discussion on "Current and Voltage Transformers for Protective Gear Purposes," to be opened by J. G. Wellings and F. J. Lane.

Grosvenor House, Park Lane, W.1, 8.30 p.m. Electrical Industries Benevolent Association Ball.

Institution of Mechanical Engineers, 5.30 p.m. Extra general meeting. "Feed Distribution and Hunting in Marine Water-Tube Boilers," by H. Hillier.

MANCHESTER.—Engineers' Club, 17, Albert Square, 6.45 p.m. Manchester Association of

Engineers. "Motion and Movement in Modern Engineering Practice," by R. Laban and F. C. Lawrence.

BIRMINGHAM.—Chamber of Commerce Building, New Street, 7 p.m. Society of Instrument Technology, Midland Section. "Earth Resistances, their Nature and Measurement," by G. F. Tagg.

NEWCASTLE-ON-TYNE.—Old Assembly Rooms, 8 p.m. I.E.E. North-Eastern Students' Section. Annual dance.

Saturday, November 9th.—I.E.E. North Midland Students' Section. Visit to the works of the Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, Manchester.

I.E.E. North Western Students' Section. Visit to Aerialite, Ltd., Stalybridge.

LONDON.—Paviour's Arms, Page Street, S.W.1, 7 p.m. Junior Institution of Engineers. Annual dance.

Monday, November 11th.—CARDIFF.—At the South Wales Institute of Engineers, Park Place, 5 p.m. I.E.E. Western Centre. "Power Supplies to Generating Station Auxiliary Services," by W. Szwander.

NEWCASTLE-ON-TYNE.—Neville Hall, Westgate Road, 6.15 p.m. "Engineering Principles Applied to the Design of Domestic Water-Heating Installations of the Solid-Fuel/Electric Type," by R. Grierson and Forbes Jackson.

Tuesday, November 12th.—LEEDS.—Corporation Electricity Department, Whitehall Road, 6 p.m. I.E.E. North Midland Centre, Installations Group. "Electrical Control of Dangerous Machinery and Processes," by W. Fordham Cooper.

Fuel and Power

Main Line Electrification "a Coal Saver"

SIR JOHN DALTON, director of the County of London Electric Supply Co., Ltd., in his presidential address to the London Fuel Club at the Connaught Rooms, London, on Thursday last week, said that main line railway electrification was a certain coal saver. Three and a half million tons of coal converted into electricity would do the same work as thirteen and a half million tons of coal burned in steam locomotives. He thought it was time that the prospect of saving some ten million tons of coal and over twenty million pounds a year should get some notice in all the welter of fuel talk now going on.

No less a person than one of the Electricity Commissioners, speaking recently, had made it clear that domestic consumers in this country get their electricity cheaper than do domestic consumers in the United States and in Sweden, where water power provided respectively over 32 per cent and over 97 per cent of the total electricity generated. Moreover, we were very near prices charged in Canada with over 79 per cent and in Switzerland with practically 100 per cent water power.

PERSONAL and SOCIAL

News of Men and Women of the Industry

IN connection with the erection of a new electricity station at Huncoat, costing £5,000,000, Accrington Corporation Electricity Committee has recommended that **Mr. H. Clarke** (who has consented to act as the Corporation's adviser on the design, construction and commissioning of the new station) shall be paid a fixed sum of £125,000. Out of this Mr. Clarke will pay £15,000 to the borough electrical engineer, £11,000 to other officers and members of the staff, and £9,000 to other special staff appointed by the Corporation. The terms of remuneration have to be approved by the Central Electricity Board.

The Committee has also recommended that the salary of **Mr. A. Goward**, borough electrical engineer, in accordance with the approved scale, shall be £1,300 per annum as from April 1st, 1947, rising to £1,526 per annum. Out of this he will pay £150 per annum for six years to the deputy engineer for additional responsibility to the borough electrical engineer, retaining superannuation rights in respect of the whole salary.

Mr. A. J. Ryan, who last year retired from the position of borough electrical engineer of Hastings, has been elected an associated member of the Incorporated Municipal Electrical Association.

Mr. F. S. Taylor, commercial assistant with the Newcastle-on-Tyne Corporation transport and electricity undertaking, has been appointed to the newly-introduced post of deputy general manager. Mr. Taylor has been with the department for fifteen years. He is an associate member of the Institute of Transport and a member of the Financial Officers' Standing Committee of the Municipal Passenger Transport Association.

The "Gothics," the Norwich works football club of Laurence, Scott & Electromotors, Ltd., is having a remarkable run of success in the F.A. and A.F.A. cup contests. At the time of writing they are the only amateur club in Norfolk and Suffolk left in both competitions.

Mr. A. W. Bunn, manager of the London and West branch of Hoover, Ltd., has been appointed to the new post of sales promotion manager to co-ordinate all sales matters between Hoover dealers and branch and district managers. Mr. Bunn, who is the brother of Mr. F. H. Bunn, director and general sales manager of the company, is succeeded as manager of the London and West branch by **Mr. H. E. Duggans**.

The G.E.C. Dramatic Society presented its third post-war play, "Give Me Yesterday," a comedy by Edward Percy and Reginald Denham, at Magnet House, Kingsway, W.C.2,

from October 7th to 11th. William Peacock gave a fine performance as the professor of music, Nicolai Szapary, while Millar Dixon and John Smithells did well as his protégé Richard Dahl and his grandson Dick Franz, respectively. Moira Threlfell gave a competent character study in the part of Caroline, the housekeeper. Other creditable performances were given by Vivianne Richardson, Elsie Walbaucke, Donald Glanfield, Irene Charles and Julie Thomas. The play was produced by Dudley Pearmain, and the proceeds will be handed to the E.I.B.A.

During the recent exhibition of high-voltage cables arranged by British Insulated Callender's Cables, Ltd., at Dorland Hall, a visit was paid by **Sir Alexander Roger**, chairman of the company. In the accompanying picture, Sir



Sir Alexander Roger, chairman of British Insulated Callender's Cables, with **Dr. G. Brazier**, research manager, at the Dorland Hall display of high-voltage cables

Alexander is seen with Dr. G. Brazier, research manager, examining a full-scale model of a 132-kV sealing end for impregnated pressure cable.

On Tuesday of last week the staff dinner of the Erith Corporation Electricity Department was held at Electricity House, Erith, and the opportunity was taken to wish God-speed to **Mr. E. A. Logan**, the borough electrical engineer, on his departure to take up the position of engineer and manager in the Electricity Supply Division of the Government of Burma.

After the toast of the Erith electricity undertaking had been proposed by the Mayor of

Bexley (Alderman J. C. McLean) and replied to by Alderman W. H. Luck (chairman of the Erith Electricity Committee), the Mayor of Erith (Alderman T. C. Pannell) gave the toast of "The Guests." He specially mentioned the presence of Mr. J. C. Williams, a former "chief" of the undertaking, and extended a welcome to Mr. R. Bell, who has succeeded Mr. Logan at Erith. Councillor A. Gorman, chairman of the Woolwich electricity undertaking, responded.

The toast of "The Chief" was proposed by Alderman Luck who, in paying tribute to Mr. Logan's achievements, said that when he arrived at Erith the undertaking was mainly concerned with supplying power for factories. Mr. Logan had introduced the "all-in" domestic tariff and now the undertaking was primarily supplying domestic consumers. Mr. Logan, in responding, spoke of the help he had received from Mr. Williams in the early months of his appointment at Erith.

Mr. S. C. Harling, who has been acting city electrical engineer and manager at Chester since July this year, has now been appointed city electrical engineer and manager. Mr. Harling was apprenticed to Harrogate Corporation Electricity Department in 1919, with which undertaking he subsequently held various appointments, eventually acting in the capacity of deputy engineer.

In 1941 he went to Chester as deputy city electrical engineer and in 1943 was appointed borough electrical engineer and manager at Leigh, Lancs., but had to relinquish the appointment on being called up for service with R.E.M.E. Mr. Harling was commissioned a lieutenant in July, 1944, and was promoted to captain in July, 1945. He is the author of a number of technical articles and short papers. He is an associate member of the I.E.E., an associate of the Institution of Mechanical Engineers, and a member of the Institute of Patentees (degree of Fellowship).

Mr. Harry Towers, general manager of Edmundsons Electricity Corporation, Ltd., has been elected to the board of A. Reyrolle & Co., Ltd., of which company he has also been appointed general manager. He will assume his new duties next January, from which date his resignation from Edmundsons will become effective. Mr. Towers joined Edmundsons in 1933, and has been general manager since 1939. He is also a director of the associated and subsidiary companies.

The Hackney Borough Council Establishment Committee has recommended that the maximum salary of Mr. C. R. Webb, deputy

borough electrical engineer, shall be increased to £1,250 per annum and that as from April 1st, 1946, his salary shall be at the rate of £1,050 per annum rising by annual increments of £50. It is also recommended that the salary of Mr. L. M. Jockel, generating station engineer, shall be increased to £880 per annum.

Mr. W. C. T. Deering, late of Skefko and Rootes Securities (Aircraft Division), and Mr. E. T. C. Wheeler, late of the Gramophone Company, have joined the staff of R. B. Pullin & Co., Ltd. in connection with the mass production of fractional-H.P. motors.

Mr. C. Lacy-Hulbert, joint managing director, and Mr. E. G. Plucknett, general sales manager, Creda Division of the Tube Investments subsidiary, Simplex Electric Co., Ltd., Oldbury, near Birmingham, are visiting the United States and Canada on a business mission. They travelled by air, and expect to return in about six weeks' time.

Mr. Tom Crabtree, director in charge of the production of Arrow Electric Switches, Ltd., is visiting the United States and will spend some time in Hartford, Connecticut, visiting the associated company, the Arrow-Hart & Hegeman Electric Co. Mr. Crabtree expects to return at the end of this month.

Barnoldswick Urban District Council has appointed Mr. A. Cooke as manager and engineer of the electricity undertaking. Mr. Cooke is personal assistant to the deputy electrical engineer at Scarborough, and during the war served in the Royal Navy, rising to the rank of lieutenant commander in the electrical branch.

Mr. R. L. Batley has been appointed superintendent engineer of generation in the Liverpool Electric Supply Department at a salary of £1,150, rising to £1,350 per annum. Mr. W. B. Parkinson, B.Sc., A.M.I.E.E., is recommended for the position of meter and test superintendent at a salary of £794, rising to £829 per annum.

Mr. J. N. Cresswell, M.I.E.E., who, since 1935, has been head of the Electrical Construction Department, North-Eastern Electric Supply Co., Ltd., is retiring this month. His colleagues on the staff have presented him with an inscribed silver cigarette case. From his own departmental staff and other friends he has received an engraved silver salver and a barograph which were presented at a dinner last Friday, attended by Lt. Colonel E. H. E. Woodward, M.C., T.D., general manager and a director of the company. Mr. Cresswell obtained his engineering education at the Science and Technical School, Wolverhampton, and at Armstrong College (now King's College), Newcastle-on-Tyne. He received his mechanical training with John Sankey & Sons, and completed his apprenticeship at the Wolverhampton Electrical Works of Thomas Parker & Co. Mr. Cresswell joined the North-Eastern Electric Supply Co., Ltd., in 1907, and, apart from a short break from 1910 to 1912 when he was engineer-in-charge



Mr. S. C. Harling

at Pease and Partners' Thorne Colliery, he has remained with the company ever since. He has served as the company's representative on a number of committees in London, and during the war was also a member of Electricity Commissioners' sub-committees dealing with technical matters relating to Air Raid Precautions.

Mr. Wilfred Jones has resigned his position as Midland planning engineer for Benjamin Electric, Ltd., to join Lode Electric, Ltd., Birmingham. He was a student of the Northampton College of Technology, and is an associate member of the Institution of Electrical Engineers and a Fellow of the Illuminating Engineering Society.

Mr. Basil R. Vickers, of the Manchester Corporation Electricity Department, has been appointed by the British Electrical Development Association as its Area Officer in Scotland with headquarters in Glasgow.

The first post-war dinner of the J. & P. Foremen's Association was held on October 18th, when nearly a hundred members and guests gathered at the R.A.C.S. Restaurant, Woolwich. Mr. G. Leslie Wates, chairman and managing director of Johnson & Phillips, Ltd., was in the chair, supported by Mr. W. Glass and Col.

R. W. C. Reeves, directors of the company, and the committee of the Association. In proposing the toast of the chairman, Mr. S. Simmons mentioned the many services to the employees which had been instituted by the management, in particular the ready assistance given to those who suffered injury or loss during the war years.

Obituary

Mr. Thomas Young, M.I.E.E., M.I.Mech.E., whose funeral took place last week, was head of the firm of Thomas Young, Son & Miller, consulting engineers, and also for some years chairman of Bertrams Engineering Co.

Mr. Stewart R. Thomson, founder and managing director of Stewart Thomson & Son (Liverpool), Ltd., electrical engineers, and a director of the Durable Welding Co. and Electric Machinery Co. (Manchester), Ltd., died last week at the age of sixty-four.

Mr. W. Wood, a local director of T. W. Ward, Ltd., Sheffield, died suddenly on October 21st, aged sixty-two. Brother of Mr. George Wood, joint managing director of the firm, he joined the staff in 1897 and has been in control of the non-ferrous metals departments since 1922.

Faraday House Dinner

MORE than 200 were present at the dinner held by the Faraday House Old Students' Association at the Savoy Hotel, W.C.2, on October 25th, with Mr. F. SMITH (president of the Association) in the chair.

Proposing the toast of "Faraday House," DR. PERCY DUNSHEATH (immediate past president, I.E.E.) described it as an admirable example of private enterprise which tended to prevent an undesirable uniformity in education. He referred to the opening of the College four years ago to lady students, who have already achieved academic distinctions. Warning his audience that the present "sellers' market" would probably not continue beyond another three or four years, he said that the future of the electrical industry would depend upon the quality of its leaders such as those which Faraday House had hitherto provided.

DR. W. R. C. COODE-ADAMS (Principal, Faraday House) stated that places in the College were now booked up for years ahead and by next summer the number of students should exceed those of any previous year. Accommodation and equipment which had suffered war damage were being brought up-to-date and new machine tools and prime movers were being added. Twenty-three ex-students had been decorated for war services and thirty-six names were on the roll of honour.

MR. C. P. H. EWBANK (chief engineer, Edmundsons), proposing "The Guests," who included many leading men of the profession, drew attention to the likelihood of a dearth of

trained men of the kind that were produced by the College's "sandwich course." SIR NOEL ASHBRIDGE (B.B.C.), in reply, said that scientific wonders which had been developed regardless of expense in war might not be economical for peace. Engineers would have to select those devices that were suitable for normal use. Included in these were navigational aids for air and sea, which would be required to have an international basis, and television. There was, he continued, a disproportionate increase in the number of people employed on "administration," which reduced the number of skilled men available for the craftsmanship side.

Responding to the toast called for in his honour by Mr. G. Chelioti (Osram—G.E.C. Lamp Works), the chairman reminded the gathering that the celebration of the Jubilee of the College in 1939 was prevented by the outbreak of war. Since then the death of Dr. Alexander Russell had deprived the staff of the College of the counsel of one who had been with them since its foundation. In Dr. Coode-Adams, however, a worthy successor had been found. Brigadier B. L. Eddis was now registrar and Mr. P. V. Hunter had become hon. treasurer. Mr. Smith appealed to those able to do so to help demobilized young engineers to take their proper place in industry and prevent their feeling that they had lost touch with things. After the first world war many good men, disillusioned, perhaps, from having expected too much, had been allowed to drift away from the electrical industry to its loss.

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Pocket Measuring Instrument

MEASURING only $4\frac{1}{8}$ in. by $3\frac{1}{8}$ in. by $1\frac{1}{8}$ in. and weighing only 14 oz complete with battery, the model 120 A universal "Taylormeter" made by TAYLOR ELECTRICAL INSTRUMENTS, LTD., 419-424, Montrose Avenue, Slough, covers twenty-one ranges of measurements with a high degree of accuracy. Seven



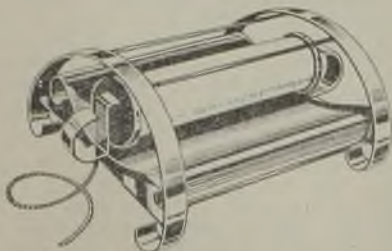
21-range universal
"Taylormeter"

d.c. and six a.c. ranges give voltages up to 5,000, and there are four d.c. current ranges up to 500 mA. Resistance can be measured in four ranges up to 20 megohms. All resistors used for the volt and current ranges are adjusted to an accuracy of 1 per cent and the moving coil instrument has a selectivity of 400 μ A full scale.

Three scales are provided, the outer for resistance measurement, the second for all d.c. measurements and a.c. volts and the third for the 10-V a.c. range. A 16-position control switch gives choice of five d.c. volt, five a.c. volt, four d.c. current and two resistance ranges. For all tests except for resistance or 5,000 V two sockets at the front of the instrument are used, but for these two other measurements sockets at the side are employed. For the 2 megohm and 20 megohm ranges an external battery of 12 V or 120 V is required, an "Adjust Ohms" control compensating for variation in its voltage. The instrument is housed in a strong shock-resisting black moulded bakelite case.

Translucent Tube Fire

A household fire of unusual design has been introduced under the trade name of "Glowlog" by the OXLEY DEVELOPMENT Co., LTD., Ulverston, North Lancs, its shape allowing users to



Horizontal "Glowlog" fire

sit all round it in the middle of a room. The framework of non-tarnishing stainless steel supports a shallow reflector horizontally while the 2-kW element above is enclosed within a translucent tube, with two horizontal guard bars. The reflector is made either of plain copper or nickel-chrome plated.

Micro-break Switch

Minimum arcing and maximum life of contacts are ensured by the design of the "Surrey" 5-A and 15-A a.c. switches just introduced by the GENERAL ACCESSORIES Co., LTD., 21, Bruton Street, London, W.1. There are no joints between terminal and contact face and there is no risk of hot spots and high resistance faults. The operating spring is so lightly stressed that



"Surrey" micro-break switch

no reduction in its strength can be detected after half a million operations.

After 50,000 operations at its maximum rating a 5-A switch showed a voltage drop across its terminals of only 0.04 V and a temperature rise of only 7 deg C. It has robust insulation and high mechanical strength and wiring and fixing have been greatly simplified. The switch and plate mount square and flush irrespective of errors in setting the box in the wall.

Polish Electrical Expansion Scheme.—Within the framework of its three-year rehabilitation plan, Poland is to spend 600 million zloty (in the pre-war value of the currency) on extending the electric power industry. The materials and equipment for the rehabilitation of old plant and for the construction of new power stations will, for the most part, be purchased abroad.—*Reuter.*

Overseas Electrical Trade

Slight Fall in Electrical Exports

FOLLOWING the general trend, electrical exports in September were lower than in August, largely because the month was one working day shorter. As will be seen from Table I, the total value of exports of electrical goods and machinery was £3,887,090; the August figure was £4,230,156. The September exports were, however, about three times the value of those in September last year and over double the monthly average of 1938.

As in August, radio apparatus showed a remarkable increase—from £169,990 in September, 1945, to £595,485 last month, in spite of the fact that Australia and Canada drastically reduced their purchases. All other customers took much bigger shares, notably South Africa and India. Large purchases of British electrical equipment were made by the Scandinavian countries.

Exports in the cable class as a whole totalled £781,380, as compared with £249,443 in September, 1945, and a 1938 monthly average of £359,881. The share of India declined considerably but most other customers took larger quantities. An outstanding feature was a substantial increase in shipments to Argentina.

Other items for which large advances were recorded were telegraph and telephone apparatus (a section in which India and unspecified foreign countries were prominent), lighting apparatus, accumulators, electric cooking and heating apparatus, and vacuum cleaners.

The rise in machinery exports was not so pronounced. As a whole they advanced from £248,157 in September, 1945, to £908,143 last month (pre-war monthly

TABLE I.—ELECTRICAL EXPORTS AND IMPORTS

Class	Exports			Imports		
	Sept., 1946	Sept., 1945	Monthly Av., 1938	Sept., 1946	Sept., 1945	Monthly Av., 1938
	£	£	£	£	£	£
Telegraph and telephone wires and cables, submarine	80,053	7,991	17,289			
Ditto, not submarine	133,061	34,102	71,803			
Wires and cables, other than telephone and telegraph, rubber insulated	220,387	83,743	117,533	1,614	18,049	31,246
Ditto, insulation, other than rubber	347,879	113,607	153,256			
Radio apparatus	595,485	169,990	149,593	288,529	618,837	75,160
Telegraph and telephone apparatus, other than radio	417,474	205,468	242,716	1,874	51,148	9,243
Electric carbons, furnace	*	*	*	1,010	1,157	4,054
Other electric carbons	*	*	*	2,532	15,901	2,301
Electric lamps	81,674	59,907	49,440	1,112	224	10,265
Other lighting apparatus	170,977	54,314	48,565	792	10,858	38,662
Primary batteries	51,343	19,894	13,572	62	17,122	3,549
Accumulators, portable	119,283	33,401	28,874	*	*	*
Ditto, stationary	6,966	551	19,773	*	*	*
Ditto, parts and accessories	42,664	11,632	*	*	*	*
Electric cooking and heating apparatus	96,438	17,924	30,664	*	*	*
Commercial electrical instruments, including ammeters, voltmeters, etc., and parts	45,228	12,003	15,878			
House service meters	40,406	8,829	15,791	8,208	4,675	32,057
Other electrical instruments	24,503	4,127	9,612			
X-ray apparatus, vacuum tubes and parts	33,595	12,460	4,881	6,069	37,979	9,734
Insulating materials, not elsewhere specified	75,163	20,278	19,343			
Unclassified electrical goods and apparatus	278,511	157,690	110,615	8,158	263,086	42,630
Generators, complete, up to 200 kW	64,085	11,586	38,071	*	*	*
Ditto, over 200 kW	194,534	28,905	119,079	*	*	*
Ditto, parts	30,557	*	*	*	*	*
Motors	265,367	51,716	145,045	2,893	4,966	26,033
Convertors and transformers	132,000	58,470	101,304	*	*	*
Rectifiers for power-house use	9,130	2,379	3,463	*	*	*
Motor starting and controlling gear	50,633	18,047	50,866	*	*	*
Switchgear and switchboards, other than telegraph or telephone	149,856	71,446	184,533	*	*	*
Other electrical machinery	11,981	5,408	15,497	5,200	139,929	14,455
Electric vacuum cleaners	81,067	3,248	26,662	84	60	7,519
Other electrically-operated portable appliances	37,330	4,249	10,394	1,076	1,970	17,108
Total	3,887,630	1,283,567	1,814,112	329,213	1,185,961	324,016

* Not classified separately.

average £657,858). No exports to Russia are shown in this section. South Africa was the largest customer for generators (£56,153), and the Union also bought motors to the value of £49,556 and "other electrical machinery" to the extent of £42,993. India was the biggest purchaser of motors (£51,663) and for other electrical machinery (£112,124).

In addition to the items given in the table mention may be made of the following which are not wholly electrical: Water-tube boiler

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

Destination	Sept., 1946	Sept., 1945	Monthly Av., 1938
	£	£	£
Eire	143,573	40,050	37,562
Channel Islands ..	35,085	13,130	11,695
Palestine	59,345	18,296	8,371
British West Africa ..	48,703	28,375	12,864
Union of South Africa	310,323	29,898	157,602
Southern Rhodesia ..	16,627	4,400	9,574
British East Africa ..	25,807	4,534	7,830
British India	312,676	201,130	122,928
British Malaya	61,356	—	32,280
Ceylon	28,111	20,045	14,931
Hong Kong	32,757	—	12,874
Australia	185,357	217,047	196,823
New Zealand	124,528	70,674	95,851
Canada	20,934	92,579	12,482
British West Indies ..	42,109	11,774	12,887
Other British Countries	120,844	19,720	26,336
Soviet Union	466	60	36,780
Finland	4,462	—	5,824
Sweden	56,793	2,073	13,735
Norway	79,415	9,693	12,582
Denmark	109,882	—	18,282
Poland	8,502	—	9,626
Netherlands	88,703	504	20,190
Belgium	85,503	2,567	10,874
France	55,895	14,574	15,674
French West and Equatorial Africa ..	2,352	758	400
Switzerland	71,179	2,575	3,572
Portugal	46,667	15,391	6,498
Portuguese East Africa	6,550	621	6,924
Spain	65,140	44,530	3,808
Italy	80	1,307	5,659
Czechoslovakia	7,512	—	7,205
Yugoslavia	11,810	—	1,471
Greece	10,060	—	4,888
Roumania	—	—	13,350
Turkey	77,184	22,293	7,633
Egypt	57,269	47,742	12,872
Iraq	36,775	5,767	5,456
Iran	60,092	16,455	16,330
China	23,192	1,843	4,042
United States	6,249	6,683	5,546
Chile	10,495	915	6,635
Brazil	69,206	7,991	11,123
Argentine Republic ..	91,899	8,402	45,387
Other Foreign Countries	149,623	43,517	33,672
Total	2,861,090	1,027,913	1,119,200

exports amounted to £180,915, against £61,470 in September, 1945, and a pre-war monthly average of £194,008. Exports of other descriptions of boilers and boiler-house plant were £228,121 last month, £45,094 in September, 1945, and the 1938 monthly average was £127,907. "Welding machinery, other than tube-making machinery and elec-

trodes" to the value of £78,873 was exported in September (£41,355 in September, 1945).

