

8/44

ELECTRICAL REVIEW

FOUNDED
1872

Vol. CXXXV. No. 3492

OCTOBER 27, 1944

POSTWEEKLY

ASKIES

*let's
see...*



Royal "EDISWAN" Lamps

THE EDISON SWAN ELECTRIC CO. LTD.



155, CHARING CROSS RD., LONDON, W.C.2



A.S.C.M. Steel Conduit is manufactured only 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.

Accepted practice in the Lobster World is a periodical shedding of his casing. Until its renewal he is unprotected.

Accepted practice in the Electrical World is permanent protection with A.S.C.M. Steel Conduit. Worlds of difference? Yes!

SPECIFY AND USE
 A.S.C.M.



The Art of Knowing How



Most of the Peaks of Achievement have been reached by the roping together of intrepid men in common adventure.

We have found that to be a sound business principle . . . a team spirit that quests ever upwards to fresh heights of attainment.



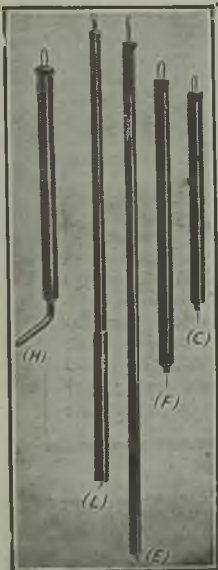
**LEADERS IN
ELECTRIC
WATER HEATING**



HEATRAE LTD., NORWICH

PHONE : NORWICH 25131

GRAMS : HEATRAE, NORWICH



IS IT ALIVE? THE "PARTRIDGE" PRESSURE DETECTOR

(Regd. T.M. No. B.581955)
will infallibly tell you, giving
visible and audible indication
(No earth connection required)

Type	Range up to	Length of handle
C	Volts 11,000	36"
E	60,000	84"
F	15,000	48"
H	11,000	36"
L	33,000	72"

Also makers of "Westminster" Vacuum Tube Detector and H.T. Earthing Rods

Patent No. 512919

The WESTMINSTER ENG. Co. Ltd.
Victoria Road, Willesden Junction, N.W.10
Telephone: **Willesden 1700-1**
Telegrams: **"Regency, Phone, London."**



TAG TERMINALS

FOR WIRELESS
AND SIMILAR
CONNECTIONS

A WIDE RANGE OF
SIZES IN STOCK

ROSSCOURTNEY & Co. Ltd.
ASHBROOK ROAD, LONDON, N.19

KNOBS



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.



NEXT BEST THING TO DAYLIGHT



Natural daylight in factories would be a boon to war production. Impossible to have such light 24 hours a day, of course. But, with Siemens "Sieray" Fluorescent Tubular Lighting, you get a powerful, all-pervading, soft light, so near to daylight as to be almost the same. No glare. No interfering shadows. And economical in electricity consumption.

FREE ADVICE — A Siemens industrial lighting specialist will, without obligation, advise on existing lighting systems. He may be able to suggest improvements which will save current charges and the Nation's fuel.



FLUORESCENT TUBE

"The Yardstick of Good Lighting"

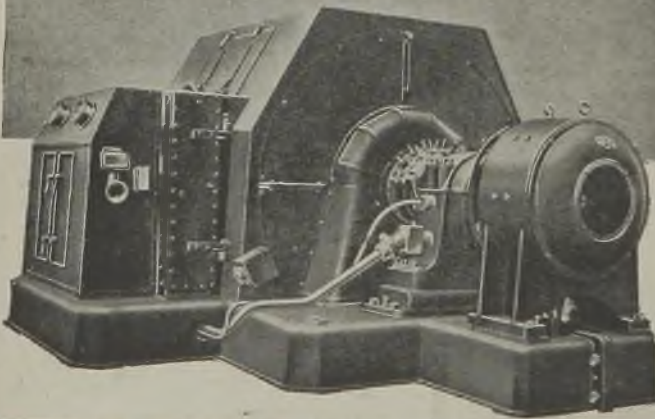
SIEMENS ELECTRIC LAMPS & SUPPLIES LTD.,
38/39, Upper Thames Street, London, E.C.4

PEEBLES

TOTALLY ENCLOSED AIR CIRCUIT

ALTERNATORS

WITH SELF-CONTAINED COOLERS



*Lower
Installation
Costs*

Air Coolers form an integral part of the machine, and excavations for deep foundations and basement air ducts are eliminated

**SIMPLIFIED AIR CIRCUIT
MAXIMUM ACCESSIBILITY**

3750 K.W. .8 power factor 3-phase
50 cycle. 5300 Volt. 1000 r.p.m.
Totally Enclosed Air Circuit Alternators with self-contained coolers, dial type thermometers for inlet and outlet temperatures, alarm horns, and emergency dampers.

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

MAIN CONTROL SWITCHES

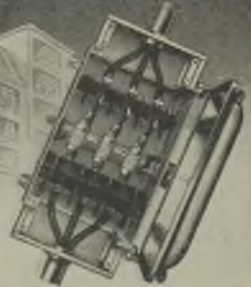
for all factories



Bill "H.R.C." Fuse Switches fitted with "English Electric" "H.R.C." Cartridges.



Made for 30, 60, 100, 160, 200, 300 & 500 Amps., 600 Volts; Double, triple and four pole and with neutral links. Fitted for Conduit, busbar chamber flange or cable glands.



Easy Wiring, minimum maintenance

LONDON: A W ZELLEY
73, GREAT PETER ST,
WESTMINSTER, S.W.1

BILL SWITCHGEAR LTD
BIRMINGHAM 20

MANCHESTER GLASGOW
BELFAST BURTON-ON-TRENT
EXETER SOUTHAMPTON

BIRCHFIELDS 5011 (4 LINES)

"RICH" BIRMINGHAM



Change of Title

In order that the Company's title shall be more descriptive of its range of products, the name of:—

The Concordia Electric Wire Co. Ltd.

has, with the sanction of the Board of Trade, been changed to:—

THE CONCORDIA ELECTRIC WIRE & CABLE CO. LTD.

LONG EATON

NR. NOTTINGHAM



FOR SHIP WIRING...

CROMPTON CABLES

TAKE A LOT OF BEATING



CROMPTON PARKINSON LIMITED, ELECTRA HOUSE, VICTORIA EMBANKMENT, LONDON, W.C.2

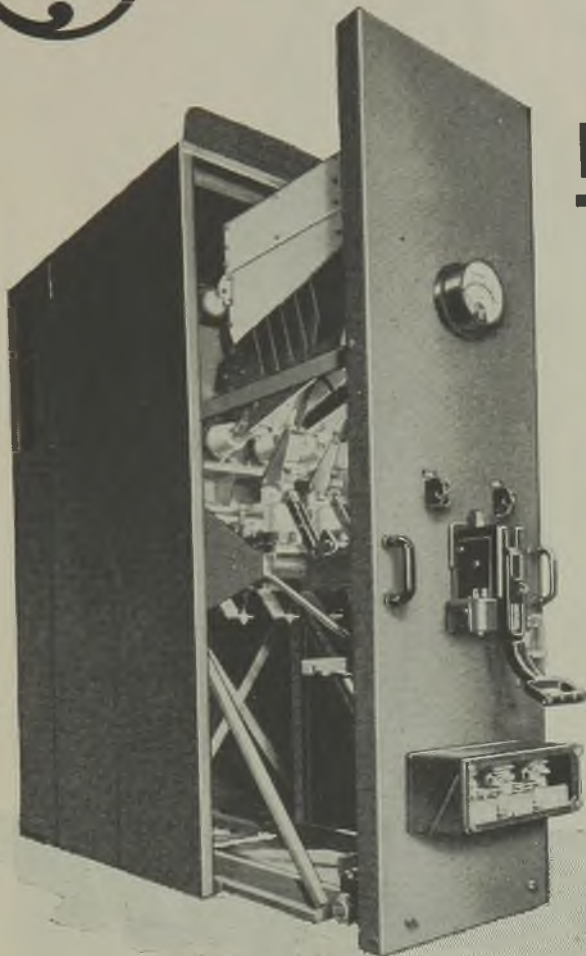
Telephone : TEMple Bar 5911

Telegrams : Crompark, Estrand, London



SWITCHGEAR

OIL-BREAK • AIR-BREAK • AIR-BLAST



AIR-BREAK TRUCK

(OIL-LESS)

Class 'AL'

UP TO
3.3 kV
100 MVA

FULLY-TESTED FOR
SHORT-CIRCUIT DUTY

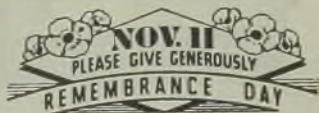
Arc duration
approximately
one half-cycle
at 100% rating.