Table II shows the distribution of exports of electrical goods and apparatus as a whole. Once again India and South Africa headed the list, although their August positions were reversed. Exports to Eire were considerably higher; they rose from £91,406 in August to £143,573 and were nearly four times the 1938 monthly average. Australia was again disappointing, the value of her purchases being less than before the war. New Zealand, on the other hand, was fairly satisfactory.

Among the foreign countries Denmark was prominent with purchases amounting in value to six times the pre-war figure. Turkey, Iran, Brazil and Switzerland showed notable advances and Holland, Belgium, France and Spain were again large purchasers. Soviet Russia reappeared in the list but her share (valued at £466) was negligible compared with the 1938 monthly average which amounted to £36,780.

For the first three-quarters of the year exports of electrical goods and machinery totalled £35,367,291. This figure compares with £18,675,005 for the first nine months of 1945 and with a figure of £16,327,048 representing three-quarters of the 1938 total value.

Electrical imports in September fell in value to below the pre-war level and were less than a third of the figure for the corresponding month of last year. The fall was due principally to much reduced imports of radio apparatus and unclassified goods and machinery.

Evolution of Lighting

AT the first meeting this session of the Birmingham Centre of the Illuminating Engineering Society the new chairman, Mr. R. MACKENZIE, presented the retiring chairman, Mr. F. F. Middleton, with the gavel and block which he had used during his past year of office.

The new chairman then delivered an instructive address on "The Evolution of Lighting," and dealt at some length with the history of street lighting in Birmingham, a subject on which he is particularly qualified to speak, having spent 45 years with that Corporation's street lighting department. Tracing its stages from the time of the cresset burner, through the link-boy, candle, oil and gas lamps to the modern gas-discharge lamp and the 44,000 lighting points now illuminating the city's streets, the chairman quoted some peculiar Acts relating to lighting matters of earlier times and illustrated his remarks with lantern slides.

COMMERCE and INDUSTRY

Aerodrome Lighting.

Stator for Hams Hall.

THE guide to aerodrome lighting issued by the British Standards Institution in 1932 and the associated B.S.S. 563: 1934, revised in 1937, have been rendered obsolete by subsequent developments in aircraft-handling technique, the use of runways or landing strips on aerodromes and changes in the principles of air-traffic control. Pending the publication of an up-to-date specification, a revision of the guide has just been published (2s. 0d. post free, from the B.S.I. at 28, Victoria Street, S.W.1), as B.S. 1332: 1946. Issued with the approval of the Ministry of Civil Aviation, this guide provides a description of the probable future requirements of aerodrome-lighting equipment to provide adequate assistance to the pilot of an aircraft in all conditions in which operations are expected to be carried out by day or night.

Cables for Mysore

Capt. S. T. Binstead, Trade Commissioner for Mysore, Grand Buildings, Trafalgar Square, London, W.C.2, informs us that the Electrical Department of the Government of the Maharaja of Mysore will be calling for tenders for the following items: Twenty-five miles of underground cable, 3-core (each 500,000 circular mils), 5,000 V, v.c. insulated, etc.; twenty miles of underground cable, 3-core (each 250,000 circular mils), 5,000 V, v.c. insulated, etc.; ten miles of underground cable, 4-core (each 6 B & S or 8 S.W.G.), 660 or 1,000 V, v.i.r. insulated lead covered, etc.; accessories for the above cables, including feeder pillars, joint boxes, etc. Capt. Binstead states that the official tender form is on the way and will be forwarded to all manufacturers who are desirous of offering their quotations on application to him.

Radio and Television Set Sales

Reporting on the sale and servicing of radio and television sets, in connection with which a joint committee of local authorities has been formed, the Fulham Electricity Committee which initiated the scheme states that arrangements have been made for the manufacture of four types of radio sets. A number of these have already been delivered and sold under the name "Civic Concord." Four types are at present available (although at the date of the report supplies had been temporarily exhausted). The hire-purchase terms are a deposit of £4 and twelve monthly payments as follows: Type "A" (a.c. 5-valve in walnut case), £1 9s.; type "B" (a.c./d.c. 5-valve in white cellulose case), £1 0s. 11d.; type "C" (a.c./d.c. 5-valve in walnut case), £1 3s. 10d.; and type "D" (smaller a.c. model in walnut case), £1 4s. 5d., the respective selling prices being £19 15s., £15, £16 14s. and £17 1s.

It is hoped to supply a satisfactory television set at between £60 and £70, exclusive of purchase tax. Only one of three companies approached was in a position to tender and the Committee has accepted its offer to prepare the required specifications subject to the Council agreeing to purchase, if the design and price are satisfactory, the whole of its output of television sets for two years (minimum 300) and also to act as consultants to the Council on all matters relating to electronic development for one year, with an option to the Council to renew the agreement, at a retaining fee of £367 10s. 0d. per annum.

ELECTRICAL REVIEW



The "Electrical Review's" new cover

New Cover Design

Next week the *Electrical Review* will appear in somewhat altered guise. The title will be in a different type and in blue on a black background. The accompanying illustration gives some idea of the appearance of the cover.

Token Exports Scheme Extended

The Board of Trade has extended the list of specified goods which may be imported from Canada, U.S.A., Belgium and Switzerland under the token imports scheme to include the following:—electric refrigerators for domestic purposes; electric meters; electric light fixtures; and electrical equipment for cycles and motor cycles.

Transporting a Large Stator

Last week-end a special train carrying an electrical alternator stator weighing 130 tons left the Heaton Works of C. A. Parsons & Co., Ltd., on the first stage of its journey to the Hams Hall "B" power station of the City of Birmingham Electric Supply Department. The plant which Parsons are supplying to this power station consists of six turbo-alternators complete with surface condensing plant giving a total output of 321,000 kW. Each set comprises a two-cylinder tandem turbine with a single-flow low-pressure cylinder driving a 50,000-kW main alternator and a 3,500-kW auxiliary alternator on one shaft line.

Three complete turbo-alternator sets have already been installed and the parts of the fourth machine are now being delivered to site.

The stator was suspended between two North Eastern Railway wagons to keep the base of the stator as near the top of the rail as possible and so obtain additional height to enable this large unit to pass under bridges and through tunnels. The width, however, was such that, to pass a number of fixed structures en route, arrangements had to be made to move the stator laterally in transit. The stator was carried on two girders which were passed through the bore, resting at each end on two swivelling cross bolsters. The longitudinal members rested on a saddle fitted to the top of the cross member. The saddle moved on rollers and the movement was actuated by means of a screwed bar passing through a large nut fixed to the cross member. This screw was operated by means of a bar inserted into the solid steel wheel fitted on each side of each wagon at both ends. The main carrying vehicles were designed to carry 70 tons, and in order to relieve the weight on these two vehicles, cantilevers were employed, which were attached to the main longitudinal girders. The cantilevers were mounted on 60-ton flat wagons.

New Thorn Premises

On the occasion of the official opening of the northern premises of Thorn Electrical Industries, Ltd., in Stevenson Square, Manchester—actually they have been in commission a year—a special display by mannequins was staged in the library of the Midland Hotel, Manchester, to show the different effects on dress colours and fabrics of Atlas fluorescent lighting and the ordinary gas-filled lamps. Dr. H. H. Ballin, manager of the illumination engineering depart-

on the future of fluorescent lighting, an abstract of which appears on page 710. Mr. L. M. Glancy, manager of the Northern branch and a director of the company presided.

At the luncheon at the Midland Hotel Mr. Glancy presented a golden key of the new premises to Mr. Jules Thorn (chairman and managing director), who then formally declared the new premises open and briefly reviewed the progress of the company. Replying to the toast of the guests (proposed by Mr. A. S. Shier, sales director), Mr. R. A. S. Thwaites, chief engineer and manager, Manchester Corporation Electricity Department, congratulated the company on its enterprise.

The Manchester premises of Thorn Electrical Industries, Ltd., are a four-storey building, with 20,000 sq ft floor space, comprising offices, stockrooms, service departments and showrooms for fluorescent lighting fittings, radio apparatus and domestic appliances.

Chief Engineers' Salaries

Having considered a resolution from Bolton Corporation protesting against the action of the Standing Joint Committee of the A.M.E.E. and E.P.E.A. in requesting engineers not to apply for the post of electrical engineer and manager at Bolton at the salary offered, the Hackney Electricity Committee has replied that it is not in accord with the sentiments expressed and is not prepared to support the representations.

Company's Seventy-fifth Anniversary

This year marks the seventy-fifth anniversary of the establishment of William Geipel, Ltd.

Founded at Covent Garden in 1871, the firm supplied the main electrical demand of the day, viz., electric bells, batteries and indicators, later making Wheatstone bridges and other instruments. In the 'eighties, when electric lighting began to come into practice, contracts were undertaken for the complete lighting of industrial, public and other premises, among them Covent Garden Theatre and the Queen's Hall. Contracting, both for lighting and power installations, remained the chief business until the early part of the present century the



Lighting showroom at Thorn's new Manchester premises

ment of the company, called attention to some of the display and decorative possibilities of coloured tubes. Earlier in the day, Dr. J. W. Strange, in charge of the Thorn fluorescent lamp research department, and Dr. Ballin read papers

company moved to Bermondsey and commenced to manufacture motor starters and control gear, later erecting its own electric cable factory at Alperton, near Wembley. In both world wars the factories were fully engaged on Government

contracts and in the recent war valuable work was done in developing and making special gear to Admiralty instructions for use at sea in connection with radar, anti-submarine and other devices. The reconversion to peacetime production is now complete.

E.A.W. Works Visit

About forty members of the Croydon Branch of the Electrical Association for Women made a visit to the Gravesend Works of W. T. Henley's Telegraph Works Co., Ltd., on October 15th. They were welcomed by Sir Montague Hughman, chairman of the company, and Mr. E. E. Judge, works manager. At the conclusion of the tour Mrs. Lewin, chairman of the Croydon Branch, of which Lady Hughman is president, expressed the visitors' thanks.

Petroleum Industry Regulations

A provisional Electrical Code for the petroleum industry has been issued by the Institute of Petroleum. This Code (5s. post free) gives guidance on the selection and methods of installation of electrical equipment for each type of operation encountered from the oil well to the delivery of finished products.

It embodies the results of an examination, by a committee of engineers, of the practice adopted by the major British oil companies and takes account of Codes of Practice, existing regulations of various authoritative bodies and legal requirements applicable to the industry both in Great Britain and abroad (including, in particular, various American codes and publications). In addition to the use of electricity for lighting, power and instruments, the Code deals with protection against static electricity, lightning and fire risks.

The arguments upon which the suggested rules and recommendations are based are explained in a number of schedules, each relating to a group of rules, which should also facilitate the adoption of suitable practice in regard to unusual applications of electricity. After experience has been gained in its application, the Code will be either confirmed or amended as may be found desirable.

Radio Components Exhibition

The annual private exhibition of British radio and communications components and accessories will be held at the new Royal Horticultural Hall, Greycoat and Elverton Streets, Westminster, S.W.1 during the period March 10th to 13th, 1947. The display is organized by the Radio Component Manufacturers Federation and, as in former years, is

intended to acquaint radio manufacturers and engineers with the most recent advances in the design and development of British radio components, accessories and materials. The exhibition will be open to visitors, by invitation only, from 10 a.m. to 6 p.m. daily during the four days.

E.I.B.A. Ball

Mr. H. S. Fothergill, the secretary of the Electrical Industries Benevolent Association, tells us that no further tickets are available for the Electrical Industries Ball at Grosvenor House on November 8th.

Lighting in the "Queen Elizabeth"

The Cunard liner *Queen Elizabeth*, which has recently completed its maiden voyage as a luxury passenger liner, contains many examples of British engineering skill, and the British Thomson-Houston Co., Ltd., has contributed its share by supplying a great deal of equipment,



The first class smoking-room of the "Queen Elizabeth" illuminated by Mazdalux lighting fittings

including special lighting fittings for some of the principal public rooms. Mazdalux lighting fittings have been installed in the first class restaurant, private dining rooms and restaurant cocktail bar, the first class smoking room, cabin class restaurant and lounge and for floodlighting the liner. In the accompanying illustration we show the first class smoking-room in which two large luminous beams, running fore and aft, divide the ceiling into three. Over the centre of the room are mounted six circular fittings, comprising dished segments the inner edges of which meet a louvred ring to which is attached a sandblasted glass roundel decorated with mirror-glass rings. On either side of the centre fittings are three smaller fittings similar in design, which are mounted flush with the ceiling. A further luminous beam runs athwart-

ships across the top of a high alcove on the lintel of which have been mounted round luminous panels which serve to light up the decorative carving. The outboard areas are lighted by architectural tubular lamps in decorative glass troughs running along the centre lines of the ceiling.

Application for "Closed Shop"

At last week's meeting of the Hammersmith Borough Council the Electricity Committee reported that the employees' side of the joint works committee had applied for the adoption of the "closed shop" principle in respect of the Electricity Department, and that the matter had been referred to the General Purposes Committee.

British Purchasing Agency in Germany

A British Purchasing Agency has been set up at Minden under the Sundry Materials Branch of the Board of Trade with the object of centralizing all exports from Germany to the United Kingdom, except timber and scrap metal. This organization will maintain the closest liaison with the Control Commission. All purchases are on Government account and distribution will be made through the Sundry Materials Branch of the Board of Trade. All inquiries should be addressed to Sundry Materials Branch, 10, Old Jewry, London, E.C.2.

Power Station Contracts

C. A. Parsons & Co., Ltd., are supplying the turbo-alternators and Babcock & Wilcox, Ltd., the boilers in connection with additions to Dunston-on-Tyne and the North Tees power stations for the North-Eastern Electric Supply Co., Ltd.

Time-switches for Australia

Following the recent visit of its sales director, Mr. L. C. Sharp, to Australia, Venner Time Switches, Ltd., has received one of the most substantial contracts for time switches ever placed with the company.

"Electricity Meets the Challenge"

Under the title of "Electricity Meets the Challenge" the Electricity Supply Companies' Public Relations Committee has opened an electrical exhibition and film show at the Exhibition Centre in New Coventry Street, London, W.

The exhibition is mainly intended to show the public that the electricity supply industry is meeting the demands of consumers satisfactorily, and it is claimed that nationalization of the industry will be detrimental. The highlight of the show is an American coloured cartoon film, shown in this country for the first time, entitled "Reddy Made Magic." This introduces "Reddy Kilowatt," the American counterpart of E.D.A.'s little man "I'm Electric," and

shows in an amusing manner Man's efforts throughout the ages to secure what has at last been attained, the harnessing of electrical energy. "Reddy Kilowatt" is finally seen working for Man, his master, after centuries of undisturbed rest.

The exhibition was opened on Friday last by Mr. Geoffrey Lloyd, who in a brief speech supported the supply companies' claim that nationalization was not only unnecessary but would prove injurious to the industry.

Trade Announcements

Hogan & Wardrop, Ltd., announce that their telephone numbers remain Clerkenwell 4293/4, and are not as shown in the new London Telephone Directory.

Mr. L. E. Page, who was recently with the Metropolitan-Vickers Electrical Co., Ltd., as lighting engineer, has now commenced business on his own account as Page Electrical, electrical wholesaler, at 65, Edward Street, Parade, Birmingham, 1.

Scottish Plastics, Ltd., are transferring, as from November 3rd, all manufacture of plastic mouldings to Avenue Works, Walthamstow Avenue, London, E.4. The Strathendry works are being taken over by De La Rue Stationers, Ltd.

The Ashley Drawing Office, Ltd., 4, Totnes Villas, Telford Road, London, N.11, has been formed to specialize in the preparation of electrical and mechanical drawings and tracings.

TRADE MARKS

THE following applications have been made for the registration of trade marks. Objections may be entered within a month from October 23rd.

TEDPRES (design). No. 637,876, Class 7. Compressor stop valves for use in machinery and in refrigerator installations. British Thermostat Co., Ltd., Teddington Works, Windmill Road, Sunbury-on-Thames, and Peglers, Ltd., Belmont Works, Doncaster.

THREE RAVENS (design). No. 639,177, Class 9. Electrical apparatus and instruments included in Class 9; scientific and weighing apparatus and instruments. Arthur E. Evans & Co., Ltd., Westminster Bank Chambers, North Street, Bishop's Stortford.

PARK. No. B641,021, Class 9. Accumulators and parts (not included in other classes). Park Brothers, Ltd., Brunswick Works, Canterbury Street, Blackburn.

SPARKLETS. No. 641,856, Class 9. Electric cables embodying woven wire mesh; electrical conductors of braided and woven metal. Sparklets, Ltd., Grosvenor House, Park Lane, London, W.1.

FUORECTOR. No. 642,454, Class 11. Electric light fittings. Edison Swan Electric Co., Ltd., 155, Charing Cross Road, London, W.C.2.

Patents Proposals

Departmental Committee's Second Interim Report

THE Second Interim Report of the Departmental Committee **By "Pagent"** Patent Planning Commission of America recommends the retention

appointed by the Board of Trade deals with the initiation, conduct and determination of legal proceedings arising under or out of the Patents and Designs Acts, including the constitution of the appropriate tribunals, and the provisions of these Acts for the prevention of the abuse of monopoly rights. It covers the origin and purpose of the grant of patents for inventions, the obligations of a British patentee in regard to working his invention and granting licences, the restrictive use of patent rights, compulsory licences, licences of right, restrictive practices, food and medicines, registration of patent agreements and, that difficult question, inventive merit.

Constructive suggestions are offered regarding most of the matters with which the Committee deals. These will no doubt find their way into statute form in due course. Proposals in the First Report, which dealt mainly with the extension of patent terms for war loss, were embodied in an Act passed in April of this year. (This Act covers other things also, such as enemy patents, which are at present the subject of further international discussion.)

Summary of Report

The following is a summary of the principal contents of the Second Report:—It begins by pointing out that the patent system is based on the theory that the opportunity of acquiring exclusive rights in an invention encourages invention and research, offers a return for developing inventions until they become commercially practicable, induces disclosure, and encourages the investment of capital in new lines of production. Industrial history appears in general to have justified the theory, and it has found favour in nearly every industrial country. Although the Soviet Government has introduced an alternative system wherein the exploitation and working of an invention and the remuneration of the inventor are at the sole discretion of the State, in the view of the Committee this is bound up with the present Russian economic system.

The Committee favours the retention of the British patent system, subject to improvement, and points out that the National

of the basic principles of the present United States patent system.

According to the report, allegations have been made of the use of patents to create restrictive monopolies mainly in the following ways: Failure to use the patented invention at all; service of only part of the potential market; refusal to grant licences under a patent for an important new process; the building up of a monopoly wider and of greater duration than the patent term; restrictive licences; patent pools and cross-licences; and prevention of production in this country to preserve the market for foreign imports.

Deliberate Suppression Not Proved

The evidence before the Committee did not prove deliberate suppression of inventions. Patents often do help to maintain cartels, but they are not the only means to that end. Cases of the last-mentioned class have been cited in connection with American, British and German firms.

From the evidence it appeared that on the whole the mere presence of Section 27 (the compulsory licence section) in the Act has a salutary effect on patentees, but it could be improved. The apparent scope of the section has been narrowed by the interpretation the Courts have put upon it. It is uncertain in application, costly, and the applicant bears a heavy onus of proof. Few applications have been made under the section.

Only a small proportion of patents have been endorsed "Licence of Right" under Section 24, and in only a very small number of these cases has there been a grant of licence. Often on grant of licence under a patent so endorsed there is an application for the cancellation of the endorsement. It appears, therefore, that the section is looked upon as a fee-saving device on commercially doubtful patents.

Section 38, which deals with restrictive practices, is too easily evaded to be useful. Since its introduction only one effective application has been made, under Section 38A (3) which relates to compulsory licences in connection with patents for food and

medicine. This somewhat curious situation was variously ascribed to fear of retaliation, uncertainty as to the principles which guided the application of the sub-section, and to the trade mark position.

A proposal was put forward to endorse all patents "Licences of Right." The Committee was of the opinion that this would discourage research and patenting and encourage secrecy. It would be difficult to make commercially profitable inventions pay for useful but unprofitable ones. Investment in developing new lines of production would not be encouraged. It would, furthermore, discourage attack on patents of doubtful validity. Another suggestion for a belated universal endorsement "Licence of Right" was also rejected by the Committee.

Duration of Patents

There was a proposal to the effect that the normal term of a patent should be for ten years with permission to the patentee to apply to the Court for a further six if he thought fit. This suggestion did not find favour with the Committee; nor did a suggestion that the Comptroller should be required to grant a compulsory licence under any patent unless he saw good reason to the contrary.

What the Committee did feel able to recommend was an extension of the compulsory licence system whereby applications might be made by those in positions to open up new fields of manufacture or to supply the patented articles to export markets which were neglected or insufficiently supplied, or by subsequent inventors who had made substantial contributions to the arts but could not satisfactorily work their inventions because licences on reasonable terms were refused to them by the patentees.

In determining the questions of grant of licence and the terms thereof the Comptroller should have in mind the following considerations, briefly expressed:—The fullest possible use for working here and for supplying foreign markets consistent with fair treatment of those already developing or working the patented invention; reasonable remuneration to those beneficially entitled to the patent; low-priced supply of food, medicine, surgical or curative devices available to the public; the patentee's ability to work his invention to the public advantage; the user already provided for by the patentee and his licensees; and the applicant's financial and working risks if he gets his licence. Applications

should be determined in the light of the conditions existing when the applications are made.

The Committee proposes amendments to the relevant portions of the Act to give effect to its proposals and in view of these it recommends that Section 38A (3) should be repealed. As regards Section 38 (1) the terms of the option referred to therein should be fully set out in the contract, and it should be made clear that no one should be prejudiced in applying for or obtaining relief under Section 27 because he has accepted the patentee's terms. An assignor or licensor should have the option of registering any document affecting the proprietorship of or any licence under a patent.

With reference to inventive merit (subject-matter) patent litigation is so expensive that even obviously invalid patents act as a hindrance to industrial progress and patents for trifling improvements or modifications may be employed to extend the period of protection and a licensee under the main patent may be thereby debarred from questioning their validity.

Power of Refusal

In such industrial countries as the United States, Germany, Holland and Sweden, the Patent Offices can reject applications lacking in inventive merit without detriment to the inventors' or public interest. The Comptroller should also have the power to refuse patents for inventions wholly lacking in subject-matter, that is to say, negligible in view of the general common knowledge of the art. At first this should only be substantiated on appeal by the unanimous decision of two "hearing officers" sitting together. He should also be able to refuse a patent where nothing of worth is contributed to common general knowledge.

Furthermore, where an applicant does not amend his specification to avoid anticipation the Comptroller should be able to refuse grant. Similarly lack of subject-matter should form a ground of opposition under Section 11 or of revocation under Section 26 of the Act. Prior user should also be a ground under these sections.

Appeals under Section 26 should be to the Appeal Tribunal. In certain circumstances there should be a further appeal to the Court of Appeal. For the trial of patent actions two special judges should be appointed not only experienced in patent litigation but also possessing scientific or technical qualifica-

tions. Either judge should be available to try patent actions and petitions for revocation or to preside over the Patents Appeal Tribunal, two of which could sit concurrently. On appeal that judge who had not tried the action should be a member of the Court hearing an appeal thereon. A scientific adviser should sit on all occasions with the judge or judges when hearing these cases unless this is considered unnecessary.

An expert witness should be allowed to tell the Court what he understands the applicant to claim as novel in his specification. Where it is desired to submit experimental proof, the party desiring this should supply to the other side full and precise particulars

of the proposed experiments and a clear statement of the facts to be established. If the experiments establish relevant facts the side requiring the experiments should usually pay for them.

Counsel should not be required to deliver signed statements setting out the contentions of fact or law to be relied on. It should be permissible to bring appeals before the Patents Appeal Tribunal on notice of appeal. Where parties so desire and are content with the Comptroller's final decision, not subject to appeal, and do not require an injunction, the Comptroller should be empowered to try infringement actions with maximum damages of £1,000.

Naval Electrical Branch

Recruitment and Training of Officers

THE enormous growth in the use of electrical equipment in ships of the Royal Navy arising out of technical development during the war has necessitated the formation of a new Electrical Branch. It will be known as the "L" Branch and will be responsible for all aspects of naval electrical and radio engineering, including maintenance, research, development and design of new equipment, for use in H.M. ships and naval aircraft, as well as in shore establishments.

The technical standard required of the officers will be high and the projected training programme is designed accordingly. Officers for the branch will be recruited once a year, commencing in 1947, from boys between the ages of 17 and 19 on September 1st, who, before their acceptance, have obtained the Higher School Certificate, with mathematics and physics as main subjects. They must also have obtained exemption from the Cambridge University Previous Examination in Latin. Selection will be made by a board during the first week in August each year.

Applications must reach the Admiralty (C.W. Branch) by the end of the first week in July, and boys who are sitting for the Higher School Certificate examination may apply. This will allow of their being interviewed in advance by the Selection Board, so that the Board may reach a decision immediately the results of the examination are known. It will also give successful candidates the maximum amount of time to procure their uniform and equipment before starting their naval training. Candidates will also be examined by an Admiralty Medical Board.

Successful candidates will be rated naval cadet (L) and be given a short preliminary period of naval training. In January, after Christmas leave, they will join the training cruiser to gain about eight months' sea

experience. They will then be promoted to midshipmen (L) and will undergo three years' advanced technical training to honours degree standard. For the present this will be at Cambridge University where they will be expected to join fully in the life of the University. During part of their vacations they will undergo training with the firms making electrical equipment for the Royal Navy, living under the same conditions as other apprentices.

At the end of their second year's advanced technical training they will be promoted to acting sub-lieutenants (L), and confirmed as sub-lieutenants at the end of their third year if they have made satisfactory progress. On completion of the honours degree course they will have two years' further training at electrical schools, at sea, and with manufacturing firms. During this period they will be promoted to acting lieutenants (L) and, on completion of the training, to lieutenants (L). There will be opportunities for promotion thereafter to high rank in the service. Electrical officers will wear a stripe or stripes of green distinction cloth in conjunction with the rows of lace on cuff and shoulder strap.

Forms of application may be obtained from the Admiralty (C.W. Branch), London. The scheme of financial assistance introduced for special entry naval cadets will also apply to naval cadets (L) during their cadet period.

Details of the recruitment of ratings into the Electrical Branch will be promulgated later.

Great Western Improvement Plans. — Preliminary consideration has been given by the Great Western Railway Co. to improvement schemes which include many started before the war. Among them is the completion of the electrified line from North Acton to Ruislip. The signal and telegraph works at Reading is to be rebuilt and re-equipped at a cost of £300,000.

Making Special Switches

Pre-Sales Service at a Feltham Works

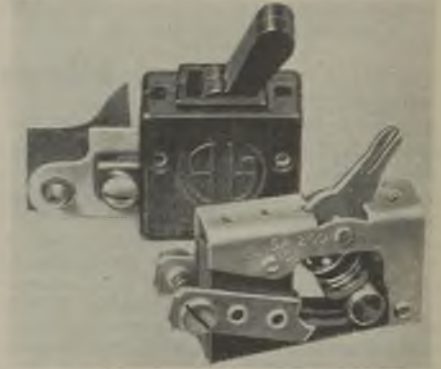
CONCENTRATING entirely on the manufacture of special switches, A.B. Metal Products, Ltd., Hatton Works, Great South West Road, Feltham, have developed a comprehensive pre-sales service for the benefit of their customers. With the company's catalogue of standard lines go special blank design sheets on which can be filled in all the necessary data and diagrams of the apparatus required. Given this information the company is in a position to produce prototypes within twenty-four hours.

At the moment production amounts to about 10,000 switches a day and includes rotary wafer, lever, toggle and miniature types. A large proportion of the output is utilized by the radio and television industry, a large number of manufacturers being customers, but there is now a growing demand from makers of domestic electrical appliances such as vacuum cleaners, fires, etc. The rotary wafer switches can be ganged together to almost infinite lengths.

Mr. L. Woolf, the sales manager, told us that wartime experiences have resulted in a greatly improved product and the rigid standards demanded by the A.I.D. are still being adhered to. The up-to-date 20,000 sq ft factory is practically self-contained and only such very specialized components as ball bearings are not made on the premises.

A well-equipped toolroom makes all the intricate tools for the multi-operation work on small components to critically fine limits.

Infra-red ovens have been provided for warming the synthetic resin material (which is brittle when cold) before being blanked out for the wafers, etc. High-tensile steel components are blanked out without tempering, and a bank of fully automatic machines



Two types of vacuum cleaner switch made at the works

produces turned parts by the million. Assembly of the rotary switch components is undertaken with the aid of automatically fed hopper eyeletting machines. Considerable attention has been paid to motion study and operators work to drawings. Inspection is carried out at all stages of manufacture—before the machined parts go into stores after the wafers and chassis have been made, and again after final assembly.

Housecraft Advisers

TO-MORROW, Saturday, the Association of Electrical Housecraft Advisers is holding its annual general meeting at the Kingsway Hall, London, W.C.2, at 2.30 p.m. The agenda includes an item on salaries and status. The hon. secretary is Mrs. E. A. Windsor, 39, Sharon Gardens, South Hackney, E.9.



Assembling wafer type rotary switches

ELECTRICITY SUPPLY

Trading at Belfast. Cliff Quay Station Extension.

Basingstoke.—REVISION OF CHARGES.—The Council has agreed that the percentage addition now being charged on tariffs for electricity supplied shall be reduced as from the date of the meter readings for the December quarter as follows: (1) In the area covered by the 1913 Order, all tariffs other than the lighting flat rate from 20 to 10 per cent; (b) in the area covered by the 1927 Special Order, all tariffs other than the lighting flat rate from 15 to 7½ per cent.

Belfast.—WIDER TRADING POWERS REJECTED.—By 26 votes to 23 the Corporation on October 21st deleted from a proposed Parliamentary Bill a clause which would have given wider trading powers to the Electricity Department.

The clause proposed by the Electricity Committee was as follows: "To sell electric lines, fittings, apparatus and appliances for lighting, heating and motive power, and for all purposes for which electricity can or may be used (called "electric fittings") and to install, connect, repair, maintain and remove same, and with respect thereto to demand and take such remuneration or rents and charges and to make such terms and conditions as may be agreed upon."

Alderman M'Kee, chairman of the Electricity Committee, said that the Belfast undertaking was the only one in the United Kingdom that had not got the powers that were now being sought. The Committee had full powers to sell by hire purchase electrical equipment but they had not the power to sell it outright to the person who wanted to buy it. All articles sold to the public would be at the recognized retail prices. The Corporation was not going to do wiring by direct labour. It was not their policy to compete with the ratepayers but to improve the standard of apparatus offered for sale.

Alderman Cole expressed the view that the prospects would be poor for a young man starting up in the electrical business against the Corporation, who could get their capital for about 2½ per cent. There would be no objection to the Corporation having showrooms and displaying what they regarded as the best equipment, but they should not be allowed to enter into competition against the small merchant.

Billingham-on-Tees.—STREET LIGHTING.—The Urban District Council has approved plans by the North-Eastern Electric Supply Co., Ltd., for lighting the carriageway between Hawthorn Avenue and Sandy Lane (£3,500) and for converting the street lighting in Wolviston Road from gas to electricity (£3,463).

Chester.—JUBILEE CELEBRATIONS.—The Corporation Electricity Committee is arranging an electrical exhibition to be held in the Town Hall from December 11th to 14th in connection with

the Jubilee celebrations of the electricity undertaking. It is also intended to arrange, if possible, a scheme for the fluorescent lighting of Eastgate Street as part of the celebrations.

Blackburn.—NEW STREET LIGHTING EQUIPMENT.—The Corporation is modernizing its street lighting, and has recently installed in the town centre Metrovick "Trafford" lanterns and equipment. The "Trafford" is a one-piece bowl refractor lantern using a horizontal-burning mercury lamp

with, if desired, a magnetic arc control device. Apart from the high night-time efficiency of this lantern, the neat, unobtrusive daytime appearance of the unit is important when so much stress is being placed on design and town planning.

Brighton.—COINS IN METERS.—The Parliamentary Committee has included in its proposed General Powers Bill a clause for penalties for using false coins in electricity meters.

SUBSTATION EQUIPMENT.—The Electricity Committee is for eleven substations at a cost of £12,600.



Metrovick "Trafford" lantern at Blackburn

to provide equipment for eleven substations at a cost of £12,600.

Edinburgh.—REVISION OF TARIFFS.—New rates for electricity supply in Edinburgh were recommended by the Corporation's Public Utilities Committee on Friday last. Mr. J. F. Field, engineer and manager, explained that the essence of the scheme was not to get more money but to spread the cost more fairly.

Fulham.—INCREASED DISCOUNT.—The Borough Council last week approved a recommendation of the Electricity Committee that, as from the current quarter, a further 5 per cent discount (making 20 per cent in all) shall be given on accounts paid within 28 days, except special agreements. It is also proposed that, notwithstanding the increased cost of rental wiring installations, the hire charges for these installations, when resumed, shall be uniform with existing charges. The facilities afforded by the "Free Kitchen" scheme, or its equivalent, are to be restored as soon as circumstances

permit. The Committee reported a surplus of £62,419 on the past year's working of the undertaking, but added that the profit in future years is not likely to be so great. Total sales amounted to 61.3 million kWh against 56.6 million in 1944-45, an increase of 8.2 per cent, the average price per kWh sold being 1.117d. (1.104d.).

WASHING MACHINES.—The Committee stated that a novel type of washing machine had been demonstrated in the electricity showrooms, the selling price being £75 including purchase tax. Arrangements had been made for these machines to be sold on hire-purchase terms (£20 deposit and twelve monthly payments of £4 16s.).

Ipswich.—**VIEWS ON NATIONALIZATION.**—In presenting the annual report of the chief engineer and manager (Mr. G. A. Vowles) at last week's Council meeting, the chairman of the Electricity Supply Committee (Alderman S. C. Grimwade) said that it looked as if this would be the last report of its kind submitted to the Council. The powers that be told them that they were to be relieved of this job, which they had carried out successfully for nearly fifty years, and many of them would be very sorry. In the course of the ensuing debate, Alderman R. F. Jackson (senior Labour alderman) said that while generating was a national system, he hoped the Committee would use the power of the Council so that the remainder of the undertaking should be retained within the province of local authorities.

CLIFF QUAY GENERATING STATION.—The Council has approved the construction of a further section of Cliff Quay generating station by the installation, ready for commercial operation in September, 1949, of one 45,000-kW turbo-alternator and two boiler units each having an evaporative capacity of 365,000 lb per hr, complete with the necessary ancillary plant, buildings and civil engineering works. The addition of this plant will raise the capacity of the station to 225,000 kW, the ultimate capacity being 270,000 kW. The estimated additional capital expenditure involved by the proposed extensions is £1,767,040, for which application for loan sanction is to be made, the total amount covered by loan resolutions previously passed by the Council in connection with the Cliff Quay station scheme being £6,691,455.

LOANS.—Application is being made to the Electricity Commissioners for sanction to borrow £12,000 to defray expenditure on the d.c. to a.c. change-over and £12,500 for meters and consumers' apparatus.

Islington.—**CONSUMERS' SERVICE.**—The Electricity Committee has prepared a scheme for the formation of a consumers' service section and proposes to place it in the charge of Mr. A. W. Robinson, assistant mains engineer, who is now in charge of the wiring section.

Liverpool.—**DISTRIBUTION EXTENSIONS.**—The Electric Power and Lighting Committee proposes to lay six additional 33-kV main trans-

mission lines from Clarence Dock station in the general direction of Speke, at an estimated cost of £795,790.

London.—**DEVELOPMENT IN COUNTY CO.'S AREA.**—The County of London Electric Supply Co., Ltd., and its twenty associated companies in Essex, Kent, Surrey, Sussex, Hants and Dorset announce that since V.E. Day they have distributed over 4½ thousand million kWh, a record for the group; connected almost 50,000 new consumers to their mains; relighted 29,500 public street lamps and erected 1,450 new lamp standards; and supplied and installed 3,500 cookers and 12,850 other major domestic appliances.

North of Scotland.—**INAUGURATION OF DISTRIBUTION SCHEME.**—Mr. Thomas Johnston, chairman of the North of Scotland Hydro-Electric Board, speaking at Brodick, Arran, at a dinner to inaugurate the Board's distribution scheme for the Island, said it was a striking example of the benefits to the Highlands and Islands of the Board's plans. With their advantages of cheap money and profits from the schemes at Loch Sloy and Tummel Garry the Board could level down electricity prices to consumers in other and more sparsely populated areas. They hoped to increase Arran's 507 consumers to over 1,300, and the present price of electricity would be more than halved—from 6d. a unit to 2½d. a unit.

Norwich.—**STREET LIGHTING AT AYLSHAM.**—Newly installed electric street lamps, some of the mercury electric-discharge type, were recently switched on. The lighting system, comprising 90 lamps, has been installed by the Norwich Electricity Department.

Seaham.—**OVERCOMING METER SHORTAGE.**—A report that owing to the shortage of electricity meters the Urban District Council was introducing a flat rate electricity charge for new houses is explained by the electrical engineer, Mr. J. S. Forster. When fourteen prefabricated houses were handed over to the tenants no meters were available. It was therefore decided, as a temporary measure, that the tenants should pay a charge of 3s. a week to cover the cost of the energy used. The meters arrived within two weeks and the arrangement was then terminated.

Southend-on-Sea.—**MEETING INCREASED DEMAND.**—In view of the continued increase in demand and to meet future conditions the borough electrical engineer submitted to the Electricity Committee recommendations regarding a modified system of switchgear for tapping the e.h.v. mains, which would effect a considerable saving, and the operation of e.h.v. networks by means of ring feeders as opposed to the radial feeders at present used. The Committee approved the modified system of switchgear and gave approval in principle, subject to the consent of the Electricity Commissioners, to the suggested scheme for ring feeders.

West Midlands J.E.A.

Twenty-one Years of Progress

ABOUT five hundred guests were present at a luncheon held at the Civic Hall, Wolverhampton, on October 22nd to celebrate the twenty-first anniversary of the formation of the West Midlands Joint Electricity Authority. COUNCILLOR F. W. SMITHIES, chairman of the Authority, presided.

Proposing the toast of the Authority, LORD BRABAZON, president of the British Electrical Development Association, said that under the 1919 Act there might have been many electricity authorities but there were only a few and the West Midlands Joint Electricity Authority was acknowledged by everyone to be the best. The reason for this was that they had got together and thought in terms of electricity, not politics. They were a microcosm of what had been dreamt of for the whole country. The Authority had always been composed of men anxious to contribute their share to a co-operative enterprise. They had shown that progress and beauty were not necessarily antagonistic. At present there was neither the coal nor the plant to supply the country's growing demands for electricity. If they had to economize in coal he hoped there would be a development in railway electrification which could save 10 million tons a year.

The standard of life in the home was dependent on electricity for the elimination of much of the drudgery. He hoped that when Mr. Shinwell had done his work and became "Lord Kilowatt, K.V.A.," he might be able to look back on an industry organized throughout the country with as much satisfaction and pride as the Authority must look back on its achievements.

Planned Development

Replying, Councillor Smithies said he thought that nowhere in Britain had the advantages of electrical development been more triumphantly proved than in the West Midlands area. Here wisely planned electrification had undoubtedly brought to the community better ways of living and working. Farmers in the West Midlands rural area were finding new prosperity through electricity; in Shropshire alone, one-third of the farms and one-quarter of the smallholdings had now been supplied with electricity. More and more electrical equipment would follow, not only for the farms and villages but for the mines and new factories. Although so much had been done in the past twenty-one years there remained a great deal yet to be done. To-day the electricity supply industry was faced with two major anxieties, a shortage of coal and shortage of plant. This was not, however, an occasion for depression and they must look on this hitch as a temporary one.

Proposing the toast of "The Electricity

Supply Industry," LT. H. D. HUGHES, M.P., said that if the lead given by the Authority had been more closely followed it was possible that the need for reorganization of the industry would not have been so urgent. They were now entering an era in which the electric washing machine and refrigerator were becoming a standard feature of every home. The future of the industry must be looked at with the one view in mind—good conditions and efficiency, and he hoped that all concerned would follow the Authority's motto "United to Serve."

MR. HAROLD HOBSON, chairman of the Central Electricity Board, who responded, declared that the electricity supply industry had



Councillor F. W. Smithies, chairman of the West Midlands J.E.A., presenting the vice-chairman, Mr. Charles Heathcock, with a silver casket at a luncheon held last week to celebrate the coming-of-age of the Authority ("Express and Star" photograph)

done too little to blow its own trumpet. It was the key industry of the whole economic prosperity of the country. All the working parties set up to inquire into the conditions of the various industries laid stress on the necessity for further electrification. About 60 per cent of the output of electricity went to industry and provided its lifeblood. The first step is rehabilitating the country and raising the standard of living was to make electricity available.

In 1941 the Government took the decision, the right one he thought, to get vital armaments at the expense of leaving the country short of generating plant. They were now endeavouring to rectify that shortage at the earliest possible moment and this meant hard work not only for the supply industry but also for the manufacturers, builders, etc. Until the leeway had been made up it was important that everyone should reduce consumption between 10 a.m. and noon and between 4 and 6 p.m. Load shedding, he said, would have to continue for a year

or two but consumers could do much to reduce it.

Speaking regretfully of the proposal to nationalize the industry, MR. G. R. J. PARKINSON, chairman of the Technical Operating Committee of the Authority, said he believed most consumers were satisfied with the present regime and any improvements could well be made without the upheaval of nationalization and the paralysing effect of control from Whitehall. MR. G. B. SANKEY, director of Joseph Sankey & Sons, Ltd., stressed the importance of personal contact between supply authority and consumer which he was afraid would be lost under nationalization.

MR. H. NIMMO, Electricity Commissioner, paid a tribute to the work of Mr. H. F. Carpenter, clerk and manager of the Authority, Mr. L. F. Jeffery, chief engineer, and their predecessors, and congratulated the Authority

on the low generating costs on the Ironbridge power station. MR. VINCENT DE FERRANTI, president of the Institution of Electrical Engineers, was glad to see how the pioneering spirit and ideals of his father, the late Dr. S. Z. de Ferranti, were being maintained. MISS CAROLINE HASLETT, director of the Electrical Association for Women, deplored the recent tendency towards restriction of freedom of choice.

At the conclusion of the proceedings the chairman presented to Mr. Charles Heathcock, vice-chairman of the Authority, a silver casket containing a resolution expressing appreciation of his services. Mr. Heathcock was a member of the conference of authorized undertakings which prepared the original scheme of re-organization resulting in 1925 in the formation of the Authority. He was one of the founder members and chairman from 1943 to 1946.

Fluorescent Lighting

Its Future in the Home

FOLLOWING the opening of the new showrooms of Thorn Electrical Industries, Ltd. (see p. 700), a two-part paper was read by Messrs. J. W. Strange, Ph. D. and H. H. Ballin, Ph.D., on "The Future of Fluorescent Lighting" with particular reference to its domestic application. In the first part Dr. Strange said that he intended to deal with present imperfections as well as the advantages of fluorescent lamps. These imperfections were very often nothing to do with the tube itself but were related to the auxiliary equipment which complicated the circuit and was costly. Nevertheless the facts that the fluorescent lamp was more efficient, lasted two or three times as long as a filament lamp, had a wide range of colour and low surface brightness were real virtues.

Discussing the basis of design and economic efficiency, Dr. Strange said that over a period of years it might be found cheaper to run a tube at a higher loading but at a lower efficiency, a consideration which favoured the present 80-W tube (with a loading of 0.30 W per sq in.) against the 40-W tube (0.18 W per sq in.). In the domestic sphere he thought that a 3-ft 30-W tube in single or multiple units had a very promising future.

Dealing with the question of colour the speaker referred to the difficulty of defining "daylight" and to the introduction of the "warm-white" tube. He said that for some purposes even redder lamps might be useful. There were still special problems to be solved. In conclusion Dr. Strange mentioned the problem of quick starting but questioned whether its solution would justify the added cost and trouble. Cold-cathode tubes started instantaneously and undoubtedly had applications in a limited field.

Dr. Ballin said that so far as this country was concerned the public had had little opportunity

of formulating any views on domestic fluorescent lighting. In the United States about 10 per cent of the wired homes (i.e., 2,600,000) had fluorescent lighting and a further 13 per cent had expressed their desire to install it.

The advantages of the fluorescent lamp were that it was a line source of light (reducing shadows). He thought that the length of a 3-ft 30-W tube was no disadvantage and was more suitable than the 20-W 2-ft tube. Fluorescent lighting was more "flexible" and could be used as part of the decorative scheme. "Warm-white" tubes would be found the most suitable generally but they might possibly be used in conjunction with "daylight" tubes, while coloured tubes would have applications for special effects.

While in industrial applications some shielding has been found necessary, this consideration was not of such importance in the home where few tubes would be employed. Where fittings were required they would have to be carefully and specially designed.

Dr. Ballin also touched upon the disadvantages of expensive auxiliaries and delayed starting; he thought that a larger production might reduce the prices of ballast gear to some extent and that an effort should be made to improve starting. Although industrially fluorescent lighting could be justified on economic grounds, in the home the advantages lay in raising the standard of lighting and adding to the comforts of living and ease of working.

To ensure satisfactory operation the lighting should be considered as an essential and integral part of architectural design; the quality of the auxiliary gear should be ensured by some standard; and electrical contractors should acquire a full knowledge of fluorescent lighting circuits, coupled with the possibility of advice and tests by electricity supply undertakings.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

The Jerusalem Electric & Public Service Corporation, Ltd., held its annual meeting on October 23rd when Mr. W. Shearer (chairman), who presided, said that the sales of electricity during the year under review amounted to 17 million kWh as compared with 15½ million kWh in the previous year and the number of consumers increased from 24,580 to 25,869. Of the new plant ordered in March, 1944, and in May, 1945, the first 2,000-kW set went into commercial operation in July this year, while the erection of the second 2,000-kW set was now taking place, and it was anticipated that it would be in operation by the end of this year. They foresaw no slackening in the demand for electricity and orders had been placed for two more generating sets of 2,000 kW each, but delivery of these could not be obtained before some time in 1948. Payment for this new plant and complementary additions to the distribution system would in due course involve the provision of fresh capital.

The Calcutta Tramways Co., Ltd.—At the annual meeting held on October 24th Sir Geoffrey Clarke (chairman) referred to the position between the company and the Calcutta Corporation. The company had applied to the High Court for a declaration that the agreement as to arbitration contained in the contract of September 3rd, 1945, had been determined and for an order restraining the Corporation from proceeding further with the threatened arbitration proceedings. An interim injunction had been granted pending the hearing of the application. With regard to the intention of the Government of Bengal to form a Transport Board for the purpose, *inter alia*, of acquiring the company's undertaking, the Government of the Province had now ceased to be that of the Governor under Section 93 of the Government of India Act and a Provincial Government, constituted after a general election, was now in power. Whether the Transport Bill for the purchase of both the tramway and bus undertakings of Calcutta and Howrah would be revived was not known.

Holophane, Ltd., held its annual meeting on October 25th, when Mr. H. G. Campbell (chairman), who presided, said that the volume of business for the year ended June 30th showed a satisfactory increase over the preceding year. They now felt justified in resuming dividends and recommended the payment of 12½ per cent for the year under review. It was proposed that the existing £1 shares be split into four shares of 5s. each and that the shares be converted into stock transferable in units of 5s. or multiples thereof. They already had a sub-

stantial order book, but progress was still restricted by the prevailing conditions of supplies and materials.

Ferranti, Ltd., report a net profit for the year ended June 30th last of £77,007, as compared with £95,678 for the preceding year, to which is added £58,832 brought in, making £135,839. General reserve receives £40,000 (against £72,817), and the dividend on the ordinary stock for the year is maintained at 6 per cent tax free, leaving £59,464 to be carried forward.

The Electric Furnace Co., Ltd., reports a loss for the year ended March 31st last of £31,195, as compared with £1,771 for the preceding year. The amount brought in is £6,762, plus a dividend of £4,000 from a subsidiary and net E.P.T. recoverable of £54,000, making £64,762. The preferred ordinary dividend is 8 per cent and the ordinary 8 per cent (both unchanged), general reserve receives £10,000 and £10,467 is carried forward, subject to directors' fees.

Murex, Ltd.—In the course of his speech at the annual meeting held on October 28th, Mr. G. P. Joseph (chairman) said that the further reduction in the trading profits reflected the adverse conditions that had prevailed in industry generally during the past year. These adverse conditions were reflected in the accounts of Murex Welding Processes which, however, had continued to maintain its strong position in the arc welding industry and had obtained its full share of the business available. The directors believed that the great wartime expansion in the application of welding would be reflected in peace-time activities as soon as circumstances permitted.

The British Electric Traction Co., Ltd., has declared interim dividends of 4 per cent actual (same), less tax, on the 8 per cent non-cumulative preferred ordinary stock and 15 per cent actual (same), less tax, on the deferred ordinary stock.

Burco, Ltd., is paying a dividend of 20 per cent for the year ended September 30th and a bonus of 15 per cent. The dividend is unchanged, but in the previous year no bonus was paid.

Johnson & Phillips, Ltd., are maintaining their interim dividend at 7½ per cent.

The Tata Power Co. has announced a final dividend of 4½ per cent, making 7 per cent tax free for the year (against 6½ per cent).

The Broadcast Relay Service, Ltd., is raising its interim ordinary dividend from 3½ to 5 per cent tax free.

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

The Anglo-Portuguese Telephone Co., Ltd., is again paying an interim dividend of 3 per cent.

New Companies

Raylite Displays, Ltd.—Registered September 16th. Capital, £5,000. Manufacturers of, and dealers in, electric, illuminated and other signs, etc. Directors: T. Martlew, R. P. Beesley, H. N. Weavers and W. F. Matthews. Regd. office: 174, East Road, Cambridge.