Long Contact Life.

BTH

THE BRITISH THOMSON-HOUSTON CO., LTD.
CROWN HOUSE, ALDWYCH, LONDON, W.C. 2

A3425



W.11
London

Walsall
means everything

ASCM
Walsall

Walsall

WALSALL CONDUITS LTD. WEST BROMWICH

The advertisement features a collection of various electrical conduits and fittings. At the top left, the word "Walsall" is written in a bold, sans-serif font inside a dark oval, with the phrase "means everything" in a cursive script below it. The central focus is a large, dark, cylindrical fitting with a circular top surface and several ports. Surrounding it are several vertical pipes of different diameters, some with threaded ends. One of the pipes has a circular label with the letters "ASCM" and "Walsall" below it. At the bottom, the word "Walsall" is written in a large, bold, sans-serif font inside a light-colored oval. Below this, a dark horizontal bar contains the text "WALSALL CONDUITS LTD. WEST BROMWICH" in a white, bold, sans-serif font.

'DELARMET' PLASTIC BEARINGS



Designed primarily for use in place of Ball Bearings and where high rotational speeds are not involved. They consist of two components, the rotary portion being of steel and the stationary portion of a special plastic material possessing a practically permanent graphoid surface.

Further details and particulars sent on request.

De La Rue Plastics Ltd

IMPERIAL HOUSE • 84 REGENT ST. • LONDON • W • 1

Telephone : REGent 4901

THE POCKET TESTOSCOPE

Size of a Fountain Pen

A convenient
rapid
fault-finding
instrument
for use
on AC
or DC
Circuits



for use
on
100-750 volts

FOR TESTING

SWITCHES OPEN CIRCUITS
LIVE CONDUCTORS LEAKAGES
EARTHS INSULATION VALUES
NEUTRAL WIRE POLARITY
CONTINUITY, ETC.

The Electrician's Good Companion.

**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 St., Temple. DUBLIN : 2 Church Lane, College
Midland Representative : [Green
W. T. BOWER, 184 Jockey Road, Sutton Coldfield

LIGHT

The Danger Spots!

That corridor with
a blind corner, that
awkward stairway,
that doorway in
a dim corner—
these are the danger spots. Wigan and
Lacent Prismatic Lighting is your solution.



Wigan and Lacent fittings comprise a
full range of units. Fully descriptive leaflets
and specifications are available on request.

HEYES

of Wigan

**HEYES & COMPANY LIMITED
WATER HEYES WORKS, WIGAN**
Agent : F. G. Ketelby, Gazette Buildings, Corporation St.
Birmingham.



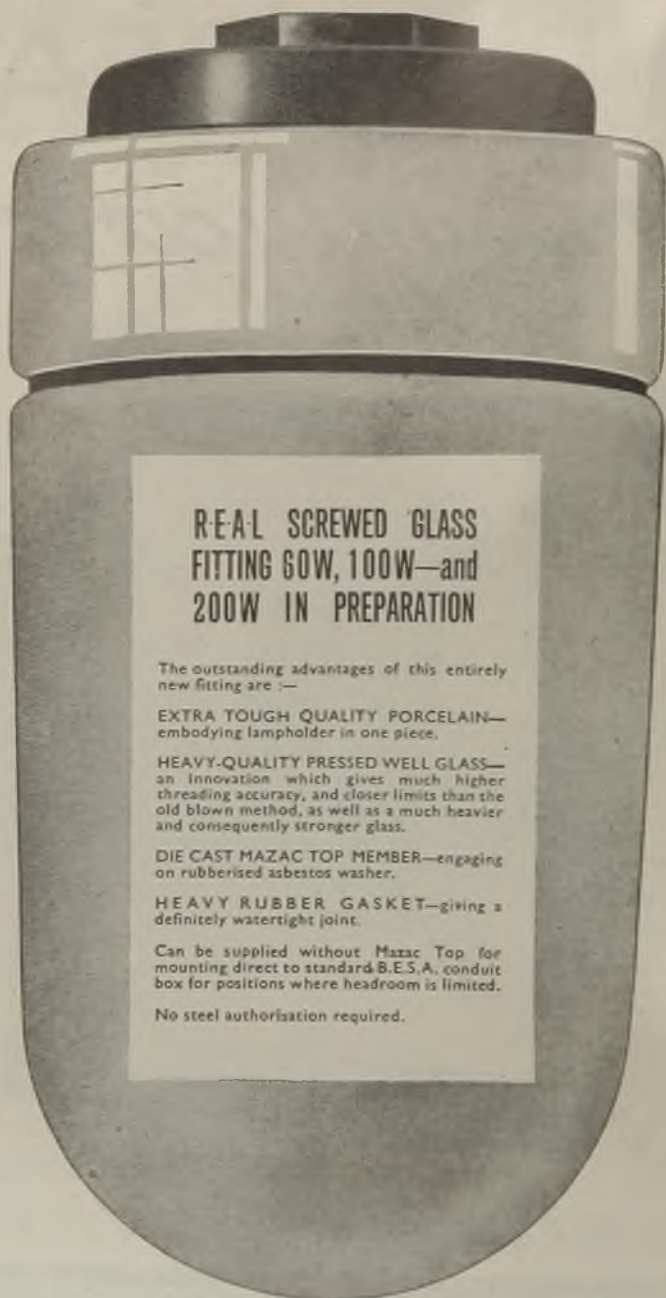
FUSEGEAR

Introducing



May we send you a copy of this new publication?

THE ENGLISH ELECTRIC COMPANY LTD.
— STAFFORD —



**R-E-A-L SCREWED GLASS
FITTING 60W, 100W—and
200W IN PREPARATION**

The outstanding advantages of this entirely new fitting are —

EXTRA TOUGH QUALITY PORCELAIN—embodying lampholder in one piece.

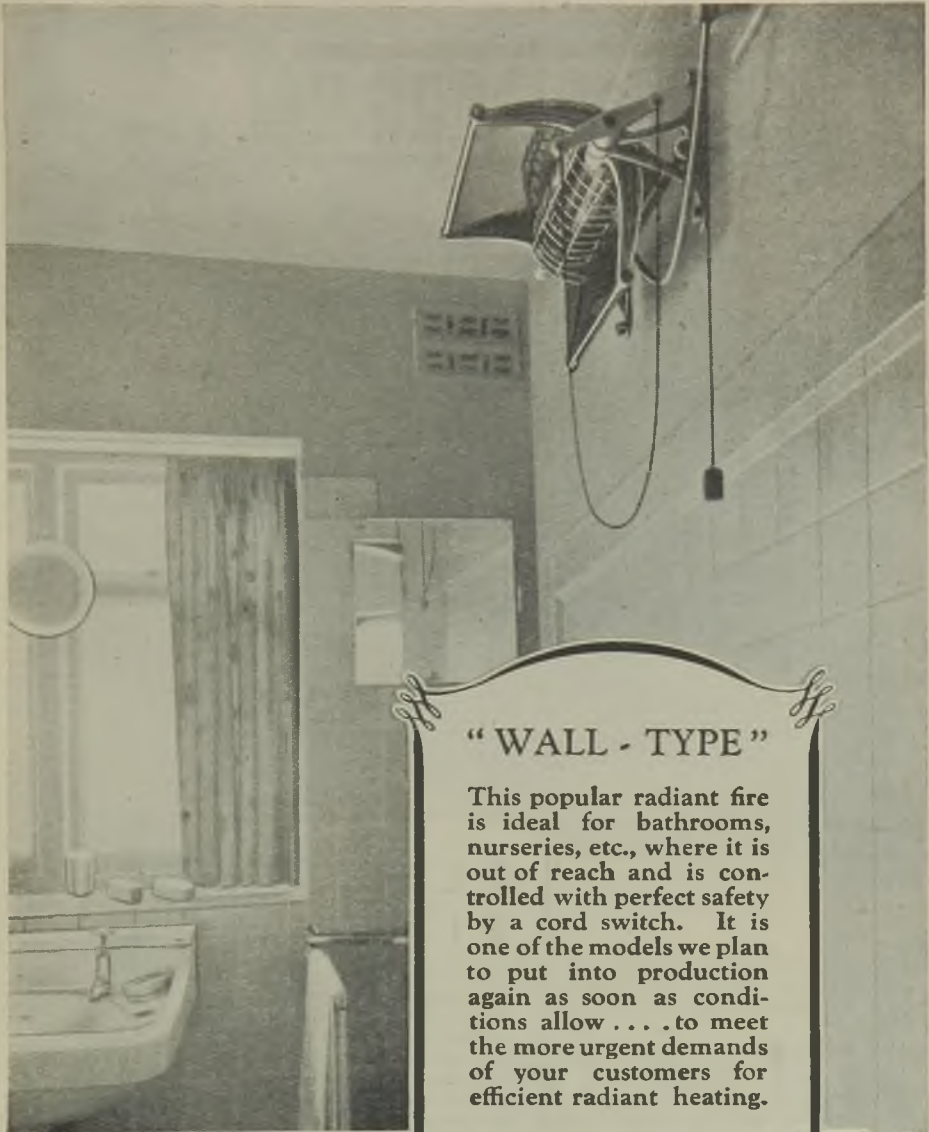
HEAVY-QUALITY PRESSED WELL GLASS—an innovation which gives much higher threading accuracy, and closer limits than the old blown method, as well as a much heavier and consequently stronger glass.