Auto-Electrics (Nottingham), Ltd.—Registered October 1st. Capital, £200. Electrical equipment specialists, etc. Directors: R. Fligg and Mrs. May Fligg. Regd. office: 276, Arkwright Street, Nottingham.

Remote Control, Ltd.—Registered October 4th. Capital, £100. Electrical, mechanical and general engineers, etc. Directors: F. Rimmington and Mrs. A. L. Rimmington. Regd. office: 39, New Broad Street, E.C.2.

Romer's Electronics, Ltd.—Registered October 7th. Capital, £2,000. Manufacturers of, and dealers in, radio transmitting and receiving sets, electrical apparatus, etc. Directors: B. J. Romer and Mrs. Jane Romer. Secretary: C. L. Winter. Regd. office: "Beechwood," Blackburn Road, Rishton, Lancs.

W. H. Podmore, Ltd.—Registered October 7th. Capital, £5,000. To acquire the business of electrical and mechanical, radio, television and refrigeration engineers carried on by W. H. Podmore at Merridale Road, Wolverhampton. Directors: W. H. Podmore and Mrs. Eva E. Podmore.

M.M. Engineering, Ltd.—Registered October 12th. Capital, £500. Manufacturers of, and dealers in, dynamos, motors and generally all kinds of electrical and mechanical plant and machinery, engineers, etc. Directors: F. A. Remnant and F. A. Richardson. Regd. office: 14, St. Thomas Road, Brentwood.

John Finnie & Co., Ltd.—Registered in Edinburgh October 8th. Capital, £1,000. To acquire the business of J. Finnie, electrical engineer and contractor carried on at 26 Saunterne Road, Prestwick. Directors: M. Gold, D. McLean and M. Markson. Regd. office: 211, High Street, Ayr.

Electric Products Co. (Liverpool), Ltd.—Registered October 14th. Capital, £2,000. Wholesale distributors and manufacturers of electrical equipment, including wireless and television receiving sets, valves, etc. Directors: R. J. Keeley and A. L. Schrader. Regd. office: 66, Park Lane, Liverpool, 10.

J. G. Lowe (Technical Services), Ltd.—Registered October 10th. Capital, £5,000. Technical consultants and advisers, radio and electrical engineers, etc. Permanent directors: J. G. W. Lowe, W. Edwards and R. Beavan. Regd. office: 14, Cambridge Square, Hyde Park, W.2.

British Electrical Supplies (Wholesale), Ltd.—Registered October 16th. Capital, £5,000. Manufacturers of, and dealers in, vacuum

cleaners, refrigerators, washing machines, domestic equipment, electrical and mechanical apparatus, lamps, signs, etc. Directors: G. Flower and E. S. Tranter. Regd. office: 99, Fenchurch Street, E.C.3.

B. H. Rains, Ltd.—Registered October 14th. Capital, £4,000. Electrical, wireless, motor and general engineers, etc. Directors: A. H. Bastin and B. R. Rains. Regd. office: 121, Stokes Croft, Bristol, 1.

Rev Motors, Ltd.—Registered October 11th. Capital, £10,000. To acquire the business of electric motor engineers now carried on by J. V. Eurich, J. E. G. Eurich, Elizabeth Brown, Gwynith C. Yates and N. F. Ayrton, at Clive Street, Bolton, as "Rev Motors." The above-named are permanent directors. Regd. office: Knowsley House, Bolton.

Electrical and Mechanical Equipments, Ltd.—Registered October 14th. Capital, £1,500. Manufacturers and sellers of radio and television sets, and accessories, etc. Directors: L. A. Sykes and N. S. Perry (secretary). Regd. office: 31b, Frogmoor, High Wycombe, Bucks.

Lind Davidson, Ltd.—Registered in Edinburgh October 15th. Capital, £1,000. Radio and electrical engineers and suppliers, etc. Directors: L. Davidson and D. Thomson. Regd. office: 46, Union Street, Inverness.

Winding-up Petitions

Green Electrical Industries, Ltd.—In the Companies Court, Chancery Division, on October 21st Mr. Justice Wynn-Parry had before him a petition for the compulsory winding-up of this company. This was a creditor's petition and there were supporting creditors. The company did not appear and his Lordship made the order asked for.

Harrison & Co. (Electrical), Ltd.—On the same day Mr. Justice Wynn-Parry heard a petition for the compulsory winding-up of this company. Counsel stated that the petition was based on a judgment for £174 and there were supporting creditors. The company did not appear and his Lordship made a compulsory order.

Ranelagh Radio & Electrical Co., Ltd.—Mr. Justice Wynn-Parry also had before him a petition for the compulsory winding-up of this company. Counsel said that the debt which gave rise to the petition had been paid and he asked his Lordship to dismiss the petition. His Lordship dismissed the petition and made an order for the taxation of costs.

Bankruptcies

H. H. Moore, Junior, electrical engineer, The Lindens, West Cliff Gardens, Bournemouth.—Last day for receiving proofs for dividend November 12th. Trustee, Mr. A. L. Metcalf, 10, Rockstone Place, Southampton, Official Receiver.



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STOCKS AND SHARES

THE forthcoming repayment of £429,000,000 Local Loans 3 per cent stock, on January 5th next, continues to be the mainspring of a demand which steadily broadens for investments of all kinds. Amongst the latter, electricity supply shares stand out with prominence by reason of the security they offer.

Good Markets

Cable and Wireless 5½ per cent preference is up 3 points, to 119½; the ordinary at 117 is 5 points better. A rise of no less than 135 points lifted British Electric Traction deferred to 1245, the Birmingham and Midland Motor Co. having declared an interim dividend from which the B.E.T. is expected to receive some £200,000. In the equipment and manufacturing group, substantial progress has been made towards wiping out the losses shown in the table of prices given here last week. Ferranti preference have moved up to 35s., General Electrics to 97s., Johnson and Phillips to 79s., and International Combustion to 8½, the last-named scoring a rise of 10s. Burco advanced to 28s. 9d. on announcement of a 15 per cent bonus in addition to the 20 per cent dividend. London Passenger Transport "C" is up 3, at 61½. A good report from Atlas Electric rallied the price to 9s. 6d. Aron Electricity Meter ordinary recovered to 55s., and Vactrics are better at 15s. De la Rue at 13½ are £1 higher. Ericsson Telephones at 53s., and Crompton Parkinsons at 32s. 3d. have also improved. Radio shares are firm: Decca at 57s. 6d. have regained 3s. 9d. of their previous fall, whilst Scophony at 7s. 6d. and Radio & Television at 10s. 6d. are both better.

Home Electricity Shares Rise

Robust strength is shown by the ordinary shares of the Home electricity supply companies. Comment was made last week upon the manner in which, almost alone amongst the Stock Exchange markets save that for British Government securities, electricity supply shares had withstood the depression spread by the grave statements of Mr. Shinwell in regard to the coal situation. So far from prices looking back, they have made further progress during the past few days. In a score of cases, gains ranging from 6d. to 3s. 6d. have been secured. In the market, the theory advanced is that some of the holders of the Local Loans stock that is to be redeemed next January have been selling this security and re-investing the proceeds into electricity supply. Preference shares as well as ordinary are in pressing demand.

Nationalization ?

The stability of the Home electricity supply industry is regarded as being such as to render attractive the yields of about 4 to 4½ per cent that the principal shares offer. Nationalization

is no longer the nigger in the woodpile. In fact, an impression prevails that under nationalization, holders of electricity supply shares might become better off than they are in existing conditions, although the vigorous campaign against nationalization has fanned the expectation that, after all, the State may not take over the industry. The market turn-over in the ordinary shares of the companies continues to be on a remarkably large scale; it is no exaggeration to say that hundreds of thousands of shares have changed hands during the past two or three weeks. Holders rendered timid by nationalization fears have been selling: other investors, perhaps more far-seeing, have been taking the shares readily, as, indeed, the rising prices indicate.

J. & F. Stone

J. & F. Stone Lighting & Radio, Ltd., recently raised its dividend from the previous 15 per cent to 40 per cent for the year ended last June. In each of the two years 1943 and 1944, 6 per cent was paid, following three years of 5 per cent annual dividends. The net profit of £139,000 for the year lately ended was three times as much as that of the previous twelve-month. On the 40 per cent dividend, the shares give a yield of over 7 per cent on the money.

Tube Investments

The directors of Tube Investments will consider the final dividend on November 11th. A tendency for the £1 shares to rise in anticipation was checked by last week's announcement that one of the tube-making subsidiaries has been closed down through lack of steel supplies. These are stated to be considerably below the production capacity of the group, causing a modification of market ideas about the coming dividend. The price of the shares remains at £6. For the year ended October, 1945, the company paid a total of 22½ per cent, with the addition of a special 10 per cent distribution from reserves. This year's interim was maintained at 10 per cent. On the 22½ per cent dividend the yield works out to 3½ per cent.

Newcomers

Particulars of the Parmiter Hope & Sugden Company have been published as a preliminary to the introduction of the ordinary shares to the market. A ten-year profits table shows that expansion of earnings was checked by the war, but has since been resumed, the gross figures for 1945-6 being the highest of the decade, except for those of 1940-41. Allowing for the dividend on the £30,600 preference capital, the current year's estimated balance would be equivalent to earnings of 55 per cent on the £53,700 ordinary capital. Dealings were expected to begin this week in the neighbourhood of 4s. 3d. for the 1s. shares. Midland Counties new shares have advanced from 9s. premium to 13s. premium.

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.

W. P. ANDERSON and **C. S. Wright**.—"Wireless transmitting apparatus." 16886. September 4th, 1944. (581314.)

J. C. Arnold (Standard Oil Development Co.).—"Electrolytic protection of metal surfaces against corrosion." 20544. December 8th, 1943. (581341.)

Automatic Telephone & Electric Co., Ltd.—"Telephone systems." 15985/44. October 21st, 1943. (581284.) "Telephone substation circuits." 4794/44. May 1st, 1943. (581380.)

E. Bartle, P. J. Robinson and **A. B. Westwell**.—"Mixing appliance for attachment to an electrical washing machine provided with a wringer driven by a vertical shaft." 4478. March 10th, 1944. (581414.)

E. G. Bowen, R. W. Taylor, F. C. Williams, R. H. Brown and **A. G. Touch**.—"Radio locating apparatus." 18363. December 25th, 1942. (581363.)

R. C. Braithwaite, K. Wilcox and **Metro-politan-Vickers Electrical Co., Ltd.**—"Mechanical relays of the fluid jet type." 9377. May 28th, 1940. (581401.)

British Thomson-Houston Co., Ltd.—"Electric discharge devices." 8708/43. May 30th, 1942. (581329.) "Operating mechanism for electric discharge lamps." 11773/43. July 21st, 1942. (581332.)

British Thomson-Houston Co., Ltd. (General Electric Co.).—"High-frequency electronic device of the magnetron class. 17946. October 29th, 1943. (581335.)

British Thomson-Houston Co., Ltd., and **T. H. Petch, Jnr.**—"Electrically operated automatic airlock doors." 13314. July 12th, 1944. (581468.)

Compagnie Générale d'Electrocéramique.—"Electric insulators." 19070/45. July 29th, 1939. (581398.)

Compagnie pour la Fabrication des Compteurs et Matériel d'Usines à Gaz.—"Electric distance relay protective systems." 3420/41. July 28th, 1939. (581360.)

A. C. Cossor, Ltd., and **J. M. S. Speirs**.—"Short-wave electric discharge devices." 2635. February 17th, 1943. (581364.)

V. Crighton and **W. R. Ingram**.—"Electric kettles." 16003. August 22nd, 1944. (581287.)

J. M. Dodds, G. J. Scholes and **Metropolitan-Vickers Electrical Co., Ltd.**—"Relaxation circuits for producing electrical impulses at regular recurrence frequencies." 8856. June 26th, 1942. (581324.)

T. L. Eckersley and **S. B. Smith**.—"Radio

direction finding systems." 7890. April 27th, 1944. (581423.)

Electro Manganese Corporation.—"Electro-winning of manganese." 16712/43. August 19th, 1942. (581370.)

L. R. Frost.—"Electric selective signalling systems." Cognate applications 10848/44 and 10849/44. June 6th, 1944. (581452.)

General Electric Co., Ltd., and **A. H. Willoughby**.—"Circuits for operating electrical discharge devices." 12340. June 28th, 1944. (581461.)

Gent & Co., Ltd., and **E. O. Chapman**.—"Electric current impulse circuit arrangements suitable for the operation of electro-magnetic apparatus." 6665. April 11th, 1944. (581385.)

T. Grocott and **W. Grocott**.—"Insulators and in the method of mounting same." 1673. January 22nd, 1945. (581349.)

Hoover, Ltd.—"Suction cleaners." 14251/44. July 26th, 1943. (581477.)

Igranic Electric Co., Ltd., and **W. F. Grafton**.—"Electro-magnetically operated circuit-breakers." 9745. July 31st, 1941. (581322.)

G. Keinath.—"Electrical indicating and recording systems." 4944/44. December 24th, 1942. (581382.)

G. Leibmann and **Cathodeon, Ltd.**—"Amplifier valves for high frequencies." 14916. November 20th, 1941. (581323.)

H. Lister, G. L. Woolnough and **Metro-politan-Vickers Electrical Co., Ltd.**—"Adjustment of electric switches enclosed in envelopes." 11578. June 17th, 1944. (581455.)

A. C. Lynch.—"Current supply for electric lamps." 20894. December 13th, 1943. (581373.)

Mallory Metallurgical Products, Ltd.—"Electric contact or like elements." 6334/45. March 14th, 1944. (581357.)

M-O Valve Co., Ltd., **J. Bell** and **H. D. Stannard**.—"Thermionic valves." 14144. July 24th, 1944. (581475.)

Philips Lamps, Ltd., **S. L. Martin** and **C. F. P. Bevington**.—"Electric incandescent lamps." 11370. June 14th, 1944. (581453.)

A. Phillips, Ltd., and **S. C. Hall**.—"Domestic washing machines or boilers." 15786. August 18th, 1944. (581282.)

Revo Electric Co., Ltd., and **A. E. Felton**.—"Tubular fluorescent lamp fittings." 3811. March 1st, 1944. (581377.)

J. Rogoff.—"Tool-installed electrical wire terminal." 3119. February 19th, 1944. (581376.)

M. P. Rubert.—"Electrode holders." 7503. April 22nd, 1944. (581388.)

G. R. Shepherd (Westinghouse Electric International Co.).—"Electric current conversion systems." 10271. May 26th, 1944. (581448.)

Sperry Gyroscope Co., Inc.—"Systems of

secret radio communication." 1078/44. January 22nd, 1943. (581344.)

Standard Telephones & Cables, Ltd.—"High-frequency vacuum tube oscillators." 6556/44. December 24th, 1942. (581384.) "Selective amplifiers employing electric discharge tubes." 6580/44. September 18th, 1942. (581419.) "Electron discharge devices." 10823/44. March 26th, 1943. (581451.)

Standard Telephones & Cables, Ltd., and J. H. Fremlin.—"Focusing of a beam in electron discharge apparatus." 10703. June 21st, 1940. (581440.)

Standard Telephones & Cables, Ltd., and M. M. Levy.—"Frequency dividers." 6744. April 28th, 1943. (581328.)

Standard Telephones & Cables, Ltd., P. K. Chatterjea and S. J. Powers.—"Manufacture of piezo-electric crystal assemblies." 16726. September 1st, 1944. (581307.)

Sulzer Freres Soc. Anon.—"Steam generators." 11781/44. July 22nd, 1943. (581458.)

Swift Levick & Sons, Ltd., and F. W. Tetley.—"Manufacture of permanent magnets." 13258. August 21st, 1940. (581402.)

R. W. Taylor, F. C. Williams, R. H. Brown, E. G. Bowen and A. G. Touch.—"Radio locating apparatus." 1251/44. December 25th, 1942. (Divided out of 581363.) (581375.)

B. Tenenbaum.—"Aerial tuning systems for radio transmitters." 16392. August 29th, 1944. (581296.)

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.

Bootle.—November 8th. Works Committee. Sodium lighting equipment. (October 25th.)

Cardiff.—December 10th. Electricity Department. 11-kV switchgear, 500-kVA transformers and 11-kV and l.v. underground cables. (October 18th.)

Edinburgh.—November 22nd. Electricity Committee. Electricity supply meters for twelve months. (See this issue.)

November 25th. North of Scotland Hydro-Electric Board. H.v. and l.v. lines, Gairloch distribution scheme. (October 25th.)

Farnworth.—November 13th. Electricity Department. 1,000-kVA transformer and e.h.v. switchgear. (October 18th.)

Great Yarmouth.—November 29th. Electricity Department. Domestic appliances for twelve months. (See this issue.)

Keith (Banffshire).—November 16th. Town Council. Electrical work for houses (14) at South Cuthil. Burgh surveyor, Balloch Road.

Manchester.—November 15th. Electricity Committee. One motor-driven air compressor and receiver. (October 25th.)

Plymouth.—November 9th. Electricity Supply Department. Twelve pit-type 150-kVA three-phase auto-transformers. (October 25th.)

Portsmouth.—November 9th. Electricity Undertaking. One three-phase 33-kV oil-immersed, natural-cooled outdoor type reactor, complete with cable boxes and fittings. (October 25th.)

Salford.—November 11th. Electricity Department. 6,600/415/240-V three-phase power transformer. (October 18th.)

Southport.—November 7th. Electricity Department. Eighty cast-iron street lighting standards. (October 25th.)

Weymouth and Melcombe Regis.—Electricity Department. 11-kV and l.v. overhead lines to supply villages of Bincombe, West Knighton and West Stafford. (October 25th.)

Woolwich.—November 27th. Electricity Department. Electricity meters, transformers, h.v. and m.v. cables for twelve months. (See this issue.)

Orders Placed

Bedford.—Electricity Committee. Accepted. Forty-three transformers (£8,546).—British Electric Transformer Co.

Chesterfield.—Electricity Committee. Accepted. Cables.—Aberdare Cables (£22,309) and B.I. Callender's Cables (£2,054). Transformers (£2,058).—Brush Electrical Engineering Co. Switchgear (£4,093).—A. Reyrolle & Co.

Ipswich.—Town Council. Accepted in connection with £400,000 distribution scheme. Transformers (two 15 MVA, 33/6.6 kV, two 10 MVA, 33/11 kV and two 10 MVA, 33/6.6 kV, all with on-load tap-changing equipment).—Ferranti.

Liverpool.—Health Committee. Accepted. Cables for the power installation at the West Derby sewage disposal works.—Liverpool Electrical Cable Co.

Middlesbrough.—Town Council. Electrical installations in 120 houses, Cumberland Road area.—Middlesbrough Electrical Installations & Services.

St. Pancras.—Contracts and Stores Committee. Recommended. Modifications to e.h.v. switchgear at various substations (£572).—A. Reyrolle & Co.

Stockton-on-Tees.—Corporation. Accepted. Equipment for supplying the Fairfield and Newham Grange estates and the Dog Hill Farm industrial site: L.v. switchboard.—W. Lucy & Co. H.v. switchgear.—A. Reyrolle & Co. Transformers.—C. A. Parsons & Co. Cables.—Edison Swan Cables.

Contracts in Prospect

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

Ashington.—Factory for Culpitt & Son, Ltd.; J. Huntley & Son, builders, Marion Street, Sunderland.

Becotree.—Houses and flats (£145,950).—L.C.C. architect.

Bedlington.—Houses for the U.D.C. at Cambois (170), Bank Top (32), Netherton Road (180), Netherton Lane (98), and Hartford Road (170); W. Hall, surveyor.

Bermondsey.—Flats (38), Arnold estate (£55,290); borough engineer.

Blyth.—New coppersmiths' shop, platers' shed and engine shop for the Blyth Shipbuilding & Dry Dock Co., Ltd.

Bolton.—Houses (26), Brightmet estate (£28,313); Bolton Federated Builders, Ltd.

Bradford.—Works extensions, Thornton Road; Oswald Tillotson, Ltd.

Bretton.—Offices and works on three acres of land for Cheshire Construction Co., Ltd., Middlewich Road, Sandbach.

Camberwell.—Dwellings (19), Dalwood Street; Church Army Housing, Ltd.

Dwellings (668), Denmark Hill (£750,000); borough engineer.

Canterbury.—Civic centre on site adjoining Dane John; city engineer.

Cheadle.—Factory for British Hard Rubber Co., Ltd.

Chesterfield.—Extensions to the "William Rhodes" Secondary School; Wilcockson & Cutts, architects, 12, Salter Gate.

Houses (202), Council estates; W. A. Derbyshire, architect.

Clapham.—Hutted school, Bradmede site (£12,794); Henry Kent (Builders), Ltd.

Clowne.—Underwear factory for J. B. Lewis & Sons, Ltd., Haydn, Road, Sherwood, Nottingham.

Croydon.—Houses (14), Ashburton estate (£16,404); Malpas Construction Co., 37, Scarbrook Road.

Cumberland.—Additions to Newton Rigg Farm School; county architect, Carlisle.

Dudley.—Houses (252), Holly Lodge estate (£269,159); Sims, Son & Cooke, Ltd.

Dunbar.—School for East Lothian Education Committee; county clerk, Edinburgh.

Durham.—Technical school and evening institute at Billingham; county architect, 34, Old Elvet.

Ealing.—Houses (100), Medlar Farm estate, Northolt (£119,500); Winckley Estates, Ltd.

Flats (60), Kingsbridge Avenue, for Liverpool Victoria Friendly Society; F. Boreham &

Wallace, architects, Victoria House, Southampton Row, W.C.1.

Houses (26), Meadvale Road; A. R. Clare, architect, 1, High Street, Pinner.

Finsbury.—Dwellings, Halford Square (£170,000); borough engineer.

Friern Barnet.—Flats (114), Colney Hatch Lane; U.D.C. surveyor.

Garforth.—Houses (42), Coronation site, Kippax (£50,600) for U.D.C.; A. Gregory & Son, Ltd., builders, Glasshoughton, Castleford.

Great Harwood.—Houses (32), Waverledge site, for U.D.C.; W. Livesey & Sons, Ltd., builders, Blackburn.

Heanor.—Houses (70), three estates; U.D.C. surveyor and local contractors.

Hyde.—Houses (330), at five Council estates; borough engineer.

Ilford.—Houses (100), Fencepiece Road (£121,680); G. Wimpey & Co., Ltd.

Flats (68), Beehive Lane and Budock Drive; borough engineer.

Islington.—Dwellings (638), five estates; borough engineer.

Jarrow.—Development of cleared areas and the provision of new shopping centre; H. W. T. Perkins, borough engineer.

Lewisham.—Day nursery, Downham (£6,000); borough engineer.

Newcastle-on-Tyne.—Large bakery, Druridge Drive, for Carricks (Caterers), Ltd.; Marshall and Tweedy, architects, Grainger House, Blackett Street.

North Shields.—Factory, Norham Road; North Eastern Trading Estates, Ltd.

Southwark.—Offices and warehouses, Long Lane; Sterrett & Blouet, 17, Ashley Place, S.W.1.

Works extensions, Falmouth Road; Waygood-Otis, Ltd.

Flats (340), some with lifts, and community centre; borough engineer.

Rebuilding works, Southwark Grove; S. N. Cooke & Partners, Sun Buildings, Bennett's Hill, Birmingham.

Stirling.—Proposed municipal crematorium; burgh surveyor.

Stoke Newington.—Artificial sunlight clinic, Milton Grove; borough engineer.

Taunton.—New factory for Steel & Glover, Ltd., 3, Thomas Street.

Tottenham.—Flats (34), Cornwall Road and Devon Road (114); borough engineer.

West Bromwich.—Factory extensions, Church Lane; Alfred Adams & Co., Ltd.

Wigan.—Factory on site at Goose Green for British Celanese, Ltd.

Houses (68), Parbold and Wrightington, for R.D.C.; J. Holding, surveyor, Bank Chambers, Wallgate.

Woolwich.—Flats (130), Barnfield estate (£209,200); L.C.C. architect.

A GOOD NAME TO REMEMBER

When delivery time is not the only consideration you will find it worth while to remember that L.S.E. are still making very good electric motors and control gear, as they have been for over sixty years.

Their range includes :—

Standard Industrial motors, A.C. and D.C.

Crane, Lift, Flameproof and other motors with special electrical or mechanical features.

Variable Speed equipments, A.C. and D.C.

Generators, Alternators, Auto-synchronous motors,

Welding Generators, etc.

Marine Motors and Winches.

Control Gear for all the above.

**LAURENCE, SCOTT
& ELECTROMOTORS
LIMITED**

NORWICH, MANCHESTER



LONDON AND BRANCHES

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

GOOD LIGHTING IS A TONIC

ESPECIALLY WITH OSRAM

Osram
THE WONDERFUL LAMP

A S.E.C. PRODUCT

The advertisement features a collection of Osram lamps: a standard incandescent bulb, a frosted tubular lamp, a standard incandescent bulb with a visible filament, and a glass-enclosed fluorescent lamp. In the lower left, a large rooster and a small chick are depicted; the rooster's beak is positioned as if speaking the slogan 'GOOD LIGHTING IS A TONIC', and the chick's beak is positioned as if speaking 'ESPECIALLY WITH OSRAM'. The background is a dark, textured surface with light rays emanating from the lamps.