DIE CAST MAZAC TOP MEMBER—engaging on rubberised asbestos washer.

HEAVY RUBBER GASKET—giving a definitely watertight joint.

Can be supplied without Mazac Top for mounting direct to standard B.E.S.A. conduit box for positions where headroom is limited.

No steel authorisation required.



"WALL - TYPE"

This popular radiant fire is ideal for bathrooms, nurseries, etc., where it is out of reach and is controlled with perfect safety by a cord switch. It is one of the models we plan to put into production again as soon as conditions allow . . . to meet the more urgent demands of your customers for efficient radiant heating.

FERRANTI

Radiant Electric Fires

Ferranti Ltd. Moston, Manchester, 10. London Office: Kern House, Kingsway, W.C.2.

CANNING



ELECTRO TINNING

The Modern Process, using Stannate Tin Solution, produces strictly controlled coatings, predetermined and uniform in thickness, even on articles of irregular shape.

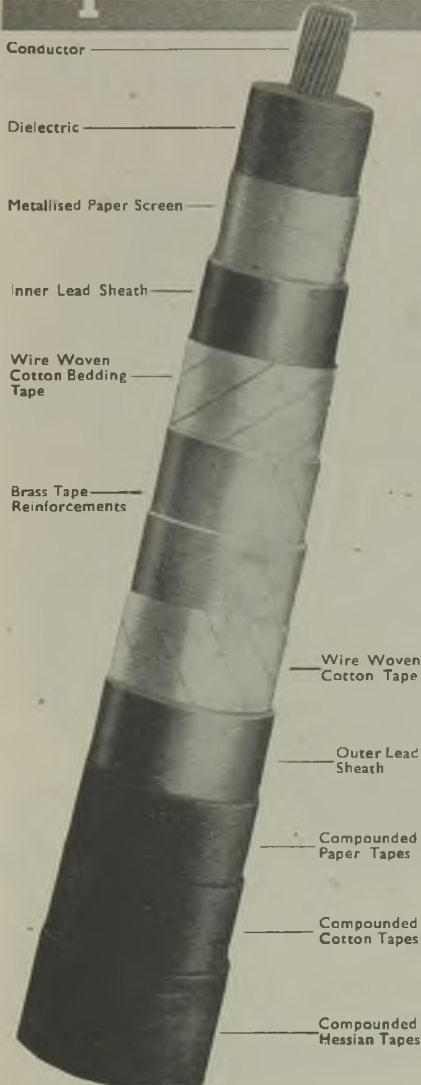
Deposits of reasonable thickness may be built up, which are not possible with a tin chloride bath.

The solution also permits of a faster speed of deposition.

W. **CANNING** & CO. LTD

**GREAT HAMPTON STREET
BIRMINGHAM 18**

A STEP FORWARD in super-tension cable technique



HENLEY 132 kV. IMPREGNATED
GAS CUSHION CABLE

The successful development of a complete technique for the design, manufacture and installation of super-tension cable systems for 132 kV working pressure, marks a definite step forward in the progress of high voltage power transmission.

The constructional details of the HENLEY Impregnated Gas Cushion Cable are indicated in the accompanying illustration. An interesting feature of the design is the incorporation of an inert gas in direct contact with the dielectric. This design is the outcome of prolonged experiment and specialised experience in the super-tension cable field. The close collaboration between the skilled personnel in the HENLEY High Voltage Research Laboratories, the Works and the Contract Department has achieved this outstanding success.

We shall be pleased to supply further details of HENLEY Super-Tension Cables and to discuss your transmission problems.

HENLEY CABLES

Famous for over a century

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.
MILTON COURT · WESTCOTT · DORKING · SURREY

PHONE: DORKING 3241 (10 LINES)
TELEGRAMS: HENLETEL, DORKING

**UNDER
ALL
CONDITIONS!**



**PIRELLI-GENERAL
CABLES**

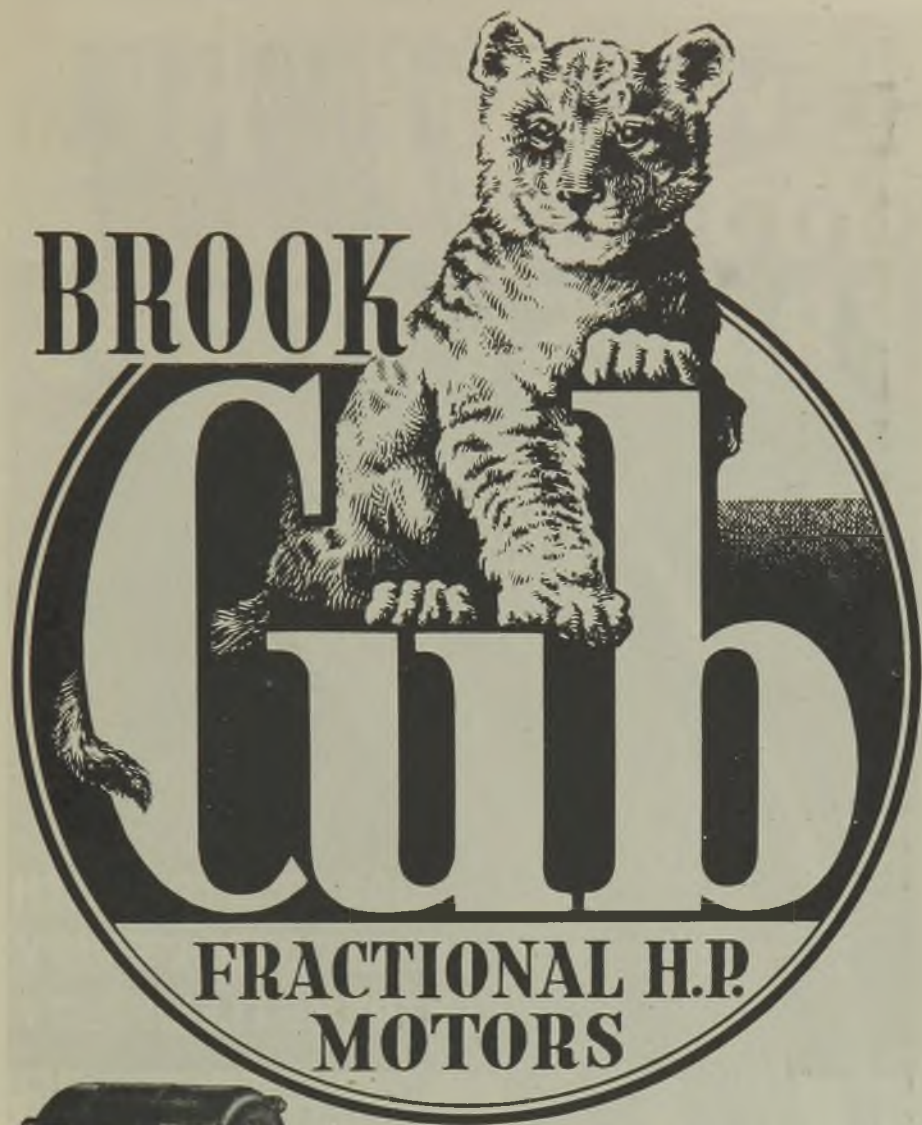
**CARRY THE
CURRENT**

WITH

**UNFAILING
RELIABILITY.**



PIRELLI-GENERAL
CABLE WORKS, Ltd., SOUTHAMPTON.



**FRACTIONAL H.P.
MOTORS**



ALTERNATING CURRENT ONLY
BALL BEARINGS • LOW IN COST

B R O O K M O T O R S L I M I T E D
E M P R E S S W O R K S • H U D D E R S F I E L D



Lewcos
REGD

COPPER

BRAIDS & CORDS



GREAT STRENGTH
HIGH CONDUCTIVITY
EXTREME FLEXIBILITY

**We specialise in MACHINE
BRAIDS AND PLAITS of
every description,**

Our Price List covering a wide range
of copper Braids and Cords will be
sent on application.

THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED
CHURCH ROAD . LEYTON . LONDON, E.10

INDUCTION INSTRUMENTS

TYPE FC



Modern instruments for Modern Switchboards—Induction ammeters, voltmeters, watt-meters, power-factor meters, frequency meters and synchrosopes—all available in round sector and edgewise cases which are uniform in appearance and dimensions with "Metrovick" moving iron, moving coil and dynamometer instruments.

Outstanding features —

- ★ Long, clear scales.
- ★ Robust movements.
- ★ 1st grade accuracy.



METROPOLITAN Vickers

ELECTRICAL CO., LTD. TRAFFORD PARK - MANCHESTER 17.

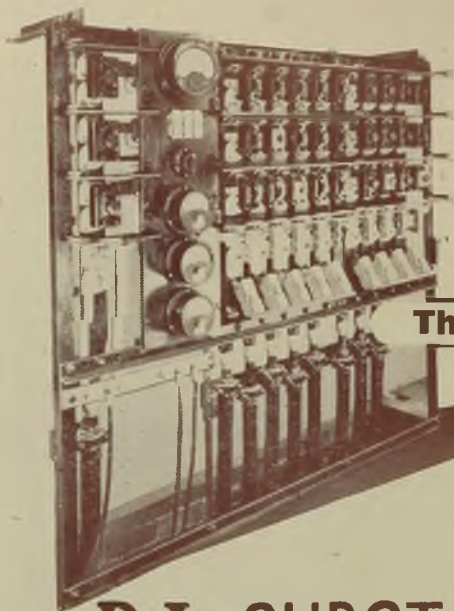
GY401



Descriptive leaflets will be sent on request

Light aids production

IMPROVE YOUR LIGHTING in consultation with METROVICK'S ILLUMINATING ENGINEERS



The Engineer concerned ...

Standard L.T. Substation Panel with thermal maximum demand indicators and voltmeter, earthing bar and duplicate earth connections.

Lower illustration shows a Standard L.T. Substation Panel 250 kVA Capacity.

B.I. SUBSTATION PANELS

Built up from tailless type units, an original **B.I.** development, these panels provide maximum adaptability of layout in a neat and compact design. The **B.I.** Technical Advisory Service will gladly assist Engineers engaged in developing or replanning L.T. Distribution Centres.

Particulars on request.

... expressed entire satisfaction

BRITISH INSULATED CABLES LTD.

Head Office: PRESCOT, LANCS.
Telephone: PRESCOT 6571



Electrical Review, October 27, 1944

BALDWIN'S

L I M I T E D



ELECTRICAL STEEL SHEETS
FOR TRANSFORMER AND DYNAMO WORK

ELECTRICAL STAMPINGS
OF ALL DESCRIPTIONS

SPECIAL ALLOY SHEET FOR MAGNETIC TEMPERATURE
COMPENSATION - HIGH FREQUENCY WORK - RELAYS

LONDON OFFICE: P.O. BOX 255. 6, BROADWAY, S.W.1.



QUALITY-



Recommend your customers to install Elasta Lamps, the lamps they can rely upon.

Elasta

E.L.M.A. LAMPS
MADE IN ENGLAND

ELECTRIC LAMPS

POPE'S ELECTRIC LAMP CO., LTD.
5, EARNSHAW STREET, NEW OXFORD ST., LONDON, W.C.2

Telephone : TEMple Bar 6074.

Telegrams : "Duramentum, Westcent, London."

Branches holding stocks from which supplies can be obtained :-

MANCHESTER :

18 Pool St., Market Street.

Tel. : Deansgate 5687.

Grams :

"Pope's, Deansgate 5687."

BIRMINGHAM : 3 Grosvenor Chambers,

Broad St. Corner, Broad Street.

Tel. : Midland 2580.

Grams : "Pope's, Midland 2580, Birmingham."

LEEDS : 6 Park Square.

Tel. : Leeds 22119.

Grams :

"Pope's, Leeds 22119."

LEICESTER :

89 London Road.

Tel. : Leicester 59028.

Grams :

"Pope's, Leicester 59028."

BRISTOL :

123 Victoria Street.

Tel. : Bristol 23239.

Grams : "Pope's, Bristol 23239."

BELFAST (Managers : Campbell, Gardner & Co.) : 27 Franklin Street.

Tel. : Belfast 25171.

Grams : "Camergard, Belfast."

WESTALITE

Rectifiers

For

D.C. POWER SUPPLIES

TO OPERATE

BRAKES • CHUCKS

CLUTCHES

SEPARATORS

CONTACTORS

AND SIMILAR

ELECTRICAL PLANT

Direct from

A.C. MAINS

ALSO FOR

Battery Charging

*TYPICAL 1kW
RECTIFIER EQUIPMENT



THE R, R.F., AND R.T.F. SERIES OF



RECTIFIER EQUIPMENTS

furnish a range of sets suitable for numerous industrial applications requiring direct current of from 17½ watts up to 8 kW.

For use direct on Single or 3-phase A.C. Supplies they incorporate "Westalite" Selenium Compound Full-wave Metal Rectifiers.

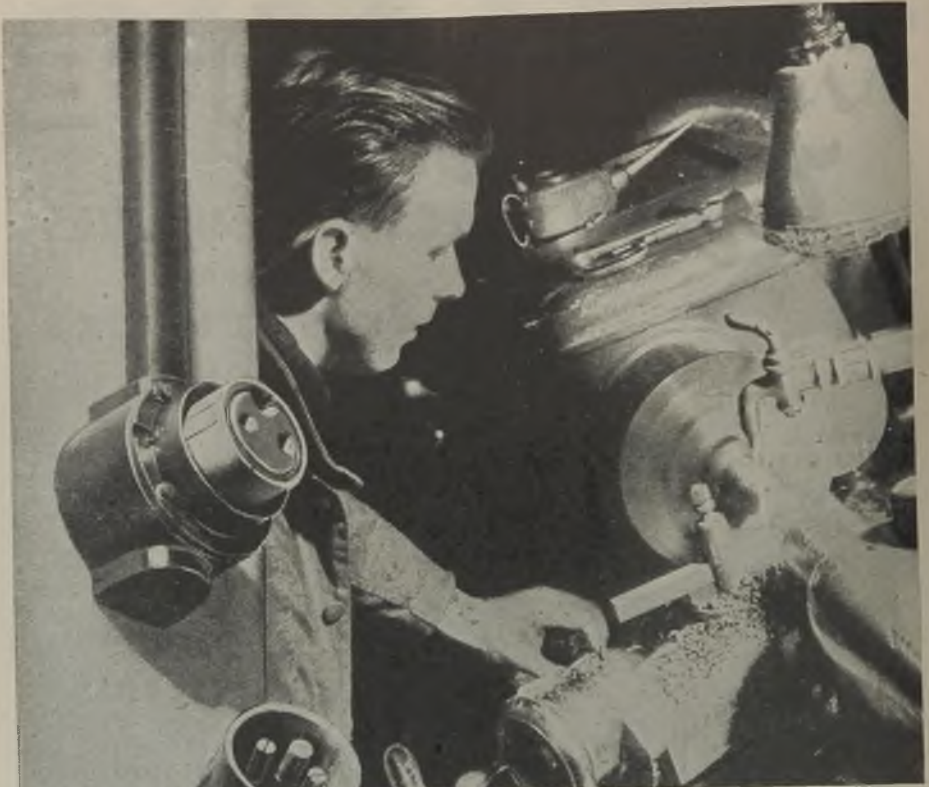
No moving parts. No filaments.

At present available to priority orders only.

Full details are given in Data Sheet No. 23.

Send for a copy to:—

WESTINGHOUSE BRAKE & SIGNAL CO., LTD.
Pew Hill House • Chippenham • Wilts.