CLASSIFIED ADVERTISEMENTS

ADVERTISEMENTS for insertion in the following Friday's issue are accepted up to **First Post on Monday**, at Dorset House, Stamford Street, London, S.E.1.

THE CHARGE for advertisements in this section is 2/- per line (approx. 7 words) per insertion; **ONLY OFFICIAL AND GOVERNMENT ANNOUNCEMENTS CAN NOW BE DISPLAYED**—30/- per inch. Where the advertisement includes a Box Number this counts as six words and there is an additional charge of 6d. for postage of replies.

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

Original testimonials should not be sent with applications for employment.

OFFICIAL NOTICES, TENDERS, ETC.

COUNTY BOROUGH OF GREAT YARMOUTH ELECTRICITY DEPARTMENT

Domestic Appliances

TENDERS are invited for the supply and delivery of Domestic Appliances required during the period of 12 months ending 31st March, 1948. Specification, conditions and form of tender for all or any items as listed may be obtained from G. T. Alcock, Esq., Chief Engineer and Manager, Electric House, Great Yarmouth:—

Large, small and breakfast cookers, boiling rings, toasters, electric kettles, percolators, waterheaters, wash boilers, refrigerators, washing machines, irons, vacuum cleaners, fires, clocks, towel rails.

Tenders, enclosed in plain sealed envelope, properly endorsed "Tender for Domestic Appliances," must reach me not later than 12 noon on Friday, 29th November, 1946. The Council do not bind themselves to accept the lowest or any tender.

FARRA CONWAY,

Town Hall, Great Yarmouth. Town Clerk. 3242
19th October, 1946.

METROPOLITAN BOROUGH OF WOOLWICH ELECTRICITY DEPARTMENT

Annual Contracts for the Supply of H.V. and M.V. Cables

TENDERS are invited by the above Council for the supply of H.V. and M.V. Cables required during the year 1st January, 1947, to the 31st December, 1947.

Specification and form of tender may be obtained from the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, upon receipt of a deposit of £1 ls., which will be refunded within one month of the receipt of a bona fide tender.

Tenders, enclosed in a plain sealed envelope and endorsed "Tender for Cables," must be delivered to the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, not later than 12 noon on Wednesday, 27th November, 1946. The Council do not bind themselves to accept the lowest or any tender.

DAVID JENKINS,

Town Hall, Woolwich, S.E.18. Town Clerk. 3199
18th October, 1946.

METROPOLITAN BOROUGH OF WOOLWICH ELECTRICITY DEPARTMENT

Annual Contracts for the Supply of Transformers

TENDERS are invited by the above Council for the supply of Transformers required during the year 1st January, 1947, to the 31st December, 1947.

Specification and form of tender may be obtained from the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, upon receipt of a deposit of £1 ls., which will be refunded within one month of the receipt of a bona fide tender.

Tenders, enclosed in a plain sealed envelope and endorsed "Tender for Transformers," must be delivered to the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, not later than 12 noon on Wednesday, 27th November, 1946. The Council do not bind themselves to accept the lowest or any tender.

DAVID JENKINS,

Town Hall, Woolwich, S.E.18. Town Clerk. 3198
18th October, 1946.

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.

METROPOLITAN BOROUGH OF WOOLWICH ELECTRICITY DEPARTMENT

Annual Contracts for the Supply of Electricity Meters

TENDERS are invited by the above Council for the supply of Electricity Meters required during the year 1st January, 1947, to the 31st December, 1947.

Specification and form of tender may be obtained from the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, upon receipt of a deposit of £1 ls., which will be refunded within one month of the receipt of a bona fide tender.

Tenders, enclosed in a plain sealed envelope and endorsed "Tender for Meters," must be delivered to the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, not later than 12 noon on Wednesday, 27th November, 1946. The Council do not bind themselves to accept the lowest or any tender.

DAVID JENKINS,

Town Hall, Woolwich, S.E.18. Town Clerk. 3200
18th October, 1946.

CITY AND ROYAL BURGH OF EDINBURGH

Electricity Supply

THE Lord Provost, Magistrates and Council of the City of Edinburgh invite Tenders for the supply of Electricity Supply Meters for the period from May 29th, 1947, to May 28th, 1948.

Copies of the specifications for the above may be obtained at the Engineer and Manager's Office, Dewar Place, Edinburgh, 3.

Sealed tenders, endorsed "Tender for Electricity Supply Meters," must reach the undersigned not later than Friday, 22nd November, 1946.

J. STORRAR,

City Chambers, Edinburgh. Town Clerk. 3225
21st October, 1946.

SITUATIONS VACANT

METROPOLITAN BOROUGH OF WOOLWICH ELECTRICITY DEPARTMENT

Engineering Draughtsman

APPPLICATIONS are invited for the position of Engineering Draughtsman in the Electricity Department at a commencing salary of 2446 5s. per annum, and increments in accordance with the National Joint Board Schedule, Grade 9, Class J.

Candidates should have had a good general technical education and training, followed by drawing office experience in generating station details and layout. Generating station experience would be an advantage.

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

Applications, stating age, qualifications and experience, together with not more than three recent testimonials, should be addressed to the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, and received not later than the 20th November, 1946. Canvassing members of the Council, either directly or indirectly, will be a disqualification.

DAVID JENKINS,

Woolwich, S.E.18. Town Clerk. 3240
7th October, 1946.

RURAL DISTRICT COUNCIL OF PLYMPTON ST. MARY

THE above-named Council invite applications for the following appointments:—

- District Engineer, at a salary of £330 per annum, rising by three annual increments to £375 per annum, plus bonus (at present £59 16s.).
- District Engineer, at a salary of £330 per annum, rising by three annual increments to £375 per annum, plus bonus as above.
- Junior Draughtsman, at a salary of £270 per annum, rising by two annual increments to £300 per annum, plus bonus as above.

Applicants for post (a) should have practical experience in construction, operation and maintenance of transmission and distribution systems up to 33 kV in rural areas.

Applicants for post (b) should have practical experience in the layout of high and low pressure systems in respect of supplies to temporary and permanent housing estates and large industrial consumers. A knowledge of the Electricity Commissioners' Regulations and procedure is essential.

Applicants for post (a) and (b) should have passed the qualifying examination of the Institution of Electrical Engineers, or equivalent.

Applicants for post (c) should have had experience in a modern drawing office, and preference will be given to candidates having knowledge of design and layout of substitution buildings.

The appointments will be subject to the provisions of the Local Government Superannuation Act, 1937, and to determination by one month's notice on either side. The successful applicants will be required to pass medical examinations.

Applications, in writing, giving age, state, qualifications and experience, accompanied by copies of two recent testimonials, must be forwarded so as to reach the undersigned not later than the 23rd November, 1946. Canvassing, either directly or indirectly, will be a disqualification.

PERCY T. LOOSEMORE,

Clerk to the Council.

Council Offices,

Plympton,
25th October, 1946.

3234

FIRST GARDEN CITY LIMITED

THE following vacancies are open:—

(a) HOME SERVICE ADVISER. Lady (single) conversant with all domestic uses of electricity and able to advise upon the selection of appliances, to hold lecture demonstrations, to visit consumers' houses, and to assist in sales development. Qualifications must include a recognised domestic science certificate and/or E.A.W. diploma. Salary £286 per annum, plus car allowance.

(b) CLERICAL ASSISTANT (MALE). To assist with stock records, invoices, time sheets. Rate of pay £5 per week of 40½ hours.

(c) STORES ASSISTANT (MALE). Used to handling electrical material and routine records. Rate of pay £5 per week of 47 hours.

(d) METER TESTER. Used to the testing and adjustment of D.C. and A.C. meters, with some technical knowledge; if necessary, suitable young man would be trained. Rate of pay £5 9s. 8d. per week of 47 hours.

All the above payments are adjusted to current cost-of-living allowances, and the conditions, where applicable, are in accordance with national agreements, including paid holidays, generous sick pay scheme, staff benefit retirement fund, canteen facilities. There is an acute housing shortage in the area. Full particulars in writing to the undersigned.

W. A. BROWN,

Electrical Engineer.

Works Road, Letchworth,
Hertfordshire.

3096

BRITISH LEIGION VILLAGE, PRESTON HALL, NEAR MAIDSTONE, KENT

Assistant Maintenance Engineer

APPLICATIONS are invited for the post of Assistant Maintenance Engineer. Applicants must have had experience of running plant, electrical, steam and general engineering maintenance of an institution. Salary £350 p.a., plus married accommodation. Preference given to men who have served or are serving with H.M. Forces.

Applications, giving full particulars of experience, with copies of any testimonials, should reach me by 9th November, 1946.

A. A. HOWICK, Secretary.

3261

BOROUGH OF NELSON ELECTRICITY DEPT.

Appointment of Mains Superintendent

APPLICATIONS are invited from Chartered Electrical Engineers, under the age of 45 years, who have held a responsible position in the distribution department of an electricity supply undertaking.

Applicants should possess a wide experience in the direction of a distribution department and in the control of staff. They should have had experience in an extensive urban distribution system supplied by means of 6.6 kV, 3-phase alternating current with substations and the necessary low tension networks connected therewith. They should also preferably have had experience of 33 kV transmission, and the supply to rural areas, together with the maintenance of bulk supplies to other authorised undertakings.

The salary offered will be in accordance with the National Joint Board Schedule, Class F, Grade 3.

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 by the Council's Medical Officer of Health.

Forms of application are not being issued and applications containing full details of age, qualifications, past and present appointments and experience, should be submitted to the undersigned not later than the 9th November, 1946, endorsed "Mains Superintendent." Canvassing any member or any officer of the Town Council, either directly or indirectly, will be deemed a disqualification.

F. W. ROBERTS,

Town Hall, Nelson,
14th October, 1946.

Town Clerk,
9083

METROPOLITAN BOROUGH OF WOOLWICH ELECTRICITY DEPARTMENT

Appointment of Lady Cookery Demonstrator

APPLICATIONS are invited for the appointment of Lady Cookery Demonstrator at the Electricity Showrooms, Electric House, Powis Street, Woolwich, at a salary in accordance with the Clerical Division of the National Scales commencing at £262 per annum, rising by annual increments of £12 to £288 per annum, with London Weighting £16 and cost-of-living bonus (at present £48 2s. per annum) in addition.

Candidates, who should hold the E.A.W. Certificate or Diploma, should not be less than 21 years of age and have had experience in demonstrating cookery by electricity.

The appointment will be subject to the Council's Conditions of Service in force from time to time, to the provisions of the Local Government Superannuation Act, 1937, and will be terminable by one month's notice on either side. The selected candidate will be required to pass a medical examination.

Applications, giving full details of age, qualifications and experience, together with copies of not more than three recent testimonials, should be received by the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, not later than 9th November, 1946. Candidates must disclose in writing if they are related to any member or senior officer of the Council. Canvassing, either directly or indirectly, will disqualify.

DAVID JENKINS,

Town Hall, Woolwich,
October, 1946.

Town Clerk,
3072

CORPORATION OF GRAVESEND ELECTRICITY DEPARTMENT

Draughtsmen

VACANCIES exist in this department for two Draughtsmen, at a salary of £413 per annum, Grade 8a, Class F, rising to £429 and thereafter to £442 or £459 according to ability. Considerable extensions are in progress on the distribution system and new offices and workshops are being designed. Power station reconstruction is also in hand. Applicants will be considered from both manufacturing firms and supply undertakings.

One draughtsman will be specifically required to deal with building construction work, while the other will be concerned with mains records, wiring, diagrams, etc.

The conditions of employment are those of the N.J.B. Agreement and successful candidates will be superannuated after passing a medical examination. Applications should be sent to the undersigned before 16th November.

G. V. HARRAP, A.M.I.E.E., M.I.I.A.,
General Manager and Engineer

3164

**CITY OF CARLISLE ELECTRICITY
UNDERTAKING**

Power Station Chemist

APPPLICATIONS are invited from suitably qualified persons for the position of Chemist at Willow Holme Power Station. The duties will comprise taking charge of a modern, well-equipped laboratory and assistant staff.

Candidates must have had experience in the testing of coal, coke, ash and oils, and the supervision of feed water treatment and boiler water conditioning for plants operating at 600 lbs. per sq. in., 850° F. steam conditions. It is desirable that applicants have a University Degree in Chemistry.

The conditions of service will be in accordance with the National Joint Board Agreement, and the present salary Grade 9, Class H (£402/£417 per annum). This Grade may be revised in the case of a suitably qualified person after a period of satisfactory service.

The selected candidate will be required to pass a medical examination and to contribute to the Council's Superannuation Scheme. Applications, stating age and giving full particulars of qualifications and experience, accompanied by copies of not more than three testimonials, and endorsed "Power Station Chemist," should be received by the undersigned not later than noon on Thursday, 14th November, 1946.

A. C. THIRTLE, A.M.I.C.E., A.M.I.E.E.,

City Electrical Engineer and Manager.

Electricity House,
46/48, Castle Street, Carlisle.
23rd October, 1946.

3246

**COUNTY BOROUGH OF STOCKPORT
ELECTRICITY DEPARTMENT**

Appointment of Draughtsman

APPPLICATIONS are invited for the position of Senior Draughtsman, at a salary of £420 per annum, rising by £15 per annum to a maximum of £465, plus cost-of-living bonus (at present £59 16s.).

Applicants must be fully-qualified draughtsmen familiar with building and structural engineering, preparation of specifications, general mains recording, and the control of the drawing office and staff. The successful applicant will be required to pass a medical examination and the appointment is subject to the Local Government Superannuation Act, 1937.

Applications, stating age, particulars of qualifications and experience, accompanied by three recent testimonials, should be addressed to the Chairman of the Electricity Committee, 23, Tiviot Dale, Stockport, endorsed "Draughtsman," and should be received not later than Monday, November 18th, 1946. Canvassing, either directly or indirectly, will be deemed a disqualification, and candidates must disclose in writing whether, to their knowledge, they are related to any member of, or holder of any senior office under, the Council. A candidate who fails to do this will be disqualified or, if appointed, will be liable to dismissal without notice.

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

Electricity Offices,
23, Tiviot Dale, Stockport.
24th October, 1946.

3260

BOROUGH OF ILFORD ELECTRICITY DEPT.

APPPLICATIONS are invited for two vacancies for Electrical Fitters for construction and maintenance work on all types of electrical plant of electricity distributing substations.

Wages at present £6 5s. 4d. per week of 47 hours, in accordance with No. 10 District Council Schedule of Wages.

The appointments are subject to the provisions of the Local Government Superannuation Act, 1937, and the successful applicants will be required to pass a medical examination to the satisfaction of the Council's Medical Officer of Health.

Applications, in writing, giving details of training and experience, enclosing copies of two recent testimonials and endorsed "Electrical Fitter," must be addressed to the Borough Electrical Engineer and Manager, 320/326, High Road, Ilford, Essex, and must be received not later than Friday, the 8th November, 1946. Canvassing, directly or indirectly, will be a disqualification.

CHARLES N. ROBERTS,
Town Clerk.

Town Hall,
Ilford.

3230

**METROPOLITAN BOROUGH OF WOOLWICH
ELECTRICITY DEPARTMENT**

Combustion Engineer

APPPLICATIONS are invited for the position of Combustion Engineer in the Selected Generating Station of the Borough Electricity Department at a commencing salary of £591 3s. per annum and increments in accordance with the National Joint Board Schedule, Grade 7, Class J.

The successful candidate will be required to advise and assist the Station Superintendent with respect to the efficient and economical operation of the boiler units, their associated plant and instruments.

Candidates should have had experience in the capacity described, preceded by a good general technical education and training. A sound theoretical knowledge of thermo-dynamics and power station heat cycles is essential, and experience of automatic combustion control will be an advantage. Candidates should be members or associate members of a recognised engineering institution.

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

Applications, stating age, qualifications and experience, together with not more than three recent testimonials, should be addressed to the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, and received not later than 20th November, 1946. Canvassing members of the Council, either directly or indirectly, will be a disqualification.

DAVID JENKINS,

Woolwich, S.E.18,
7th October, 1946.

Town Clerk
3241

**CITY AND COUNTY OF KINGSTON-UPON-HULL
ELECTRICITY DEPARTMENT**

Assistant Mechanical Maintenance Engineer (Turbine House)

APPPLICATIONS are invited for the above position from persons available from civilian positions, or from those serving in H.M. Forces.

The candidate appointed will be required to take charge of the mechanical maintenance of all plants in the turbine house. Preference will be given to applicants who have served an apprenticeship with a firm of turbine manufacturers, and have had subsequent experience in the overhaul of large turbines. A graduateship of the Institute of Mechanical Engineers or the holding of a 1st Class Board of Trade Certificate (Steam) would be an advantage.

The salary will be in accordance with the N.J.B. Scale, Class J, Grade 8, rising to Grade 7 (Grade 8, £521; Grade 7, £503/£589) after one year's satisfactory service. The appointment is subject to a medical examination.

On appointment, the applicant must reside within the city boundary (waived during present conditions) and, after three months' satisfactory probation, will be required to contribute to the Local Government and Other Officers' Superannuation Scheme.

Applications should give names of references who may be consulted and should be submitted to the General Manager, Electricity Offices, Ferensway, Kingston-upon-Hull, by 18th November, 1946.

3229

**BOROUGH OF WORKINGTON ELECTRICITY
DEPARTMENT**

Appointment of Lady Showroom Attendant and Demonstrator

APPPLICATIONS are invited for the position of Lady Showroom Attendant and Demonstrator in the Electricity Department.

The salary will be in accordance with the National Joint Council's Scales of Salaries, General Division (Females), commencing at £52 a year at the age of 16 and rising annually to a maximum of £240 at the age of 30, plus cost-of-living bonus.

The appointment is subject to the provisions of the Local Government Superannuation Act, 1937, and the selected candidate will be required to pass a medical examination. The appointment will be terminable by one month's notice on either side.

Applications, stating age, qualifications and experience, together with copies of not more than two recent testimonials, should be delivered to the undersigned not later than the 9th November, 1946.

JOHN R. COCKFIELD,

Town Hall, Workington,
October, 1946.

Town Clerk,
3267

**METROPOLITAN BOROUGH OF HACKNEY
ELECTRICITY DEPARTMENT**

Appointment of Senior Demonstrator and Demonstrator

A PPLICATIONS are invited for the following appointments on the permanent staff of the Council in the Electricity Department:—

- (1) Senior Demonstrator in Electric Cookery and Electrical Housecraft (Female).
- (2) Demonstrator in Electric Cookery and Electrical Housecraft (Female).

Candidates shall have had a good general education and hold a recognised Diploma, approved by the Ministry of Education, in Domestic Science and Electrical Housecraft. Applicants for the senior appointment shall have had experience in a similar position and in the supervision of a staff of demonstrators; also in the supervision of industrial canteens and in the preparation of demonstrations and lectures.

Salaries, which are provisional until an approved scale is adopted, will be in accordance with the National Joint Council for Local Authorities' Administrative, Professional, Technical and Clerical Services: (1) Senior Demonstrator, A.P. and T. Division, Grade 1, rising from £330 p.a. by annual increments of £15 to £375 p.a., plus £20 p.a. London weighting and the current cost-of-living bonus, at present £48 2s. p.a. The commencing salary will be determined within the grade mentioned according to the qualifications and experience of the successful applicant. (2) Demonstrator, Clerical Division, rising from £252 p.a. by annual increments of £12 to £288 p.a., plus £16 p.a. London weighting and current cost-of-living bonus, at present amounting to £48 2s.

The appointments are subject to one month's notice on either side and to the provisions of the Council's Superannuation Acts. The selected candidates will be required to pass a medical examination.

Conditions of appointment, together with forms of application, can be obtained from the undersigned upon receipt of a stamped addressed envelope.

Applications, endorsed "Demonstrators," shall reach the undersigned not later than 1st post on 15th November, 1946.

DUDLEY SORRELL,

Town Hall, Hackney, E.8.
21st October, 1946.

Town Clerk.
3296

**COUNTY BOROUGH OF ST. HELENS
ELECTRICITY DEPARTMENT**

Appointment of Junior Engineer

A PPLICATIONS are invited for the above position, with salary and conditions in accordance with Grade 9, Class G, of the National Joint Board's Schedule, at present £380 per annum.

Candidates must be experienced in the operation of the control board in a modern generating station and must possess theoretical qualifications equivalent to the Higher National Certificate in Electrical Engineering.

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

Applications, accompanied by copies of not more than three testimonials, must be made on the form obtainable from the address given below, and be received not later than 19th November, 1946, endorsed "Junior Engineer."

P. BREGAZZI,

Electrical Engineer and Manager.
Electricity Works, Carlton Street,
St. Helens, Lancs.
25th October, 1946.

3281

SOUTHERN RAILWAY

ELECTRICAL Engineering Assistants are required for:—

- (a) Power Supply and Distribution.
- (b) Electric Rolling Stock.

The qualifications required for both (a) and (b) include a University Degree or equivalent, and practical engineering workshop training.

For (a) no experience subsequent to training is necessary. Pay £275 plus present war allowance of £72 16s. per annum.

For (b) experience is required in the design and manufacture of electric traction equipment for rolling stock. Pay up to £450, plus present war allowance of £72 16s., according to experience.

Applications to be addressed to Chief Electrical Engineer, Southern Railway, 15, St. Thomas Street, London, S.E.1.

3303

**BOROUGH OF BRENTFORD AND CHISWICK
ELECTRICITY DEPARTMENT**

Assistant Meter Engineer

A PPLICATIONS are invited for the position of Assistant Meter Engineer at a salary in accordance with Grade 8b, Class E, of the N.J.B. Schedule (at present £378, rising to £395 17s. per annum).

Candidates must have sound technical training and be capable of supervising (under the general direction of the Meter Superintendent) meter repairing, meter and instrument testing and care of sub-standard instruments for a Class "A" D.C. and A.C. polyphase testing station. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Applications, endorsed "Assistant Meter Engineer," must be delivered to the undersigned not later than Monday, 4th November, 1946. Not more than two testimonials and the names of not more than 2 referees may be submitted if desired. Canvassing, directly or indirectly, will be deemed a disqualification, and candidates must declare any relationship with members or senior officers of the Borough Council of which they are aware.

A. E. JEANS, M.I.E.E.,

Borough Electrical Engineer.

Electricity Showrooms and Offices,
197/199, Chiswick High Road,
London, W.4.

3095

CITY OF LANCASTER

Assistant Shift Charge Engineer

A PPLICATIONS are invited for an Assistant Shift Charge Engineer at Caton Road Generating Station. Salary in accordance with the 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 the 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, must reach the undersigned not later than Saturday, November 16th, 1946.

GEO. C. MILNES, M.C., M.I.E.E.,

"Electricity,"
North Road, Lancaster.

3233

**DORCHESTER CORPORATION ELECTRICITY
DEPARTMENT**

Charge Engineer

A PPLICATIONS are invited for the above position from engineers with the necessary experience for E.H.T. and L.T. switchboard operation in a static sub-station.

The conditions of employment will be in accordance with the N.J.B. Schedule, Grade 8b, Class B, with commencing remuneration at the rate of £313 per annum.

Applications, endorsed "Charge Engineer," giving full particulars of training and experience, age, if married or single, together with copies of recent testimonials, should be sent to the undersigned not later than 20th November, 1946.

J. ADRIAN HANDS,

21, North Square, Dorchester.
28th October, 1946.

Town Clerk.
3276

LINCOLN CORPORATION ELECTRICITY DEPT.

Resident Engineer (Temporary)

TO take charge of civil works in connection with the extension of a Selected Station. Applicants should have a good knowledge of structural steel and ferro-concrete constructions, including cooling towers, laying of large pipe lines and general power station work. Salary £750 per annum or according to ability.

Applications for the above position, setting out full particulars of training and experience, together with references, to be sent to the undersigned not later than Saturday, the 9th November, 1946.

F. NEWBY,

Electricity Department,
Brayford Side North,
Lincoln.

3266

STOKE-ON-TRENT CORPORATION ELECTRICITY DEPARTMENT

Appointment of Draughtsman

A PPLICATIONS are invited from suitably qualified persons, under the age of 45, for the position of Draughtsman. Applicants should be technically trained to at least National Certificate in Electrical Engineering standard, be experienced switchgear draughtsmen and thoroughly familiar with protective gear diagrams, sub-stations layouts and equipment.

The salary and conditions of service will be in accordance with Grade 9a, Class H, of the National Joint Board Agreement (£265—£351 per annum).

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

Application forms and further details may be obtained from the General Manager, Electricity Department, 31, Kingsway, Stoke-on-Trent. Completed applications must be returned in the envelope provided so as to be received not later than Monday, 18th November, 1946.

HARRY TAYLOR,

Town Clerk. 3220

Town Hall,
Stoke-on-Trent.

UTTOXETER URBAN DISTRICT COUNCIL ELECTRICITY DEPARTMENT

A PPLICATIONS are invited for a position as Junior Mains Assistant. Candidates must have good technical education and training, with experience in E.H.T. and L.T. overhead and underground distribution systems, including drawing and records.

The appointment is subject to N.J.B. Schedule, Class B, and the Local Government Superannuation Act.

Applications, with copies of testimonials, to be forwarded to the undersigned by Thursday, 14th November, 1946.