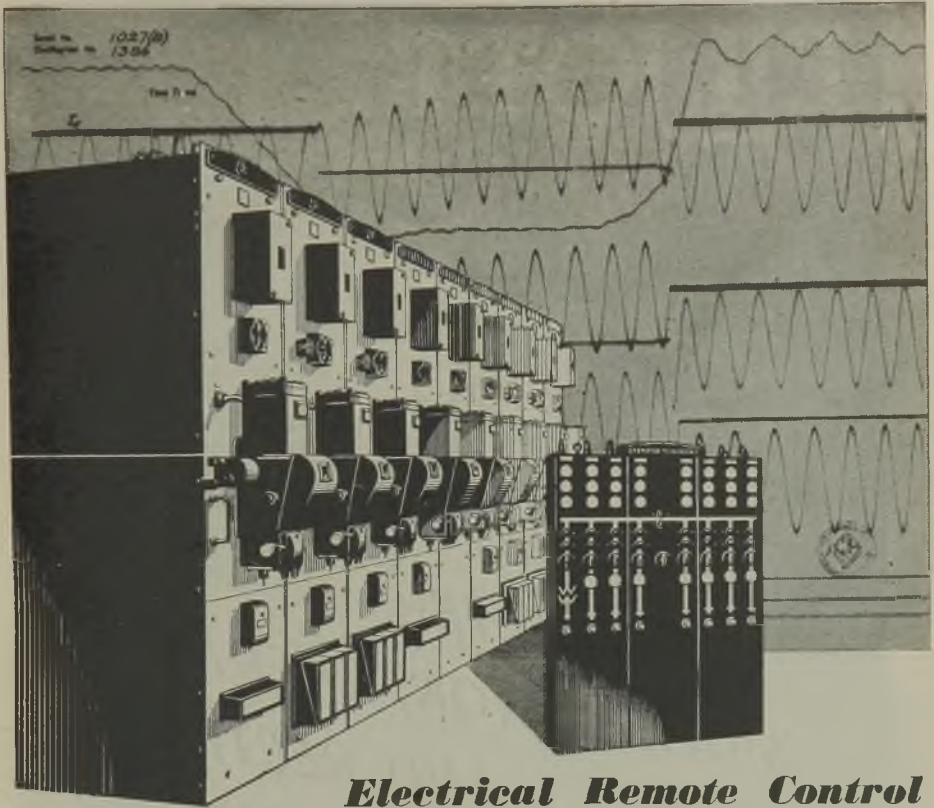
Metal-Clad
B.S.196 PLUGS AND SOCKETS
For Simple and Safe
Supply of Current in

**FACTORIES • WORKS • SHIPYARDS
 AND ALL OTHER INDUSTRIAL PLANT**

**5-AMPERE 15-AMPERE 30-AMPERE
 WITH SCRAPING EARTH CONNECTIONS**

- — STRONG CONSTRUCTION
- — SOUND EARTHING
- — PROTECTED PLUGS
- — SHIELDED CABLE-ENTRY

REYROLLE
 HEBBURN-ON-TYNE ENGLAND



Electrical Remote Control

This 9-panel Crompton D.A.2A Truck-type Switchboard is fitted with solenoid-operated circuit breakers, electrically remote controlled from the panel shown. The declared rating is 150 MVA, system 11 kV, 3-phase, 50 cycles. Testing at the Crompton Short-Circuit Testing Station made certain of good performance at this rating.



CROMPTON PARKINSON
LIMITED

ELECTRA HOUSE, VICTORIA EMBANKMENT, LONDON, W.C.2, and Branches

ELLIOTT

MEASURING

Instrumento



MOVING COIL,
DYNAMOMETER,
MOVING IRON, THERMAL
AND RECTIFIER
TYPES



Accurate & Reliable

MADE BY—

**ELLIOTT
BROTHERS
(LONDON) LTD.**

CENTURY WORKS, LEWISHAM, S.E.13.

Tel. : TIDEWAY 3232



Why not have 'PHOTOSTAT' on the premises?

If your work requires considerable numbers of facsimile copies, why not install a "Photostat" machine so that these copies can be made on the premises?

The "Photostat" provides the simplest, quickest and most reliable method of producing facsimile copies in monochrome of plans, charts, statistical tables, hand-writing, wash or line drawings and photographs. The operation of the machine is very largely automatic and skilled labour is not required.

It will be to your advantage to include "Photostat" in your post-war planning. Consult us about its applications; our extensive experience of all kinds of business problems in which "Photostat" has been of assistance is at your service.

Write to

PHOTOSTAT LTD.

Dept. 1, Adelaide House, King William Street, London, E.C.4. Phone: MANsion House 8226.

Resistance Wires

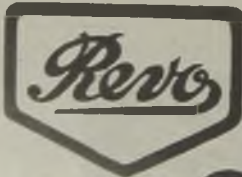
Insulating Beads

**Lionel Robinson
& Co. Ltd.
3 Staple Inn
London, W.C.1
Telephone • • HOLborn 6322**

BRITAIN LIGHTS UP



REVO MOONLIGHTING AT LLANDUDNO
 one of the many Cities and Towns
 throughout the Country now equipped with



MOONLIGHT STREET LIGHTING CONVERSION FITTINGS

Attachments for converting existing Revo 'Starlights' or complete ready-wired 'MOONLIGHT' Units for use in existing lighting fittings, or for new positions to give 0.02 or 0.2 F.C. intensity now in production.

Early delivery guaranteed

REVO ELECTRIC Co. Ltd. TIPTON, Staffs.



**THE CONSISTENT
ACCURACY OF
METALLIC
STEEL
CONDUITS
MEANS TIME SAVED
IN FITTING**

LOOK FOR THE
ASCM-MARK

ON EVERY
LENGTH..

METALLIC SEAMLESS

TUBE COMPANY LIMITED
LUDGATE HILL BIRMINGHAM
PHONE CEN 7102 GRANS FLASK BIRMINGHAM

Sales Depots : London - 88 Goswell Road, E.C.1
Newcastle-on-Tyne - - - St. John Street
Leeds - 5 York Place Swansea - 1 Grove Place
Glasgow - - - - 137a, St. Vincent Street



**'What,
no larder!'**

SHE may consider the idea of a kitchen without a larder somewhat revolutionary. But actually, with a refrigerator of ample size, a larder is quite unnecessary. With this in view, Prestcold engineers have designed a model of 4½ cub. ft. capacity for mass-production at a popular price. It would hold sufficient perishable goods for a family of four. Non-perishable foods would be kept in kitchen cupboards. The "no-larder" kitchen has been proved satisfactory in actual practice, and architects and builders will be quick to realise the constructional saving to be effected. For the future health of the nation a refrigerator is a desirable addition to every home. For the "quick-frozen" foods which will be available after the war, refrigerators will become an absolute necessity to all. The following advantages of the Prestcold design are well worth noting.

Storage capacity of approximately 4½ cubic feet, which will hold all the perishable foodstuffs for a family of four.

Larder space rendered unnecessary. Dry goods and non-perishable foodstuffs would be kept in kitchen cupboards.

Waist-high refrigerator door, allowing access to interior without stooping.

Height adaptable by varying position of supporting frames.

Refrigerator can be built into kitchen fittings with cupboard space above and below it.

Design provides for adequate ventilation of mechanism without the necessity for special air-bricks or ducting.

GODWIN

Electric

PUMPS

**FOR WELLS &
BOREHOLES OF
EVERY DEPTH**

TYPE E.O.E. for Wells and Boreholes exceeding 25 ft. in depth. Totally enclosed self-lifting mechanism of Patented design. Precision workmanship throughout. Pump can be supplied complete with ½ h.p. Electric Motor or with flat and loose pulleys for belt drive. Capacities from 50 gallons per hour.

● We invite Agents to write for illustrated literature, prices and discounts.

H. J. GODWIN LTD.
QUENINGTON, GLOS.

Telephone : Cain St. Aldwyn 36 (3 lines)

Telegrams : Pump, Quenington

PRESTCOLD

Refrigeration

A PRODUCT OF THE PRESSED STEEL COMPANY LIMITED

CRYSELCO

CONSTRUCTED

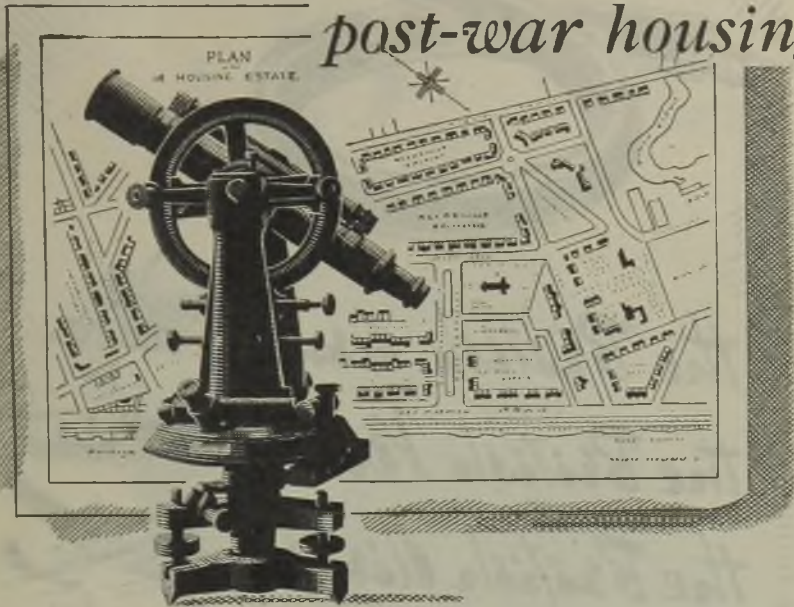
TO CONSERVE



*Save light
- save FUEL*

CRYSELCO • LIMITED • BEDFORD

The New Craftsmanship for past-war housing



The millions of new houses which are and will be needed in this country—“prefabricated” and brick built alike—will call for ample supplies of standardised electrical products of good design, quality and durability.