A. MCGREGOR,

Electrical Engineer. 3204

Town Hall,
Uttoxeter.

A British firm of Telephone Manufacturers in India has vacancies for experienced Telephone Engineers. Applicants should be capable of planning automatic telephone exchange networks, developing area layouts, assessing traffic data, and generally advising customers on technical requirements. The post offers good prospects to suitable engineers who should, preferably, be aged about 30. Good salary with kit and travelling allowances and usual leave. Apply, giving full details of qualifications and experience and whether married or single, to—Box No. 112, Dorlands, 18/20, Regent Street, London, S.W.1. 3221

A Midlands house of repute will shortly require the services of two Salesmen, whose qualifications should incorporate a sound knowledge of the electrical and radio trades, coupled with first-class selling ability and retail trade connections. Remuneration will be by salary, commission and expenses. Applicants should state, in confidence, full details of their previous experience.—Box 3075, c/o The Electrical Review.

A ACCOUNTANT for senior position required by the Sussex Electricity Supply Co. Ltd. at Littlehampton. Preference given to one with experience of electricity supply or similar public utility undertaking. Appointment will be permanent and pensionable. Applications in writing, giving details of age, experience, etc., and salary required, to—Electricity Office, Littlehampton, 3302

A PPLICATIONS are invited for the undernoted appointments: (a) Two Meter Testers. Applicants must be fully qualified and experienced in testing D.C. meters and A.C. single-phase and polyphase meters. Specialised knowledge of D.C. testing and/or 3-phase kVA meter and M.D. testing will be an advantage. (b) Two Meter Repairers. Applicants must be fully qualified and experienced in the repair of all classes of electricity meters. Specialised D.C. experience and/or experience of M.D.I. mechanisms will be an advantage. Rate of pay will be in accordance with Joint Industrial Council Schedule, No. 13 District, Zone B, Scotland, present rate 26 52d per hour for 47-hour week. Applications, stating age, qualifications, etc., and date available for duty, should be forwarded within 14 days from the date of this advertisement. Copies of testimonials only should be included. Applications to—Area Manager, The Grampian Electricity Supply Company, Blackfriars, Perth. 3268

A RMATURE Winder or Improver required, experienced to 50 h.p., highest rates, congenial conditions.—Lindsey Electrical Co. Ltd., 262/4, Victoria Street, Grimsby. 3253

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

A RMATURE Winders and Improvers urgently required. Top rates and good conditions.—Collins Electrical Ltd., 22, St. Alban's Place, London, N.1. 85

A RMATURE Winders and Improvers wanted for General Repair Works, A.C. and D.C. top rates.—Phillips & Sons Electrical Ltd., 40, Waterford Road, S.W.6. 3266

A RMATURE Winders and Improvers required, A.C. and D.C., top rates, good working conditions.—Electrical Power Repairs (Gillingham) Ltd., Strover Street, Gillingham, Kent. 1964

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

A SSISTANT Engineer required by established firm of electrical contractors (London). Applicant must be of good education, with practical, technical and commercial experience. Full particulars to—Box 3201, c/o The Electrical Review.

A SSISTANT Engineer required in technical sales department with sound knowledge of transformers and rectifying equipment. Age, experience and salary required, by letter, to—General Manager, F. C. Heayberd & Co. Ltd., 28, Russell Square, London, W.C.1. 3215

A SSISTANT Plant or Maintenance Engineer required to do certain amount of drawing work in addition to dealing with shop queries. Location of work is at Rugby. Full details of training and experience should be given. Basic salary up to £7 per week, according to experience and ability, plus 32/6 married, 29/6 single, staff war bonus.—English Electric Co. Ltd., Queens House, Kingsway, W.C.2. 3008

A SSISTANT required for work in Patent Department of long-established radio and television manufacturers. Applicant's qualifications must include a good technical knowledge of radio and electronics, preferably a degree, or equivalent, a definite aptitude for, and interest in, new inventions and patent procedure. Salary according to qualifications and experience. Age not above 35 years. Apply, giving necessary particulars, to—Box 3227, c/o The Electrical Review.

A SSOCIATED Portland Cement Manufacturers Ltd. Senior Assistant Electrical Engineer, with initiative and experience of the installation and maintenance of distribution systems in large factories. Applicants should be capable of negotiating contracts with equipment manufacturers, and should preferably have a degree and have spent some years on the manufacturing side. The post carries with it good prospects of advancement. Salary will be between £600 and £700 per annum, depending upon experience, plus 3105 per annum war bonus plus staff bonus. Pension fund. Applications, which should give full details of training and subsequent experience, should be submitted not later than the 22nd November, 1946, and should be addressed to the Chief Engineer, A.P.C.M. Ltd., 192, Ashley Gardens, S.W.1. 3211

A UTOMOBILE Dynamo and Starter Armature Winder, able to undertake fr. h.p. motor rewinds. Fully experienced and able to take charge of any established department. Permanency and good prospects. West London district. Write, stating age, experience and salary required, to—Box 2959, c/o The Electrical Review.

C ABLE Makers in Midlands require experienced Foreman capable of taking complete charge of production of rubber longitudinal and forcing machines, also rubber mixing, calendaring, etc. Apply, stating age, experience and salary required, to—Box 3263, c/o The Electrical Review.

C EYLON, Manager required for Engineering Department, engaged on all classes of general land and marine repair work, general structural ironwork, also new tea and rubber machines, foundry work. Only first-class engineers who have served indentured apprenticeship in similar general works will be considered. Age 35 to 45, A.M.I. Mech. E., must be experienced in estimating, costing, costing correspondence, able to advise clients, control, train and instruct foremen and workmen of allied trades. Four years' salary agreement. Salary £1,000, rising to £1,250, provident fund bonus, passage out, and home six months' half-pay leave. Apply, with copies of references, stating school and technical qualifications and experience in chronological order, also present salary, to—Box 3194, c/o The Electrical Review.

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

D ESIGNER required for small industrial type transformers. Age, experience and salary required, by letter, to—General Manager, F. C. Heayberd & Co. Ltd., 28, Russell Square, London, W.C.1. 3216

CIVIL Service Commission. The Civil Service Commissioners announce that a special competition will be held for appointments as Assistant Examiner in the Patent Office under the Board of Trade. Approximately 200 vacancies will be filled by competitive interviews spread over a period of two or three years. Vacancies will be available for mathematicians, physicists, chemists, electrical engineers, mechanical engineers and persons with general scientific qualifications. Candidates must have passed an examination qualifying for a University degree or its equivalent or hold other qualifications specified in the regulations. Candidates must have been born on or after the 2nd August, 1910, and have attained the age of 20 on the 1st January of the year in which they compete. Allowance will be made for service in H.M. Forces prior to 3rd September, 1939, and for service as established civil servant commencing before age 25, the latter allowance being subject to a maximum of two years. The salary scale is £250 a year, rising to £400 a year (men), £350 a year (women), plus consolidation additions varying from £78 a year (men) and £63 a year (women) at the minimum of the scale to £90 a year and £72 a year for men and women respectively at the maximum. Commencing salary will vary according to age. Subject to efficiency there is advancement after 5 years' service to Examiner, £450 to £750 (men) and £375 to £650 (women). There are prospects of promotion to higher grades. Candidates who have served or are serving in H.M. Forces must send in their application forms in time to reach the Civil Service Commission not later than 1 February, 1947. All other candidates must send them in by 1 December, 1946. Copies of the regulations and forms of application may be obtained from the Secretary, Civil Service Commission, Burlington Gardens, London, W.1. or from the Chief Officer, Civil Service Commission, at the following addresses, quoting No. 1664: (India) 10, Underhill Lane, Delhi; (Egypt) 8, Sharia Tolubat, Garden City, Cairo; (Italy) c/o G.H.Q., C.M.F.; (Germany) c/o 2nd Echelon, G.H.Q., B.A.O.R.

DESIGNER-Draughtsman required; experienced in development of light electro-mechanical apparatus and preferably with a knowledge of telecommunications laboratory gear; accustomed to workshop practice and production problems; capable of working on own initiative. Apply, stating age, experience, salary, etc., to—Muirhead & Co. Ltd., Elmers End, Beckenham, Kent.

DRAUGHTSMAN capable of developing designs of electro-mechanisms from rough conceptions and supervising model-making. Unusual scope for ingenuity, initiative and advancement. Model Maker also required for same class of product. Guildford district. State age, experience and salary required.—Box 9785, c/o The Electrical Review.

DRAUGHTSMAN required by progressive electrical engineering firm, W. London area. Some experience necessary in mechanical design of H.V. transformers up to 300 kVA. Salary from £300, according to experience. Apply, stating age and full details of experience, qualifications, to—Box 3213, c/o The Electrical Review.

DRAUGHTSMAN required, experienced up to 500 kVA. Promising and well-paid position. Apply, stating age and experience, to—Brentford Transformers Ltd., Windmill Road, Brentford, Middx.

DRAUGHTSMAN, with experience of H.T. and L.T. oil circuit breakers and metalclad switchgear, required for South Midlands. Technical man preferred. Write, giving full details of experience, technical education, age and salary required.—Box 3214, c/o The Electrical Review.

DRAUGHTSMAN required in Midlands with experience of either (a) industrial control gear (b) traction control gear; (c) high and low tension switchboards; (d) electrical instrument and relay design; (e) oil circuit breaker and metalclad switchgear. Draughtsman with good mechanical experience only would be considered. State age, experience and salary required to—The General Electric Co. Ltd., Switch Drawing Office, Witton, Birmingham.

DRAUGHTSMAN Designer required. Good opportunities for man who has original ideas and experience in design for mass production to combine the two in the design of household and radio equipment in London area. Applicants should write, stating age, experience and salary required.—Box 3231, c/o The Electrical Review.

DRAUGHTSMEN for design of Radio Communication Equipment. Experience in this class of work desirable but not essential, although drawing office experience in electrical and mechanical apparatus is essential. Location of work is at Chelmsford. Basic salary up to £7 per week plus 25% staff war bonus.—English Electric Co. Ltd., Queens House, Kingsway, W.C.2.

DRAUGHTSMEN required in N.E. London area. Two Seniors with sound mechanical knowledge and experience in F.H.T. outdoor switchgear of the oil minimum type. One Senior with experience of steelwork, cable ducting, overhead lines, etc., for outdoor switching stations. One Intermediate with experience of control boards, indoor cellular gear and kiosks, knowledge of diagrams an advantage. Good salary offered to suitable men. Apply, stating age and experience.—Box 3243, c/o The Electrical Review.

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

DRAUGHTSMEN (Senior) required for layout of electrical services, substations and lighting for new wide strip mill. Must be familiar with electrical controls of tandem mills and reversing mills. Office situated Newport, Monmouthshire, later may move to Banbury. Apply—Northern Aluminium Company Ltd., General Engineering Department, Banbury.

DRAUGHTSMEN, Senior and Juniors, over 22, required for power transformers, by a large Birmingham firm. Electrical experience desirable but not essential.—Box 2893, c/o The Electrical Review.

DRAUGHTSMEN (25/35) required for the Manchester district, with experience in A.C. and/or D.C. machinery. Applicants must be capable of preparing own calculations, etc. State age, full experience and salary required.—Box 3128, c/o The Electrical Review.

ELECTRIC Cookers and Appliances. Vacancy occurs in large works in South Yorkshire for man to take charge of test and inspection of domestic equipment. Experience with vitreous enamelled parts an advantage. Only those previously engaged on similar work should apply. Give full details of experience and salary required.—Box 3280, c/o The Electrical Review.

ELECTRIC Lamps (miniature) Foreman Charge-hand, South London factory. Qualifications, stem making, head lamps in particular, sealing, etc. Some knowledge of filaments an asset.—Box 3152, c/o The Electrical Review.

ELECTRIC Wire and Cable Makers in the Midlands. Duties will include quality control of all products during manufacture and final inspection. Applicants should give age, past experience and salary required to—Box 3264, c/o The Electrical Review.

ELECTRICAL Contractor has vacancy for an experienced Assistant, age 30-40, with extensive practical experience of domestic installations, capable of preparing estimates, dealing with correspondence, interviewing and supervision. State age, training, experience and salary required.—E. Powell Ltd., 39, High Street, Tunbridge Wells.

ELECTRICAL Engineer for Burma, with B.Sc. degree or equal, or Associate Member of the Institution of Electrical Engineers. Must have experience of power and boiler plant and running maintenance of works plant. Cement works experience desirable but not essential. Three years' agreement, renewable thereafter by mutual consent. First agreement terms according to qualifications. Company provides free passage, partially furnished accommodation and medical attendance. Write, stating age, whether married or single, and enclosing copies of references, to—Box B.487, c/o Streets, 110, Old Broad Street, E.C.2.

ELECTRICAL Engineer for old-established London office of important Continental manufacturers. 35/45, with wide experience handling tenders, orders, general correspondence, etc. Good position calling for personality, intelligence, versatility, accuracy and ability read technical French.—Box 3291, c/o The Electrical Review.

ELECTRICAL Engineer for small contractors' business. Must have knowledge of all systems. Estimating, costing, specifications, book-keeping, stores. Able to deal with correspondence. Drive and initiative essential. Definite prospects for right man. Apply by letter only, stating experience and salary required, to—Oakes & Foster, 29, St. John's Wood High Street, N.W.8.

ELECTRICAL Engineer for the Manchester district, experienced in dealing with contracts, also technical and commercial correspondence relating to all classes of A.C. and D.C. machinery and appropriate ancillary equipment. State experience, age and salary required.—Box 3130, c/o The Electrical Review.

ELECTRICAL Repairs. Capable men required for work on industrial electrical equipment. Good rates of pay to men of ability. Write—Cox & Danks Ltd., Fage Road, Feltham, Middx.

ELECTRICAL Engineer required to assist in technical and administrative work in a Test Room engaged in the production and finishing of instruments of precision. Applicants must have had previous experience in testing all types of accurate moving coil instruments. Degree man preferred. Factory situated in Home Counties. Progressive post for the right man. State age, experience and salary required.—Box 3048, c/o The Electrical Review.

ELECTRICAL engineering firm in Essex have a vacancy for a Jig and Tool Draughtsman between 25 and 30 years of age. Experience in machine tool design an advantage but not essential. Apply, stating experience and salary required. to—Box 3024, c/o The Electrical Review.

ELECTRICAL Wholesalers, London, require Junior Storekeeper and Packer for progressive position, some knowledge of the electrical trade. State experience and salary required to—Box 3196, c/o The Electrical Review.

ELECTRICIAN with experience of shopfitting for work in London and small proportion in provinces. T.U.—Box 2976, c/o The Electrical Review.

ELECTRICIANS. Must be good. Installations, jobbing, maintenance.—Oakes & Foster, 29, St. John's Wood High Street, N.W.8 (Pri. 1786). 9820

ELECTRICIANS, preferably experienced in conduit work. Conditions of service and rates of pay in accordance with No. 9 D.J.I.C. Present rate 2s. 4d. per hour. Apply—Wessex Electricity Company, Oxford Rd., Newbury. 3301

ELECTRICITY supply company in North Scotland requires (a) H.T. and L.T. Cable Joiner, and (b) Overhead Linesman. Rates of pay in accordance with J.I.C. Schedule, Scottish District No. 13 (Zone B). Reply, giving age, previous experience, references, etc., to—Box 3272, c/o The Electrical Review.

ENGINEER required by large firm in London area for design and development work on fractional horsepower motors. Previous experience essential. A degree in electrical engineering is desirable. Write giving full details of experience and qualifications, also salary required. to—Box 3295, c/o The Electrical Review.

ENGINEER required to take immediate control of erection and running of Short Circuit Testing Station for Switchgear. Must have had previous experience in this type of work, and ability to control staff. Reply, stating age, experience and salary required. to—Box 3120, c/o The Electrical Review.

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

EXPERIENCED Constructional Steelwork Draughtsman, used to transmission lines and masts, required for mast design section. Location of work is at Chelmsford. Basic salary up to £7 10s. per week, according to experience and ability, plus 25% staff war bonus.—English Electric Co. Ltd., Queens House, Kingsway, W.C.2. 3232

EXPERIENCED Draughtsmen are required by large electrical firm in Midlands. Must be familiar with mechanical design and construction of medium and large A.C. and D.C. machines. Reply, with full particulars. to—Box No. 315, 8, Serle Street, London, W.C.2. 2967

EXPERIENCED Designer to take charge of electric motor designs. Applicants should have held similar position elsewhere. Generous salary will be paid to applicants having the necessary qualifications.—Box 2906, c/o The Electrical Review.

FERGUSON, Palin Ltd., Higher Openshaw, Manchester 11, require an inside Sales Engineer to handle switchgear enquiries and orders. Previous switchgear experience essential, preferably in similar capacity. 1833

FIRST-class Draughtsmen and Tracers for radio and electrical engineers in London area. Previous experience essential. Write, stating age, experience and salary required. to—Box 3253, c/o The Electrical Review.

FIRST-class Designer-Draughtsman with experience of radio and electrical equipment and the design of chassis, press tools, sub-assemblers, etc. Mechanical knowledge desirable. Radio and electrical engineers in London area. Write, stating age, experience and salary required. to—Box 3252, c/o The Electrical Review.

FIRST-class practical Engineer wanted, thoroughly accustomed to the complete overhaul of high-speed petrol and Diesel engines.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 3250

FITTER. A vacancy occurs for a Mechanical Fitter accustomed to the overhaul and maintenance of generating plant. D.J.I.C. (No. 10) London Area conditions. Wages 2/- per hour (plus 8d. war bonus) per 47-hour week. Applications, stating age, training and experience, to Chief Electrical Engineer, Hammersmith Borough Council, 154, Uxbridge Road, Shepherd's Bush, W.12. 3209

FOREMAN required in a works situated in South Yorks producing cooking apparatus. Applicants should have had experience in general sheet metal work both from the bench and power presses. Must be good disciplinarian and able to fix piece rates. Knowledge of vitreous enamelling not essential but an advantage. Give full details of qualifications and salary required.—Box 3279, c/o The Electrical Review.

FOREMAN wanted by leading firm of cable manufacturers for copper wire mill, including pickling plant and annealing ovens. Applicants should be between 30 and 40 years of age and must be conversant with all modern methods and fully capable of taking complete charge of plant, including die room for the re-finishing of synthetic and diamond dies. The position, which is a staff appointment, is progressive and superannuation benefits are available.—Box 3023, c/o The Electrical Review.

FOREMAN, with thorough knowledge of electrical machinery with some winding experience, required for large repair shop N.W. London. Good wages and prospects offered.—Box 3250, c/o The Electrical Review.

JUNIOR Draughtsman for the Manchester district, experienced in A.C. or D.C. machinery. Good prospects for keen young man. State age, experience and salary required.—Box 3129, c/o The Electrical Review.

JUNIOR Switchgear Estimating and Sales Engineer required for London office. State experience, age, salary required, etc., to—J. G. Statter & Co. Ltd., 82, Victoria Street, London, S.W.1. 3097

LADY or gentleman required as assistant to export manager by city firm. No Saturdays. Write—Box "C.P.M.," c/o 95, Bishopsgate, E.C.2. 2999

MAINTENANCE Engineer wanted by N.W. London manufacturers to take charge of dept. Must have experience with machine tool installations and all types of electrical work, both light and power, and also of hydraulic plant. Reply to—Box 181, Phillips Advertising Ltd., 15, Wilton Road, London, S.W.1. 3259

MAINTENANCE Inspectors required for telephone, clock and sound (P.A.) installations in North of England district. E.T.U. rates or equivalent weekly salary. Good prospects.—Box 3238, c/o The Electrical Review.

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

NORTH East Coast firm requires Engineers between 25 and 30 years of age, as follows: (1) For Turbo-Alternator Department to assist with tenders and following up contracts, etc. Preferably with degree in electrical engineering. (2) For Turbine Works Department to assist with technical work, testing, etc. Preferably with engineering degree covering thermo dynamics. (3) For Land Boiler Department to assist with tenders, testing, etc. Preferably with engineering degree. Please give full particulars with application and state salary required.—Box 3208, c/o The Electrical Review.

OPERATORS wanted, cable trade, North Midlands for all branches wire drawing, tinning, extruding, diamond polishing, etc. Good steady job and heaving arranged for right types. Write in confidence, giving details of experience, etc., to—Box 3121, c/o The Electrical Review.

OPPORTUNITY for young man with flair for publicity and sales promotion and to act as assistant to sales manager in transport engineering concern. Write, stating experience, age, salary, etc., to—Box 3081, c/o The Electrical Review.

OVERHEAD Linesmen, experienced in erection and maintenance of E.H.T. and L.T. overhead lines and services. Conditions of service and pay in accordance with No. 9 D.J.I.C. Present rate 2s. 2d. per hour. Apply—Wessex Electricity Co., Oxford Road, Newbury. 3300

PRODUCTION Engineer with good knowledge of modern methods for electrical engineering firm employing 1,000. Must be able to understand and enforce rigidly the system operating throughout the works, stores, etc. Good disciplinarian. Reply, stating experience and salary required.—Box 3228, c/o The Electrical Review.

PLUMBER-Joiners, E.H.T. and Low Tension, required at Oxford and in Berkshire. Conditions of service and rates of pay as per No. 9 D.J.I.C. Present rate 2s. 4d. per hour. Apply—Wessex Electricity Coy., Oxford Road, Newbury. 3155

RADIO Development Engineers required for mass production of domestic receivers. Minimum technical qualifications being, standard of City and Guilds finals, and for senior position applicants must have actual factory experience of putting into production laboratory designed models. Apply Personnel Manager, Airmeec Ltd., Wadsworth Road, Perivale. Other applications will not be entertained. 2992

REPRESENTATIVES required by Internal Telephone Company (rental) for London, Cardiff, Newcastle, Glasgow, Norfolk and Suffolk, Kent. Thorough training given. Applicants must have had previous experience speciality selling and must not be older than 45. Very good income for right men.—Box 3297, c/o The Electrical Review.

REQUIRED by large oil company, for duty in Middle East. Electrical Foreman, extensively experienced in the construction and operation of medium-sized Diesel-driven power plants and distribution systems and switchgear up to 3,800 v., and possessing fundamental theoretical knowledge. Age 30-34, preferably single, as no provision can be made for married accommodation. Single duty tour in first instance, probable minimum three years. Salary £500 per annum, free quarters/messing and allowances between the range of £120 to £288 per annum, according to number of dependants. Replies, quoting reference PL-C/7(2), to—Box 1377, c/o Charles Barker & Sons Ltd., 31, Budge Row, London, E.C.4. 3206

REQUIRED. Plant Layout or Builders' Draughtsman conversant with the usual engineering workshop service equipment, such as compressors, boilers and the various service mains, preferably also conversant with building construction and plant installation in order to cover layout drawings and ordering of equipment. Will be required to progress this type of work and provide any technical liaison required. Location of work is at Rugby. Basic salary up to £7 per week, according to experience and ability, plus 32/6 married, 29/6 single, staff war bonus.—English Electric Co. Ltd., Queens House, Kingsway, W.C.2

RESearch Assistant required for London area. Candidates should have experience of research allied to industry, and preferably some knowledge of magnetic materials and their use in electrical instruments. Applicants should give details of experience, age and salary required.—Box 3091, c/o The Electrical Review.

SALES Representative required for Midlands and Northern Counties. Selling experience of electrical instruments and equipment desirable. Apply in writing to—Scophony Limited, 36, Victoria Street, London, S.W.1. 3294

SCIENTIFIC Civil Service. The Civil Service Commission invite applications for appointment to three Superintendent posts at the Royal Aircraft Establishment of the Ministry of Supply. Candidates should be British subjects, born on or before 1st August, 1915, and not more than 50 years of age on 1st October, 1946. They should possess for two of the posts an Honours Degree in Physics, Mathematics or Engineering with (1) experience of mechanical and electrical instruments, a knowledge of aircraft navigation and/or of gyroscopic equipment, or (2) experience in the structural problems of aircraft design. For the third post they should possess high qualifications in light electrical engineering with experience of aeronautical electrical equipment and the electrical industry. The appointments are permanent with superannuation benefits under the Federated Superannuation System for Universities and are graded as Senior Principal Scientific Officer on the provincial scales £1,100 x £50—£1,300, plus a consolidation addition of £120 (men), and £95 x £50—£1,125, plus a consolidation addition of £96 (women). Forms of application and full particulars of the appointments may be obtained on application to the Civil Service Commission, 6, Burlington Gardens, London, W.1, quoting No. 1669, to whom completed applications must be returned not later than 14th November, 1946. 3207

SENIOR Assistant to Patent Manager required by long-established radio and television manufacturers. Qualifications must include a degree, or equivalent, and a sound knowledge, both practical and technical, of radio and electronics, with a real interest in technical correspondence and specifications. Salary between £550 and £700 p.a., according to qualifications and experience. Apply, giving necessary particulars, to—Box 3226, c/o The Electrical Review.

SENIOR Draughtsmen required in the Glasgow area to specialise on the design of modern electric cookers. Applications, stating qualifications, salary required, etc., to—Box 3299, c/o The Electrical Review.