The M.E.M. factory is fully equipped to turn out switches, fuseboards, and other electrical gear immediately the change over from war priorities to peacetime production becomes permissible. By full mechanisation and skilled planning M.E.M. engineers have created the New Craftsmanship which might be described as *quality in quantities*.

Quality depends upon good design, good materials and tested construction. Quantity production is the result of mechanisation and organisation. The M.E.M. factory is self-contained and self-sufficient. It produces good electrical gear from start to finish—good all through.



MEM 8"
All-Insulated
Switch and Fuse



**SWITCHGEAR • MOTOR STARTERS
FUSEGEAR • ELECTRIC FIRES**

MIDLAND ELECTRIC MANUFACTURING CO. LTD., TYSELEY, BIRMINGHAM, 11
London Showrooms and Stores: 21-22 Rathbone Place, London, W.1 • Manchester Showrooms and Stores: 48-50 Chapel Street, Salford, 3



the British Army
the British Navy
the British Air Force
USE THEM
Why Not You?

ASHTON

CABLES & FLEXIBLES

Used in the activities of all the fighting services and various government departments "ASHTON" Cables and Flexibles are in the front line for quality and reliability. There are types and finishes including P.V.C. (Plastics) for every purpose, all manufactured under the strictest laboratory control throughout. Present supplies available for essential purposes.

ACF.1

AERIALITE LTD
 STALYBRIDGE CHESHIRE

WHEREVER A.C.
WELDING FINDS
A NEED . . .

J. & P.

. . . FINDS THE
ANSWER!



THE J. & P.
SINGLE

OPERATOR A.C.

WELDING SET IS FULLY DESCRIBED
IN LEAFLET No. G5. Ask for your copy

JOHNSON & PHILLIPS LTD.,

CHARLTON, LONDON, S.E.7

Telephone : Greenwich 3244 (13 lines).

Telegrams : "Juno," Charlton, Kent



The mark that means that "little more" in quality




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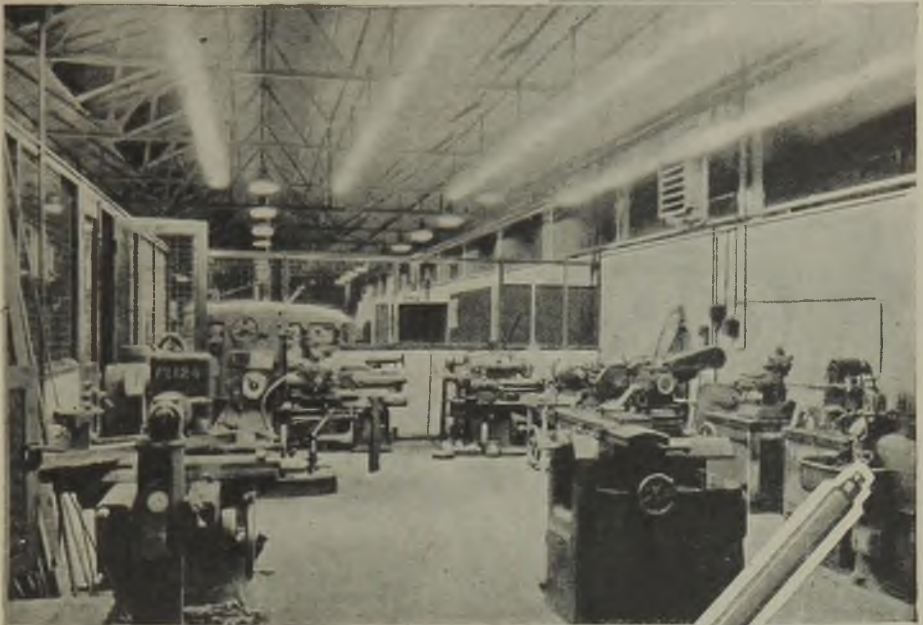
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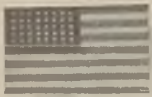
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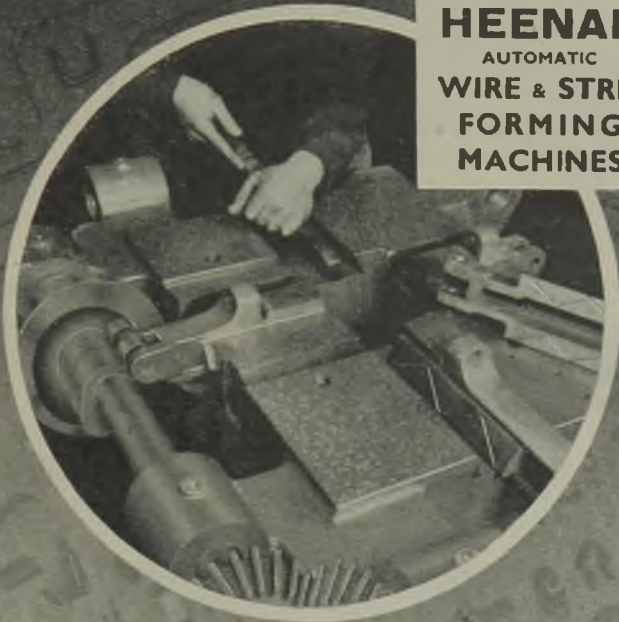
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ELECTRICAL REVIEW

October 27, 1944

Contents :—

	Page
Editorial—War Record of the Grid	577
Colliery Distribution	580
New Indian Industries	584
Future Load Conditions	585
The Public's Choice	586
The Grid and the Nation	587
Portable Tools. By R. S. Bennett, A.M.I.E.E., A.M.I.Mech.E.	588
Rules and Registration	589
Forthcoming Events	590
Correspondence	591
Personal and Social	593
Electrical Exports in Wartime	595

Managing Editor :
Hugh S. Pocock, M.I.E.E.
Technical Editor : C. O. Brettelle, M.I.E.E.
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<i>Contents continued :—</i>	Page
Experimental Research	597
Electric Heaters. By R. D. Reynolds, A.M.I.E.E.	598
Commerce and Industry	599
Electricity Supply Questions	602
Fire Resisting Cable	603
Brazilian Post-War Plan	605
Electricity Supply	606
Financial Section	607
New Patents	611
Contract Information	612
<i>Classified Advertisements</i>	67
<i>Index to Advertisers</i>	76

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872



Vol. CXXXV. No. 3492.

OCTOBER 27, 1944

9d. WEEKLY

War Record of the Grid

Contribution to Victory

NOT often has the saying "they builded better than they knew" received so pointed an application as it has in regard to the British grid during the past five years. Although its main features of co-ordinated generation and power-station interconnection came about from a realisation during the last war that stations for serving local areas exclusively had proved inadequate under modern conditions, its design some years later had in view the maintenance of this country's industrial position in what then promised to be an era of peaceful progress, the accent being on cheapness of electricity.

Nine years have passed since Mr. Harold Hobson (now Chairman of the Central Electricity Board), in a presidential address to the Association of Supervising Electrical Engineers, gave what may be termed an interim report of the operation of the grid and of the increasing advantages it could reasonably be expected to bring to industry and the public at large. These expectations were generally recognised to be in course of fulfilment when the present war broke out. Subsequent happenings provided the main theme for this year's presidential address of Mr. E. R. Wilkinson to the same Association.

Avoidance of Prolonged Interruptions

Although for security reasons he dealt with the subject on broad lines, Mr. Wilkinson was able to indicate clearly enough how inestimable has been the contribution of the organisation he serves to the allied victory and also why, if the grid had not existed, something of the

kind would have had to be hastily improvised with the consequent detraction from the war effort. When it becomes permissible to dot the i's and cross the t's regarding the manner in which prolonged interruptions of supplies to individual areas were prevented (trailing cables from runaway barrage balloons causing more trouble than enemy planes), appropriate deductions from the particular to the general may be found to have possessed unusual validity.

Precautions Justified

The steps taken to ensure war preparedness appear to have been well justified in the event. Some of them, including the concrete housings for turbo-alternators, such part of the protection of outdoor transformers as may reduce output and the bricking in of windows, will, no doubt, be dispensed with as quickly as circumstances allow. Others, however, as exemplified by connections to the grid at more than one point, improved segregation of plant items and, possibly, the stocks of emergency spares, are likely to prove permanent assets. So, too, is the habit engendered among power-station engineers, which the Board has fostered, of pooling their experiences, while useful experience of another kind has been gained by the managers of some undertakings in negotiations for connecting up loads of a magnitude altogether beyond the scope of small power stations.