SENIOR Designer-Draughtsman required for electrical control gear. Knowledge of contractor design essential, five-day week and excellent prospects. Age over 35. Write details of experience, salary required.—Box No. 316, 8, Serle Street, London, W.C.2. 2966

SHOWROOM Assistant required, previous experience essential. Apply in writing, stating experience, age and salary required, to—Giles (Electrical Engineers) Ltd., 9/11, Victoria Colonnade, Southampton Row, W.C.1. 3223

SKILLED Armature Winder required for India. £40 per month plus ten per cent. of Bombay concern's profit. Fare paid out and home after four-year period. Must be single man with full winding tradesman apprenticeship.—Box 3191, c/o The Electrical Review.

STOREKEEPER Assistant required with knowledge of electrical contractors' stores. Apply in writing, giving previous experience, age and salary required, to—Giles (Electrical Engineers) Ltd., 9/11, Victoria Colonnade, Southampton Row, W.C.1. 3224

TECHNICAL Assistant for Repair Works in Scotland. Take charge assembly and testing all types motors and apparatus. Must be capable of redesigning A.C. and D.C. windings. State training, experience and salary to—Box 9824, c/o The Electrical Review.

THE North-Western Divisional Coal Board wishes to receive applications for the following senior positions on the Production Director's Divisional Staff: (a) A Mechanical Engineer, (b) an Electrical Engineer, (c) a Coal Preparation and Sales Liaison Officer. In the latter case applicants should be fully conversant with coal cleaning technique and with modern methods of preparation of coal for the market. Applications, stating age, present position and salary, qualifications and other particulars, should be forwarded to the Production Director, National Coal Board, North-Western Divisional Board, temporary address c/o Ministry of Fuel and Power, Burton Road, West Didsbury, Manchester, 20. Envelopes should be marked "Divisional Board Application." 3265

TRANSFORMER Design Engineer required, experienced in all types up to 500 kVA. Promising and highly-paid position. Write, stating age and experience, to—Brentford Transformers Ltd., Windmill Road, Brentford, Middx. 3236

TRANSFORMER Draughtsmen required for Production D.O., up to 2,000 kVA. Experienced men are invited to apply, stating full particulars, to—Personnel Officer, Foster Transformers & Switchgear Ltd., Apex Works, South Wimbledon, S.W.19. 3255

WANTED for transformer sales department, Technical Correspondents for the preparation of tenders and the handling of orders. Applicants should be of good education and have sound technical electrical training, preferably with workshop experience. A detailed knowledge of transformers, voltage regulating equipment and reactors is preferred. Good salary and prospects are offered to applicants with the right experience. Apply in writing to—Personnel Manager, Metropolitan-Vickers Elect. Co. Ltd., Trafford Park, Manchester, and mark envelope "Technical Correspondent." 2990

WINDING Shop Foreman required for firm in Eastern Counties. Must have sound practical experience in connection with A.C. and D.C. industrial type motors. State age, experience and salary required.—Box 3219, c/o The Electrical Review.

WORKS Manager required by progressive electrical engineering firm, W London area. Experience necessary in modern production methods and factory layout. Knowledge of transformer manufacture an advantage. Apply, giving full details of age, experience, qualifications and salary required, to—Box 3212, c/o The Electrical Review.

WORKS Manager required for London factory of old-established manufacturers of electrical and radio components. Position calls for energy, initiative and drive. Give full details of qualifications, past and present employment, age and salary required. Applicants should have held position carrying salary of £1,000 p.a.—Box 9802, c/o The Electrical Review.

X-ray Technician required for India. Must be able to construct, repair and service X-ray equipment of all types. Apply in first instance to—Box 3269, c/o The Electrical Review.

APPPOINTMENTS 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.

BOROUGH of Wimbledon—Mains Assistant. All applicants are thanked.

SITUATIONS WANTED

A production executive (34), desires responsible position in instrument or radio factory. Good technical and production experience, 14 years in industry.—Box 9816, c/o The Electrical Review.

A Representative seeks position, 28 years. South Coast, West of England. Good connection supply undertakings, contractors, wholesalers, etc. Fittings, accessories, appliances, fuses. Car. Manufacturers preferred.—Box 9797, c/o The Electrical Review.

ADVERTISER (41) desires change. Over 22 years' experience electrical instrument making (18 years' chargehand instrument assembly & calibration).—Box 9783, c/o The Electrical Review.

ARMATURE Winder, A.C. & D.C. repetition or repair, all classes of winding, or any other electrical job. Over 30 years' experience. Able to take charge.—Box 9782, c/o The Electrical Review.

BUYER, M.P.O.A., with many years' continuous experience buying all classes of materials for engineering trade, both electrical and mechanical, seeks position with company requiring a good organizer and disciplinarian. Salary required £650 per annum.—Box 9756, c/o The Electrical Review.

BUYER, M.P.O.A., 20 years' experience, Birmingham, London, electrical engineering, desires change. Resident Birmingham.—Box 9810, c/o The Electrical Review.

CHARTERED Electrical Engineer (34) desires appointment with managerial responsibility for department. 10 years' experience electrical/mechanical plant inspection, maintenance, repair and installation work. 4 years electrical officer R.A.F. Experienced in maintenance organisation and planning and in plant purchase and repair costing. Has been concerned with many large industrial plants. Would like to join firm expanding on new lines. Particularly interested in agricultural electrification and agricultural plant maintenance. Prepared for small investment or consider partnership.—Box 9789, c/o The Electrical Review.

CHIEF Draughtsman or Designer desires change. Many years' varied mechanical and electrical experience, including management, tool design and planning. S.W. Lond n.—Box 9786, c/o The Electrical Review.

CHIEF Draughtsman with many years' experience on experimental and production design of domestic appliances, radio equipment, measuring instruments, light mechanisms, etc., seeks position in London.—Box 9818, c/o The Electrical Review.

COMPETENT Electrical and Mechanical Engineer age 34. foreman or representative desires responsible position. Extensive experience of industrial installations and maintenance of A.C./D.C. power plants, installing motors, control gear, lighting, illuminations, heating, ventilation, lay-outs, records and estimating.—Box 9784, c/o The Electrical Review.

CONTROL Gear Engineer (24), H.N.C., six years' experience development/test automatic switch-gear, including Ward Leonard equipment, remote control by impulse methods, and all types A.C. motor controllers. desires design/development post in London area.—Box 9829, c/o The Electrical Review.

ELECTRICAL Contractors' Supervising Engineer, long experience, electrical and mechanical, capable, practical, energetic.—Box 9757, c/o The Electrical Review.

ELECTRICAL Engineer, A.M.I.E.E., sound technical training, requires post where 20 years' experience installation and maintenance could be fully utilised.—Box 9815, c/o The Electrical Review.

ELECTRICAL Engineer, with excellent mechanical background, 26, B.Sc. (Eng.), D.I.C. (Hons.), Grad. I.E.E., experienced in the laboratory technique for the development of high-voltage equipment, seeks responsible position where practical experience is required.—Box 9803, c/o The Electrical Review.

ELECTRICAL Engineer (31), M.Sc., A.M.I.E.E., wishes to enter development or sales in light engineering field, preferably electro-medical.—Box 9744, c/o The Electrical Review.

ELECTRICAL Engineer (46) seeks progressive appointment leading to advancement, supervisory or managerial. Design, lay-out, estimating of large private and industrial lighting, power and heating installations. Conversant with office management, control of skilled and unskilled labour.—Box 9786, c/o The Electrical Review.

ELECTRICAL Engineer (25) D.F.H. (Hons.), Grad. I.E.E., seeks permanent progressive position South of England or Continent. Four years as electrical officer R.N.V.R. following thorough practical training. At present engaged on switchgear development.—Box 9833, c/o The Electrical Review.

ELEC. Foreman, 20 yrs.' exp., large installations and maintenance, requires progressive position, London area, own car.—Box 9827, c/o The Electrical Review.

ELECTRICAL Wholesalers' Manager, 27 years' experience, extensive knowledge in all branches, supplies and correspondence, desires change with well-known firm. Not afraid of responsibility. Good connection with the retail trade. Replies to—Box 9782, c/o The Electrical Review.

ENGINEER, A.M.I.E.E. (36), 20 yrs.' exper. manufacturing and development. Chief draughtsman all types dynamo electric machinery. Requires progressive position as Assistant Production Manager or Assistant Chief Engineer. London or Home Counties. Minimum salary £650.—Box 9772, c/o The Electrical Review.

ENGINEER, with initiative and enterprise, requires responsible position. Twenty-five years' successful experience works management, design, development, testing in light engineering and precision instruments, electrical and mechanical. Sound technical and practical training to degree standard. Can introduce new line of manufacture.—Box 9762, c/o The Electrical Review.

F H.P. Motors. Electrical Engineer, Grad. I.E.E., experienced design and manufacture, desires position of responsibility and scope.—Box 9809, c/o The Electrical Review.

FOREMAN Armature Winder, 20 years' varied experience, new or repair, rotary or static, industrial power application, conversions, some drawing, requires good position.—Box 9830, c/o The Electrical Review.

FOREMAN Electrician, 30 years' exper. lighting and power installation, factory maintain., free Nov.—Box 9752, c/o The Electrical Review.

If you want a Chief or Assistant Engineer (age 39, B.Sc., A.M.I.E.E., etc.) for a telephone operating company abroad please write—Box 9745, c/o The Electrical Review.

PACKER Storekeeper, long experience supervising despatch, excellent references.—Box 9793, c/o The Electrical Review.

PLUMBER-Joiner, experienced E.H.T. and L.T. cables, switchgear services, etc.—Box 9831, c/o The Electrical Review.

QUALIFIED Instrument Engineer seeks progressive post. Production, development or sales. Box 9806, c/o The Electrical Review.

TELECOMMUNICATIONS Engineer (36), B.Sc., A.C.G.I., A.M.I.E.E. having wide experience of telephony including carrier telephony desires post giving opportunity of developing and applying his knowledge of radio engineering.—Box 9788, c/o The Electrical Review.

WORKS Executive, qualified mechanical engineer, comprehensive administrative experience covering the application of time and motion study, production control, scheduling, standard costing, process planning to electro-mechanical engineering work. Good organiser with successful record in handling labour and getting results.—Box 9822, c/o The Electrical Review.

FOR SALE

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

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

A large surplus stock of Serrated Manila Pocket A Envelopes, size 3½" x 2¼". Minimum quantities 500,000 lots. Price on demand.—BCM/CABD, London, S.W.1. 3239

A BOUT 10,000 yards unused single-core 44/012 TRS Flexible Cable in 100-yard coils, £17 per 1,000 yards.—Barlow-Whitney Ltd., Coombe Road, Neasden Lane, N.W.10 (Gladstone 1152/3). 3190

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

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

A .C. Motors, 1/75th h.p. to 5 h.p., all voltages. Also D.C.—The Johnson Engineering Co., 319, Kennington Road, London, S.E.11. Telephones, Reliance 1412/3 50

A .C. Motors for sale: 220-h.p., 575-r.p.m., 400/3/50-cycles, Crompton slip-ring; 100-h.p., 580-r.p.m., 400/3/50-cycles, G.P.C. slip-ring; 100-h.p., 730-r.p.m., 500/3/50-cycles, E.C.C. slip-ring; 75-h.p., 730-r.p.m., 500/3/50-cycles, Siemens slip-ring; 60-h.p., 480-r.p.m., 400/3/50-cycles, B. West slip-ring; 35-h.p., 960-r.p.m., 400/3/50-cycles, Parkinson slip-ring; 40-h.p., 480-r.p.m., 400/3/50-cycles, L. D. & M. squirrel cage; 28-h.p., 488-r.p.m., 500/3/50-cycles, B.T.H. slip-ring.—Newman Industries Limited, Yate, Bristol. 3062

GOVERNMENT SURPLUS STORES

THE Ministry of Supply has for immediate disposal the following petrol driven Generating Sets located as shown below:

Lot "A" A.R.3349.—203 Petrol Engine Driven Generating Sets, 1½ B.H.P. J. A. Prestwich (A. Lyon) Engine. O. 36 kW, 12/20 volts. D.C. Lancashire Dynamo Generator. Location, 35 Maintenance Unit, R.A.F., Heywood, Lancs. (L Shed, A.C. Shed L/2).

Lot "B" A.R.3349.—23 as above except that generators of four sets are by Crompton Parkinson. Location, 14 Maintenance Unit, R.A.F., Carlisle. (Bay H-Sec. 1.6Site).

Condition of both lots unused. Running spares available with each engine.

For sample inspection only by appointment contact: Lot "A"—Disposal Liaison Officer, Room 65, 35 Maintenance Unit, R.A.F., Heywood, Lancs. Tele. No. Rochdale 4681. Lot "B"—Squadron-Leader Torbet, O.I.C. S.C.O. 14 Maintenance Unit, R.A.F., Carlisle. Tel. No. Carlisle 1840, Extn. 43.

Purchasers must take delivery "Free on Rail" Location within two weeks of the date of issue of Release Instructions.

Offers for any or all of these items are invited. No Forms of Tender are necessary and letters should be addressed to: Ministry of Supply, Director of Contracts, Gt. Westminster House, Horseferry Road, London, S.W.1. to arrive not later than 10 a.m. on 20th November, 1946. Envelopes must be marked "Tender No. 303201 returnable 10 a.m. 20th November, 1946." Failure to mark the envelope correctly may result in a tender not being considered.

Any contracts made as the result of this tendering will be subject to the Department's Conditions of Sale, copies of which may be obtained if desired from the Ministry of Supply, Directorate of Disposals (RE), Room 629, Great Westminster House, Horseferry Road, London, S.W.1. Reference 12/Sales(RE) 9854. Tender No. 303201 should be quoted when applying for these forms. 3273

A.C./D.C. 5-valve Superheterodyne Sensitive 3-wave Band Receiver. Excellent tone. Attractive modern cabinets in "Plastele" or polished wood, £16 16s. Usual trade terms and facilities. Early delivery. Trade only.—Morgan, Osborne & Co. Ltd., Southview Road, Warlingham, Surrey. 110

ALTERNATING Diesel Set, 350 kW, 40/3/50, direct coupled; excellent condition; can be seen running. Complete.—Box 3247, c/o The Electrical Review.

AUDAX Ltd. now have available an extensive range of new season's designs of high-class Lamp Shades in Plastics and Parchment, together with a range of Table Lamps. Prompt delivery available to all parts of the country. Enquiries particularly invited from wholesalers and electrical factors.—84, Preston Road, Brighton (Tel. Preston 5565). 9583

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BATTERY Chargers for home and export, 4 models, 2.6-12 v., 1, 2 or 4 amp. D.C., any mains voltage. Generic trade terms. Write for catalogue.—The Banner Electric Co. Ltd., Hoddesdon, Herts. Tel.: Hoddesdon 2659. 97

BEANTEE Festoon Striplight Holders, made of X2 Bakelite, for use with 7/029 T.T.R. cable, require no tools or screws for wiring. Immediate delivery of any quantity. Passed by the fire authorities. Used by corporations and supply companies all over the world. Large quantities of British made Electric Lamps and Cable always in stock.—The Beantee Illuminations (London) Ltd., Temporary Address, 6, Upper Street, Islington, London, N.1 (Phone, Canonbury 4555). 71

BLT Grinders or Sanders, 4" wide belt, £6: 6" wide belt, £14 15s.—John E. R. Steel, Clyde Mills, Bingley, Phone 1066. 52

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 691/2. 92

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

CENTRI Pump, 2½" bore, driven by Crompton 220-volt D.C. 2-h.p. shunt motor, good condition, 1944. What offers?—Fletcher, 5, Park Crescent, London, W.1. 9805

CLEFA "Hall Lanterns, Pendant Fittings and Wall Brackets; also Shade Makers, Gymbals, etc. Actual manufacturers.—Central London Engineering (Fabrications) Ltd., 120, Old Street, E.C.1 (CLE. 2586). 108

D.C. Generating Set consisting of: 1 150-h.p. Ashworth & Parker, two-cylinder compound condensing steam engine, driving by "V" rope 1 83-kW, 220-volt, D.C. Generator. May be seen running, Manchester area.—Box 3278, c/o The Electrical Review.

D.C. Generators by Mawdsley, 6.75 kW, 85/65 volts, 105 amps., 1,750/2,900 r.p.m., compound wound, ball race bearings, condition equal to new. Price £5 each, plus carriage.—Cox & Danks Ltd., Frederick Road, Salford, 6. 3077

D.C. Motors, new, 200/230 volts, 1,400 r.p.m.: 8 to 314 h.p., also 110 volts, D.C., 21 h.p., several available with starters.—Stewart Thomson & Sons (L'pool) Ltd., Fort Road, Seaford, Liverpool, 21 (Telephone Number, Bootle 2697) or 28, Victoria Street, Westminster, London, S.W.1 (Telephone Number, Abbey 2101). 96

D.C. Motors from 2 h.p. to 2½ h.p. for sale at cheap prices. Must clear.—Sadd, 5 Coleridge Ave., Mancr Park, London, E.12. 9834

DYNAMIC Balancing Machines. Production Type, supplied in four standard sizes, accommodating electric and other rotors weighing from a few ounces up to about 5 cwt. Portable Dynamic Balancing Equipments for larger rotors of all kinds and weights, adapted for balancing operation on test-stand or on site. Early delivery.—C. F. R. Giesler Ltd., River Place, Essex Road, London, N.1. 2982

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ELECTRIC Motors, 1/3 h.p., 3,000 r.p.m., D.C. 110 volts. Also 220 volts. Stock delivery, £6 each.—John Steel, Clyde Mills, Bingley, Yorks. 84

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

ELECTRIC Motors, A.C. and D.C. We supply all types and sizes of electrical machinery. Slow speed reduction gears can be supplied to customers' requirements with short deliveries. Send your enquiries to—Be-Be Engineering, 3, Retreat Close, Kenton, Middx. (Wordsworth 4928). 42

ELECTRIC Welding Plant, Engine and Electric, A.C. driven, 300 amps. output, complete with weather-proof covers.—Box 34, c/o The Electrical Review.

EVERSHED Megger, 500 volts.—Box 3193, c/o The Electrical Review.

FIRE Elements. Good quality, pencil type. Wound nichrome wire, 9¾", 1 kW, 48/- dozen; 500 lots, 3/7 each; 1,000 lots, 3/6 each; 5,000 lots, 3/3 each. 8", 750 w., 42/- dozen; 500 lots, 3/1 each; 1,000 lots, 3/-; 5,000 lots, 2/9. Quotations for other sizes. Immediate delivery all sizes. Carriage paid 500 and over, otherwise 4/2 per 100 extra. Samples 5/- each.—Box 9812, c/o The Electrical Review.

FLUORESCENT, from stock, 18", 24", 36", also 5 ft 80-watt Trough and Flush with Constead unit. Complete with tubes.—Box 9731, c/o The Electrical Review.

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. Constead Units for sale. Dispenses with all starter gear and gives instantaneous lighting, prevents maintenance worries, each unit guaranteed. Apply—Scemco Ltd., 6/7, Soho Street, London, W.1 (Tel. GER. 2034). 117

FLUORESCENT Lighting in several designs can be supplied from stock to meet all requirements. Send your enquiries to—John Phillips & Co. (Electrics), 311, Fortune Green Road, N.W.6 (Park 8132). 3014

FLUORESCENT Lighting, 18" 15w., 24" 25w. and 36" 45w. fittings complete with tubes. Colours: White, warm white, daylight and pink. Delivery 7 days. We are pleased to state that we are now in a position to allow increased discounts outside the London area.—Scemco Ltd., 6/7, Soho Street, London, W.1. Tel. GER. 2034. 120

FLUORESCENT Lighting Fittings. Extensive range, including Trough and Flush type, fitted with "All in One" Constead Unit. Delivery 7 days, with tubes. Write—Scemco Ltd., 6/7, Soho Street, London, W.1. Phone, GER. 2034.

FLUORESCENT Lighting. Self-contained Ballast Units by Hi-Craft. Complete with Glow Starter Switch and Power Factor Condenser for 80-watt tubes. Supplied from stock.—Scemco Ltd., 6/7, Soho Street, London, W.1. Tel. GER. 2034.

FOR Sale, the following Motors: 220/230 v. D.C., 2 1/5 h.p. Delco, 1.750 r.p.m.; 1 1/6 h.p. Century, 1.460 r.p.m.; 1 1/8 h.p. Singer Sewing Machine type; 1 1/2 h.p. Emerson, 1.750 r.p.m.; 400/440 v. D.C., 1 1/2 h.p. Canning, 1.260 r.p.m.; 110 v. D.C., 1 1/2 h.p. I.D.C., 1.425 r.p.m.; 400 v., 3-phase, 50 cycles, 2 1/2 h.p. Electrominor, 2.900 r.p.m.; S.C.; 1 to 1/2 h.p. Brook, 3.000/720 r.p.m. S.C.; 400 v., single-phase, 50 cycle, 2 h.p. Metro-Vick., 1.455 r.p.m. S.C.; 230 v., single-phase, 50 cycle, 2 h.p. I.D.C., 1.440 r.p.m. S.C.; 230 v., 3-phase, 50 cycle, 2 h.p. C. & P., 2.900 r.p.m. S.C.; 6-volt, 100-amp. Plating Generator, self excited.—Hywood Ltd., Elect. Eng., 18, Coram Street, W.C.1. 3088

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

HEAVY duty Arc Welding Plants. 200 amps. Price £36 10s. complete. Also Spot Welders, £48 10s.—John E. R. Steel, Clyde Mills, Bingley. Phone 1066. 50

INDUCTION Motors. 230 volt, 1-phase capacitor and shaded pole, flange mounting, suitable hairdryers, fans, etc., with impellers up to 12" dia. Quotations large or small quantities.—Aleyne Foster (Engineering) Ltd., Ottways Avenue, Ashted, Surrey. 8777

INSTALLATION Tester, 500 v. Record Minor, 211. From stock.—Robins Electrics, 222 & 222b, West End Lane, N.W.6. 83

JUNCTION Electric Irons, superior design and quality, supplied with suitable stand. Also Junction Nickel-plated Torch Cases. Supplied for home trade and export. Distributors—Brooks & Bohm Ltd., 90, Victoria Street, London, S.W.1. Tel. Vic. 9550. 49

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

LARGE number of Plating and Anodising Generators, up to 1,200 amps. for the most part unused. Send requirements to—Fyle, Wilson & Co. Ltd., Bishop's Stortford, Tel. B.S. 1000/1. 3282

LARGE range of toasters, fans, portable and wall electric fires, radiators, convector heaters, floor standard and table lamps, electric irons (heat controlled and others), vacuum cleaners, hair dryers, novelty bowl fans, boiling rings, electric kettles, immersion heaters. (Radios very shortly available.) Large range of torch cases, cycle lamps and all types of lighting and H.T. batteries, etc. Detailed list and catalogues available. Place your orders in good time.—Brooks & Bohm Ltd., 90, Victoria Street, London, S.W.1. Phone, Victoria 9550/1441. Inland Telegrams, "Beebats, Sowest, London." 66

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

Goodman (Radio) Ltd., 9, Percy Street, Tottenham Court Road, W.1. are sole London agents for the "Midco" Elongated Fluorescent Choke and Fluorescent Starter Switches. Museum 0216. 76

MONOMARK, Permanent London address. Letters re-directed, 5s. p.a. Write—BM/MON053, W.C.1. 69

MOTOR Generator Sets and Convertors, all sizes and voltages from 1/2 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 2a

MOTORISED 1/2" Bench Drilling Machine. 13 speeds, £15 5s.—John E. R. Steel, Clyde Mills, Bingley, Phone 1066

MULTI-Range (Eleven) A.E.G. Millivoltmeter, push lined carrying case, condition as new, £27.—Allsop, Westfields, Bakewell, Derbyshire. 9730

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

NISSEN Type Huts, 24' x 16', £52; 36' x 16', £72. Plasterboard Huts, 31' x 19', £80. Secondhand. Many other sizes; also other types of ex-Government buildings now in stock, some with floors. Immediate dispatch arranged and no licences required. Inspection welcomed, or write for full list from—J. Thorn & Sons Ltd., Box 80, Brompton Road, Bexleyheath, Kent. Phone, Bexleyheath 305. 47

NEW or Secondhand A.C./D.C. Motors can be supplied from stock or at short notice. Specialists in rewinds and repairs. Send your requirements to—John Phillips & Co. (Electrics), 31, Fortune Green Rd. N.W.6 (Park 8132), 3015

OFFERS are invited for three 250-kVA Transformers. Metro-Vickers, 1944, 6,000/435, Delta Star, +/—2 1/2% and 5% U.P.F. 97.88%. Tapped off circuit switch. As new.—Modern Window Fittings Ltd., Fletcher Street, Stockport, Phone, Stockport 2456. 9813

ONE 1,250-kVA B.E.T. Voltage Regulator, with Brookhurst on-load hand-operated tapping switch, 3-phase, 50 cycle. Input 6,100-6,800. Output 6,600 volts. Price £250 or offer.—J. D. Markland, Power Station, Maidenhead. 3256

OSMOR Radio Heat equals complete first-class 5-valve Superhet, positively only small condensers and resistances to find. Super-efficient components. Building instructions, £5 16s. Cabinets. Trade invited.—Morgan Osborne Ltd., Southview Rd., Upper Warrlingham 2560, Surrey. 1001

PEONE 99 Staines. 90-kW Ruston Diesel Set, 110 vo. D.C.; 25-kW Mirlees ditto, 110 vo.; 7/9-kW Ruston ditto, 110 vo.; 5-kVA Ruston ditto, 400/1/50. Weir Feed Pump, 8 1/2" x 6" x 13".—Harry H. Gardam & Co. Ltd., Staines. 60

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

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 2121, 4 lines); also at Phoenix Works, Belgrave Terrace, Soho Road, Handsworth, Birmingham (Telephone, Northern 0898). 26

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

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

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

SELENIUM Metal Rectifiers for A.C. to D.C. conversion. Many sizes in stock, also Transformers, Meters and Sliding Resistances for low voltage D.C. supplies. Send for list.—S. G. Lewis, F. Portland Court, New Brighton, Cheshire. 9825

SELF-Priming Electric Pumps, 300 g.p.h., £14 5s.—John E. R. Steel, Clyde Mills, Bingley. Phone 1066. 53

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

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

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

STEAM Generating Plant, comprising 400-kW Escher Wyss Turbine, 360-lbs. pressure, 600° Fahr., 9,060 r.p.m., with reduction gear 9,000/3,000 r.p.m., complete with condenser and auxiliaries and Oerlikon Generator, 380/3/50, Exciter and Shunt Regulator. Good condition. Full particulars from—Oerlikon Ltd., Victoria House, Southampton Row, London, W.C.1. 3293

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

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SWITCHGEAR: Westinghouse oil-immersed, draw out Switches. Ten for sale, various sizes.—Norman E. Potts (Birmingham) Ltd., 105, Alcester Road South, Birmingham, 14. 9750

STEAM Generating Plant. The following is a selection of sets available in our comprehensive stock: 2,000-kW B.T.H. Turbo-Alternator, 6,600/3/50, 180/210-lbs. pressure, complete with surface condenser and all auxiliaries, seen running. 1,250-kW Brush Ljungstrom Turbo-Alternator, 400/3/50, 200 lbs. pressure, complete with surface condenser and all auxiliaries, seen running. 750-kW Adamson/Mather & Platt High-pressure Pass-out Turbo-Generator, 200-lbs. initial steam pressure, passing out 25,000 lbs. per hour at 80-lbs. pressure. 500 volts, three-wire D.C., with balancer, complete with surface condenser and all auxiliaries. First-class condition. Full particulars from—Stewart Thomson & Sons (Liverpool) Ltd., Fort Road, Seaford, Liverpool, 21 (Tele. No. Bootle 2697); or 28, Victoria Street, Westminster, London, S.W.1 (Tele. No. Abbey 2101). 94

SWITCH Blocks. Well-finished hardwood, I.W. and W.E., 3" x 1/4", 45-lb. gross; 3 1/2" x 1/4", 48-lb. gross. Cash with order or pro forma invoice only, less 24% carriage paid.—Elf Manufacturing Co., 62, Gilmore Crescent, Worcester. 9794

SWITCHGEAR. Flame proof Heavy Industrial, also quantity of Igranite Starters. Particulars on application to—T. F. Williams (Engs.) Ltd., 6, Cleveleys Avenue, Cleveleys, Nr. Blackpool. 3202

TWO 12.5-kW, Compound, D.C. Mawdsley Generators, 220 volts, 57 amps., direct-coupled 4-cylinder Hyland Engines, with self-starters, charging 24-volt dynamos, batteries, built 1944, good condition. What offers?—Fletcher, 5, Park Crescent, London, W.1. 9804

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VACUUM Cleaner Spares and Accessories. Bags, bearings, belts, brushes, fans, switches, etc. Repairs, rewinding, rebristling. Send for price list.—Reliance Vacuum Cleaner Service, 152-154, Broadway, Bexleyheath, Kent. 93

WE have for immediate disposal the following materials surplus to our requirements: Black Oiled Silk, 1 1/2 sq. 394; Yellow Varished Silk, 5" x .006"; Black Varished Silk, 1 13/16" x .006"; Yellow Varished Silk, 1 13/16" x .006"; Varished Silk, sq. 394, 1 15/16" x .006"; Varished Silk, 10 m/m x .0025 sq. 364. All the above are brand new and are offered at considerably less than market prices to clear.—Leightons (Contractors) Ltd., 10, Chandos Street, London, W.1. Tel. LANGHAM 3704. 2235

WEE Meggers, Evershed, 500 v., 20 meg., in carrying case, £12 5s. 6d., ex stock (new).—Robins Electric, 222, West End Lane, N.W.6. 82

WIRE. For disposal, quantities of Tinned Phosphor Bronze Wire as follows: 35 cwts., 0.0124" dia.; 6 cwts., 0.0076" dia. All wound on wooden bobbins having 2 1/2" dia. flanges. Offers to—Box 3245, c/o The Electrical Review. 3245

5-kW and 24-kW, 220/250-volt D.C. Generating Sets, complete with 4-cylinder, 10-h.p. Austin Engines, with petrol tanks, radiators, fans and switchboards. Large number available.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 103

5-kW, 100-v., 50-a., Comp. Int. D.C. Generator, direct-coupled to 8-h.p., S.C., 3/50/400-v. Motor on bedplate.—S. C. Bilsby, Crosswells Road, Langley, near Birmingham. 3254

10-ft. lengths of Busbar Trunking System, complete with 3 round aluminium conductors, 1/2" dia., fitted internally. Can be inspected at—Cox & Danks Ltd., Plant & Machinery Department, Fages Road, Feltham, Middx. Phone, Feltham 3471. 3290

200-kVA, 3-phase, 50-cycle, double-wound, oil-immersed Transformer, 11,000 input, made by Bryce Electric Construction Co. Ltd., 400-amp., 660-volt, type A2, triple pole, non-drawout, ironclad Oil Circuit Breaker. Both new, £250.—Midland Gauge & Tool Co. Ltd., Factory Centre, Kings Norton, Birmingham, 30. 3197

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., Grace Street, Spon Lane, West Bromwich. 36

400-kVA oil-cooled Transformer, 6,600 v. primary, secondary 100, 90, 80 and 50. Three truck-type Switch Cabinets, Infra-Red Mould Drying Units—S. C. Bilsby, Crosswells Road, Langley, Nr. B'ham, 3192

350,000 Plain New Skillets, abt. 1 1/2" x 1 1/2" x 4 1/2", at 25/- per 1,000, d'd England. —G. H. L., 206, Bishopsgate, London, E.C.2. 3210

440-volts, 3-phase, 50-cycles Motors, standard r.p.m., slip-ring. Two 90-h.p. Metro-Vickers; two 50 h.p.; one 40 h.p.; one 20 h.p.—Norman E. Potts (Birmingham) Ltd., 105, Alcester Road South, Birmingham, 14. 9749

5,000 good strong Crates, inside measurements 29" x 9 1/2" x 9 1/2", 1/2" thick, battened all round, at 1s. 9d. each, ex works.—K. Goldser & Sons, 14a, Rectory Square, London, E.1. (Tel. Steyneep Green 2550). 75

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ACCUMULATOR Plates (old) and lead Peroxide; actual smelters we pay top price. Also old storage batteries, transformers and whole installations purchased.—Elton, Levy & Co. Ltd., 18, St. Thomas Street, S.E.1. Hop 2825-6. 39

A.C./D.C. Motors wanted urgently, all sizes and voltages. Best prices offered.—John Phillips & Co. (Electrical), 31, Fortune Green Road, N.W.6 (Park 8132). 3016

A.C. Motors urgently wanted, any condition, 400/3/50 A type, sizes from 1 to 20 h.p., speeds 1,500 and 1,000. State price.—Bowie Electrical Service, Roscoe Street, Scarborough (Tel. 1264). 2881

A.C. Motors, all sizes, burnt out machines acceptable providing mechanically sound.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 3285

CELLULOSE Acetate Offcuts urgently wanted. Send samples and prices to—Box 107, c/o The Electrical Review. 3285

ELECTRIC Insulating for Norway. Leading Norwegian import firm, buying for own account, wants supplies of electrical insulating material in bakelite, micaite, varnished cambric, steatite. Please apply to—C. Ragne's Asbestkompani A/S, Radhusgt. 6, Oslo. Established 1894. 3103

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FLUORESCENT Bar Elements (Flat), 9" x 3", 1 kilo.; also 5 to 15-amp. Switches. Large or small quantities. Offers to—Supreme Electrical Manufacturers, 3, Downs Road, Epsom, Surrey (Phone, Epsom 1359). 9712

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REQUIRED: Mica Electric Iron Elements; Toaster Elements; Spirals, nichrome wire; Cotton-covered Flexes; Brass, Copper and Steel Sheets, min. size 9" x 6" Alu. Strip, 1/2" x 1/2"; Machinery, new and used; Timber; Glazing; Rubber Grommets; Asbestos; Switches; Iron Connectors, etc., etc. Offers to—British Diamix Ltd., Metrum Works, Beatty Street, N.W.1. Euston 5951. 44

SECONDHAND 1 1/2-h.p., 230-volt, A.C. single-phase Motor with starter required.—Runback Electrical Products, 71, Oxford Road, Manchester, 1. 3244

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

WANTED. Well-known Wholesalers in N.W. Lanes are prepared to make spot cash purchases of switch-gear, domestic appliances and regular or clearance lines of all requirements for the electrical contracting trade. Offers in confidence to—Box 3031. c/o The Electrical Review.

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2-h.p., 110-volt D.C. Vertical Motors.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 3287

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ADDITIONAL lines of electrical components and appliances required for distribution throughout the North West. Please send samples and terms to—Leonard Heys, Karaday House, Henry Street, Blackpool. 3032

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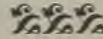
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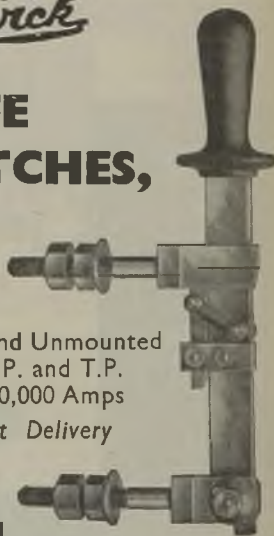
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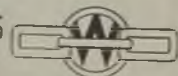
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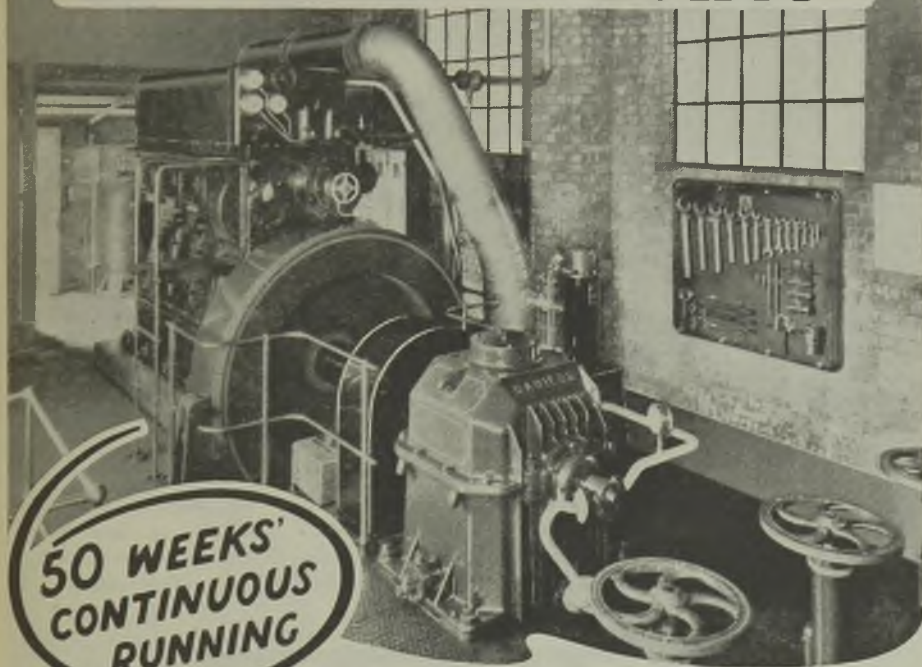
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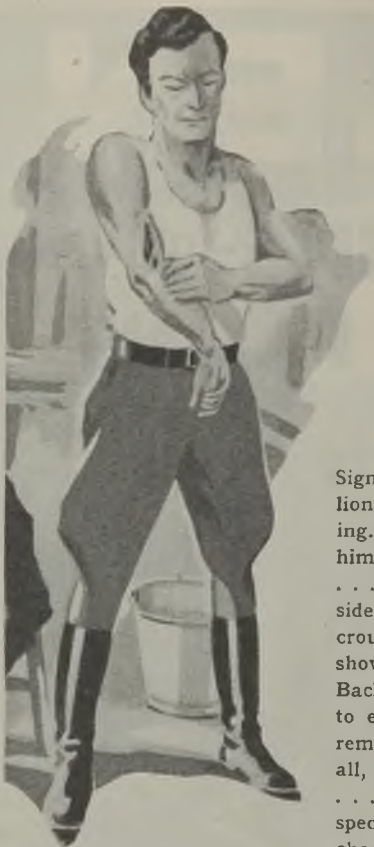


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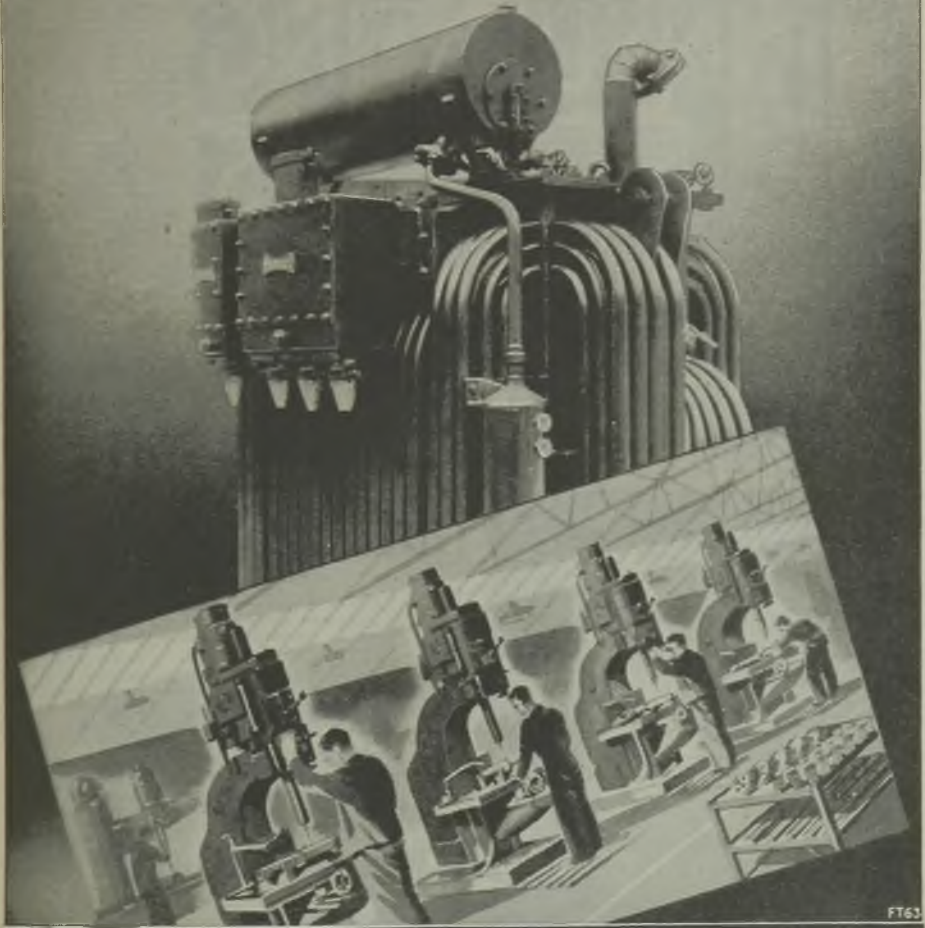
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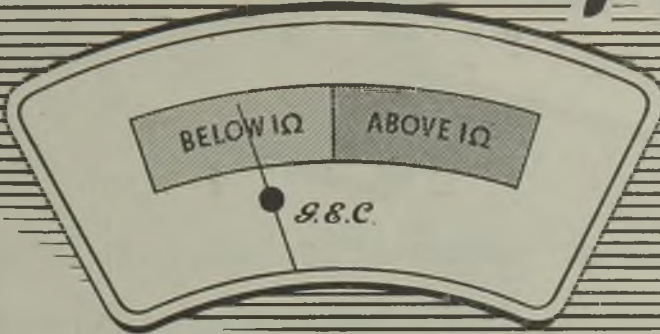
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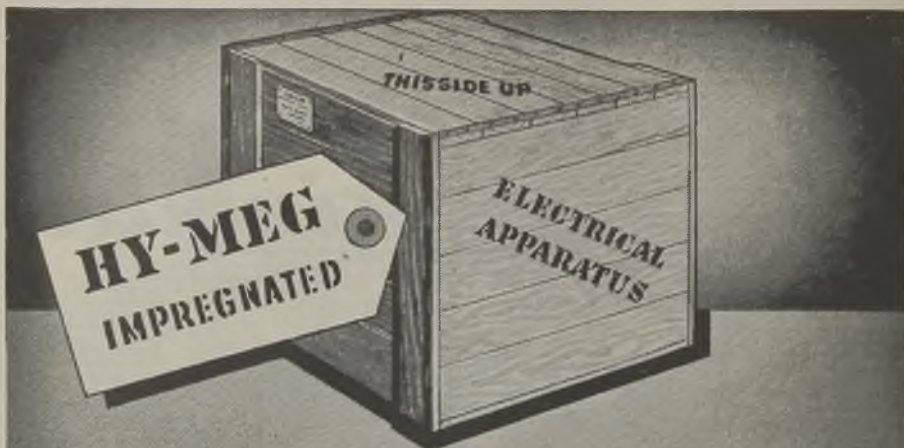


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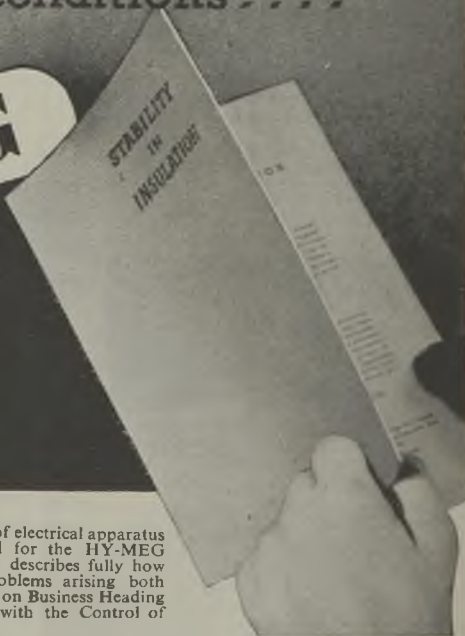


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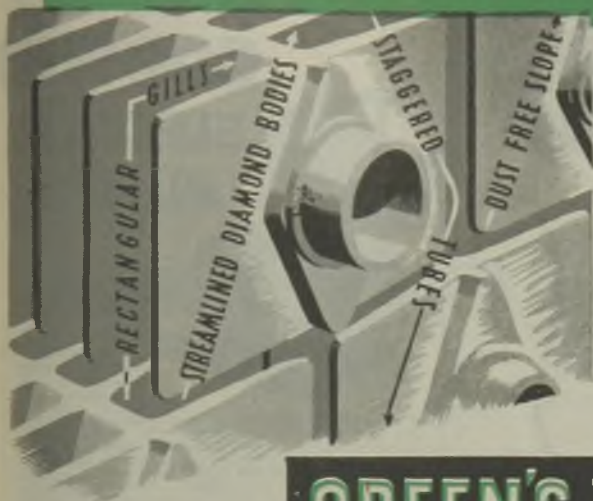
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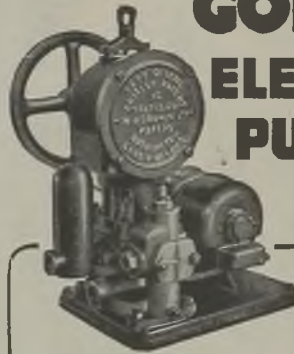
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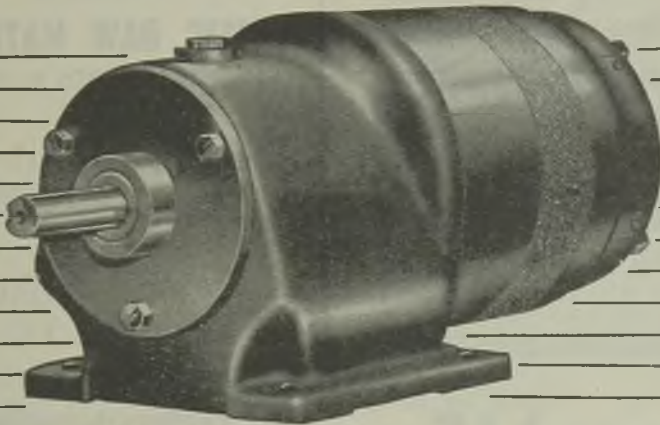
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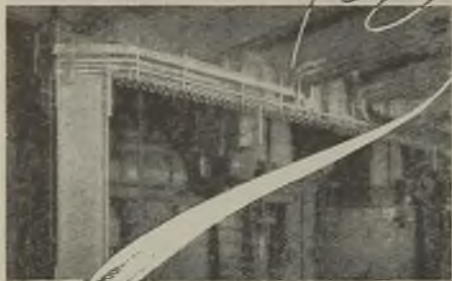
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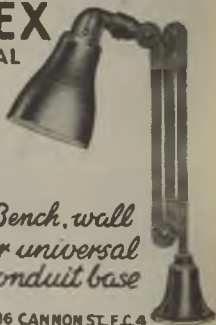
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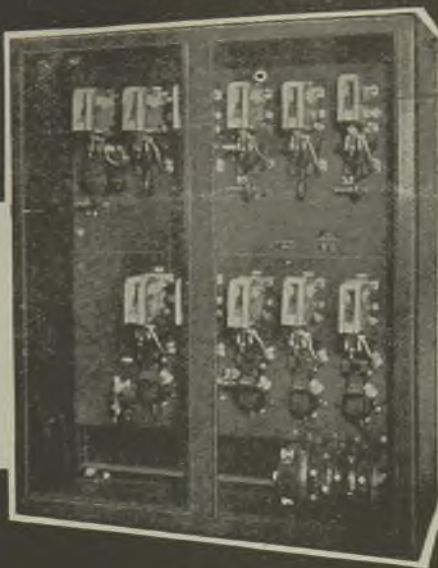
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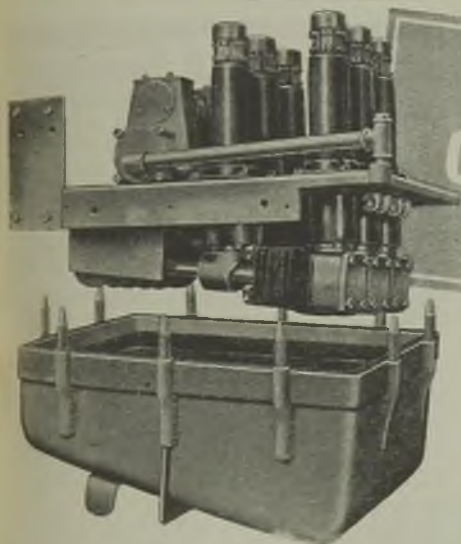
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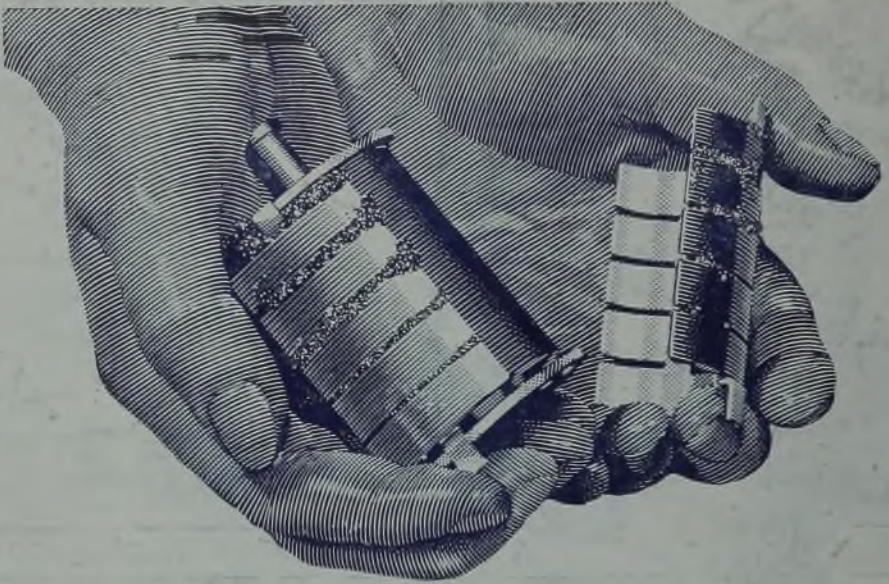
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