With the accent shifted from cheapness of electricity to security of supply under extreme stress, economy in generation has been naturally affected adversely as a

result of the policy of spreading the total load over a large number of stations. This has been a temporary expedient, but something better in the way of thermal efficiency than a restoration of the *status quo* is to be looked for in post-war plant. Indispensable as the grid has proved itself to be in keeping the supply going with so high a degree of reliability in crises, its value in making electricity widely available, while less spectacular, has also been of the first importance and is, moreover, a lasting asset.

EARLY in 1941 the Board of Trade suspended publication of the brief summary of overseas trade which had been issued since the beginning of the war, it being felt that even in this abbreviated form the figures were capable of conveying useful information to the enemy. It occasions no surprise to learn, from the details now released, that the country's export trade has drastically declined during the interval. The electrical goods group has not suffered so much as some of the other classes, possibly because it holds a high place as regards essentiality and has been less affected by the closing of Continental markets, the bulk of pre-war exports going to Empire countries. It is interesting to recall that in the first year of the war exports of electrical goods, as apart from machinery, displayed a remarkable buoyancy and in May, 1940, when the "export for currency" drive was on, reached the record total of £1,477,336. The pre-war trend had been noticeably upwards, and it may justifiably be said that, but for the present conflict, electrical apparatus manufacturers would have met with growing success in overseas markets.

THE position with regard to generators, motors and the like was, in the earlier trade summaries, obscured by their inclusion in the large machinery group. That there exists an urgent demand from the Dominions for the supply of British power plant has, however, been made clear by the reports of Dominion electricity undertakings, whose representatives have in some cases visited this country in order to expedite delivery. One of the primary considerations from the customer's viewpoint after the war will be the time

required to fill an order, and it will be vital in the nation's interests that manufacturers shall have the necessary man-power and materials to be competitive in this respect.

DESPITE the necessity for building up and expanding our post-war export trade, Mr. Hugh Dalton, President of the Board of Trade, made it clear in the House of Commons last Friday that what might be described as a "limited priority" was to be given to goods for the home market. The reason for this is obvious. Long-suffering though the British public is, it would scarcely regard kindly the export of goods badly needed in this country. Mr. Dalton's statement is, however, somewhat at variance with previous announcements and if it is to be carried into effect facilities for manufacturers to develop their post-war products must be granted without delay.

So much attention has lately been given to the subject of plugs and sockets in general, in which round pins seem to have been taken for granted, that nothing has been heard of the flat pin for quite a time. The I.M.E.A. is not going to let the matter rest, however. It has been endeavouring to persuade the B.S.I. to produce a standard specification for flat-pin plugs. There has been delay and the Council (according to the October *I.M.E.A. Journal*) "has expressed its strong dissatisfaction of the way in which the question has been dealt with." It is making further representations, being of the opinion that there is a sufficient number of undertakings using this type of plug to warrant its being standardised. As an addendum it may be remarked that B.E.A.M.A. makes a statement on the plug position in general in this issue.

IN its memorandum on the electricity supply industry, published last year, the Incorporated Association of Electric Power Companies quoted with approval some of the principal passages of the McGowan Report, a report which the Government of the day accepted as a basis for its reorganisation plan as set out in a subsequent White Paper. Mr. F. W. Lawton, city electrical

engineer of Birmingham, speaking as chairman of the South Midland Centre of the I.E.E. last week, also considered that the McGowan (and Weir) Reports provided a "firm and impartial foundation" for future developments. He maintained that it was inadvisable to separate distribution from generation in a large and complex area and he spoke appreciatively of the work of the Commissioners and Central Board in co-ordinating the industry without destroying individual initiative, which nationalisation would tend to do.

Rate of Growth ANY move that would seriously disturb the rate of growth of electricity supply is to be deprecated.

This gives the text of Mr. H. W. Grimmitt's chairman's address to the I.E.E. Transmission Section, in which he submitted evidence that all anticipated developments for many years could be catered for within the range of a steady continuance of the percentage for the past ten years, which he regards as satisfactory. Any considerable departure from this, either up or down, would disturb the economic structure and possibly lead to unemployment. The same argument can be applied to individual undertakings, as local percentages should not differ much from the national average. In arranging for mains extensions, estimates should be based as far as practicable on the assumption of steady growth of load during the next twenty years.

Good Work THE "liberation" of the people of the South-East Coast towns from the enemy's long-range guns and flying bombs has brought them relief after a long period of stress and strain which will be appreciated by nobody more than the electricity supply workers. These men have received high praise from the Electricity Commissioners and the Ministry of Fuel and Power. During the past three or four years, for instance, Mr. R. G. Widgery, chief electrical engineer of Dover, and his staff have been called upon to keep the system running under almost continuous bombardment and at no time has the supply been cut off for more than a few hours to isolated groups of consumers. The electricity supply men of Dover and the other towns involved take their place with their London confreres as real heroes of the "Home Front."

Compulsory Regulation IN spite of the damper put on its proposals by the Institution of Electrical Engineers, the National Committee on Statutory Wiring Regulations and Registration intends to continue its campaign. There is by no means unanimity within the industry regarding the desirability of close control of the electrical contracting business. Although it is certain that no section is in favour of shoddy installation work, opinions vary as to the implications of the Committee's plan and as to the possibility of ensuring its effective application. Apart from the actual installations, such questions arise as the approval and inspection of appliances, and the case of the householder who wants to do his own repairs or even extensions.

Supply Authorities' Attitude THE position of the electricity supply authorities in this matter is equivocal. The company undertakings are not represented on the Committee; the municipal authorities are, but their attitude is doubtful. By an unfortunate concatenation of circumstances their representatives were prevented from attending the Press meeting which is reported in this issue. We do not question the reasons for the withdrawal of the manufacturers and the wholesalers from the Committee, but this leaves unrepresented two important sections of the industry which are really concerned in the matter—more concerned, for instance, than the E.P.E.A. which is represented.

Influence of the I.E.E. THE views of the I.E.E. have been referred to. It is the opinion of some members of the Committee that the matter is not one upon which the Institution is constitutionally competent to pass judgment. However that may be, and quite apart from the merits of the National Committee's proposals, it is a fact that the Government Departments look upon the I.E.E. as the only organisation really representative of the whole electrical industry. The industry knows that, except in strictly technical matters (which compulsory registration is not), this is not the case, but the Governmental idea can be appreciated when it is considered how sectionalised the industry is and how the interests of the sections overlap.



Colliery Distribution

From Supply Intake to Coal Face

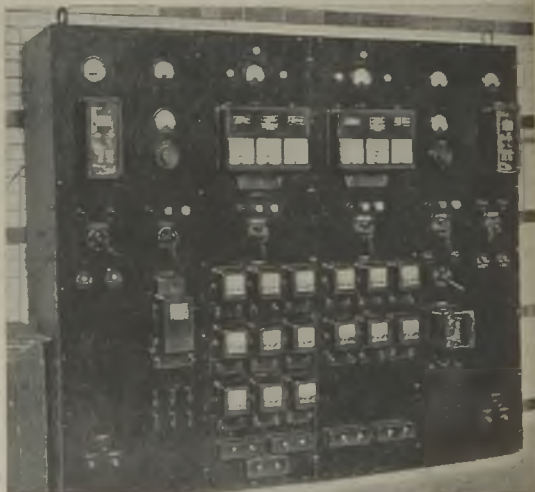
IN earlier articles we have dealt fully with the electrical side of the coal winning processes at the recently completely electrified Treeton Colliery of the Rother Vale Collieries Branch of the United Steel Companies, Ltd. It is now proposed to outline the electrical distribution system from the point of supply intake to the coal face, but, as this colliery is electrically interconnected with others in the group, reference must also be made to the general system from which the whole of the group is supplied.

The supply to the group is taken from the 66-kV system of the Yorkshire Electric Power Co., which, of course, is supplied from the power stations at Ferrybridge and Thornhill. Alternative supplies are provided from the undertaking's 11-kV local distribution system. An agreed supply of 7,000 kVA is afforded at the Treeton Colliery for use there and at the Beighton Brookhouse Colliery by means of a 66/11-kV outdoor substation through two 5,000-kVA 66/11-kV transformers. This supply undertaking's outdoor substation (title illustration) is a little distance from the Treeton Colliery, where the supply is actually provided and metered at 10.5 kV at the colliery substation.

Of the agreed 7,000 kVA, 4,000 kVA is normally required at Treeton and 3,000 kVA at Beighton Brookhouse, and in the latter case the supply is transmitted by an 11-kV overhead line interconnector provided by the supply undertaking for the sole use of the colliery company which can thus take a

supply at one point only and thereby obtain the benefit of diversity. A duplicate 66-kV substation at Beighton serves mainly as a standby in the event of the Treeton 66-kV substation being put out of use for any reason by operating the overhead line interconnector in the reverse direction.

Normal metering is effected in the Treeton colliery power house where there are two sets of Trivector metering equipment, one

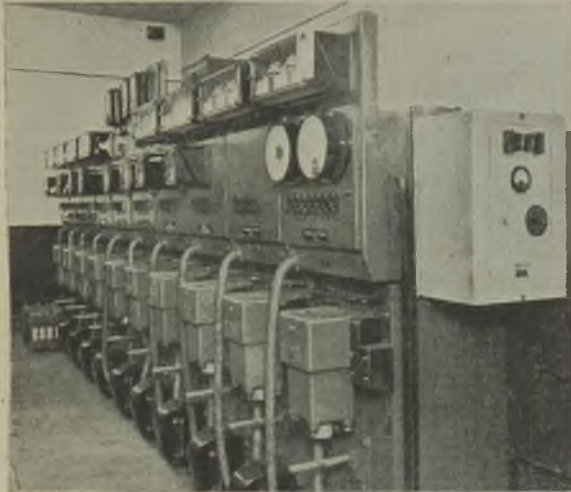


Normal metering is effected in the colliery power house on a board which is also equipped for remote control of the 66-kV outdoor type switchgear

for checking purposes. In addition, to meet the colliery company's convenience for internal costing, single-phase Wh meters are provided on the Beighton interconnector.

For a further check single-phase Wh meters are provided on the two 5,000-kVA transformers, by which means a comprehensive check is obtained on the Trivector metering system.

Duplicate 11-kV feeders are run from the point of supply to the colliery company's 11-kV board in the Treeton colliery substation for distribution from this point. The 11-kV switchgear consists of one ten-panel metalclad air-insulated Ferguson Pailin switchboard, the individual units of which have a rupturing capacity of 150 MVA.



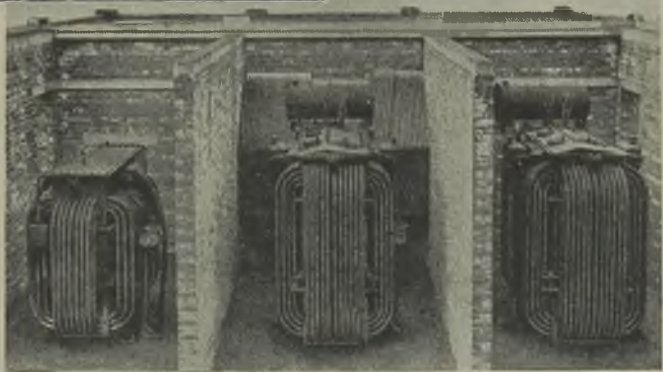
Above: The individual 11-kV units in the colliery substation have a rupturing capacity of 150 MVA
Right: Three 11/3-3-kV star-star connected transformers adjacent to the colliery substation supply direct to the main colliery distribution board

From three of these panels supplies are afforded to three 11/3-3-kV transformers, two of which are of 2,500-kVA capacity and the remaining one of 1,250 kVA. These Ferranti transformers are naturally-cooled outdoor equipments and are connected star-star. For distribution at 3.3 kV a 15-panel totally-enclosed vertically-isolated horizontal draw-out air-insulated Ferguson Pailin metal-clad unit switchboard is installed.

Of the fifteen panels, three are incoming units and the twelve outgoing units serve the following equipment: Compressors, surface lighting transformers, screens, washery, 0-0

shaft cable, 0-06 shaft cable, 0-1 shaft cable, Meadow pump and sawmill, upcast winder, downcast winder, 3.3-kV/500-V surface transformer and ventilating fan. The feeder to the compressor is taken directly to the five-panel flush control board referred to in the "Coal Winning" article (*Electrical Review*, September 8th, p. 328). The surface lighting transformer is an 80-kVA, 3.3-kV/110-V, three-phase equipment. The screens feeder serves directly the 100-HP group drive referred to in the "Modern Coal Treatment" article (*Electrical Review*, October 6th, p. 475.)

The washery feeder is connected through a 12.25-kVA reactor to a five-panel English Electric switchboard in the washery buildings for controlling the supply to a 200-HP group drive for the whole washery with a duplicate for this feed, a 3.3-kV/500-V, 150-kVA transformer serving the low-voltage supply to the slurry plant and screens through a five-panel G.E.C. switchboard. From one panel of this the 35-HP motor for the picking bands and six 5-HP motors for the dry-cleaning plant are fed through a subsidiary distribution board. The fourth panel controls an outgoing feeder for the main office supply situated a little distance from



the colliery and Treeton village lighting and the fifth panel, of course, serves for the incoming supply.

The shaft cables are all cleated down the downcast shaft wall at 25-yd. centres by 5-ft. wooden cable cleats. These cables are fed to the main underground substation which is about 150 yd. from the pit bottom on to an English Electric seven-panel flame-

proof switchboard of the totally-enclosed draw-out type with isolating oil circuit-breakers having a rupturing capacity of 25 MVA and a carrying capacity of 150 A. A further panel has been added to control

supply is afforded to the five-panel gate-end switchboard also referred to earlier.

All the gate-end switches and the two-panel board at the loading point are equipped for push-button remote control of the face equipment. The gate-end panels are also equipped with earth leakage and overload protection. From the five-panel board trailing cables serve the coal cutters, high-frequency drills and the face conveyors; these cables are of the collectively screened type.

The feeders to the electric winding engines referred to in an earlier article are taken directly to the circuit-breakers governing the respective equipments. The surface transformer supplies various auxiliary circuits and the feeder to the ventilation fans is connected directly to the stator oil circuit-breaker in the fan house.

In addition to the supplies provided at the Treeton and Beighton Brookhouse Collieries, arrangements have been made by the colliery company to provide a supply to Thurcroft Colliery to

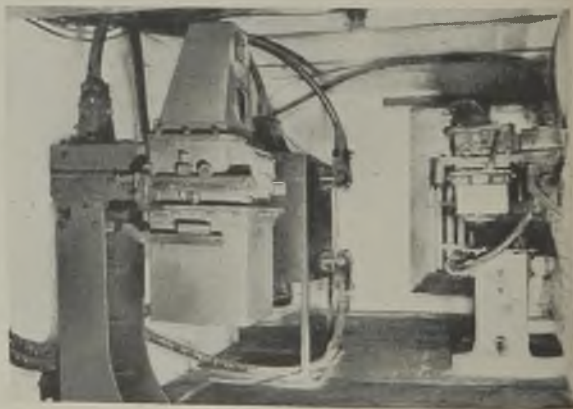
augment the supply provided by the colliery company's 1,000-kW generating station at that site which is normally running in parallel with the supply company's system. Further, a stand-by supply is provided *via* the interconnector to the Orgreave Colliery at which point the power company provides a separate point of supply at 10.5 kV to the extent



The main underground substation is about 150 yards from the pit bottom; the shaft cables connect direct to the 3.3-kV switch-gear at the far end

the 0.1 shaft cable, which is a 200-A unit. Of the eight panels in the underground substation, three are for incoming feeders and the remaining five outgoing units serve the following equipment: 250-HP Barnsley haulage, 40-kVA, 3.3-kV/500-V transformer in the substation, two-panel switchboard in the High Hazel plane, of which one panel feeds the Barnsley seam and the other the High Hazel seam, 125-HP High Hazel plane haulage and the Haigh Moor seam.

The supply to the coal face machinery is practically identical in each seam from the underground substation, and generally it is in line with the following description of the scheme to the Haigh Moor seam. At a distance of not more than 300 yd. from the coal face is installed a 125-kVA portable substation (Transwitch) controlled by high-voltage and low-voltage oil circuit-breakers on either side of the transformer. This is a Reyrolle product. At the discharge end of the gate conveyor is a 2½-kVA road lighting unit which is in circuit in the main run of the cable which provides the lighting for this point. The cable then proceeds to a two-panel unit referred to in the earlier article, and from this two-panel unit a



The Wathwood pumps are served by their own distribution station

of 2,500 kVA. Here again the colliery company's generating plant runs in parallel with the public supply system. The colliery company has also supplied an 11-kV inter-

connector between the Orgreave and Beighton Brookhouse Collieries; the generating plant at the latter point also runs in parallel with the common system. The total capacities of the generating stations at Orgreave, Beighton Brookhouse and Thurcroft Collieries are 5,000 kW, 1,850 kW and 1,000 kW, respectively.

The importance of avoiding interference with output during actual change-over periods has already been referred to in previous articles, and in this respect the following notes on the

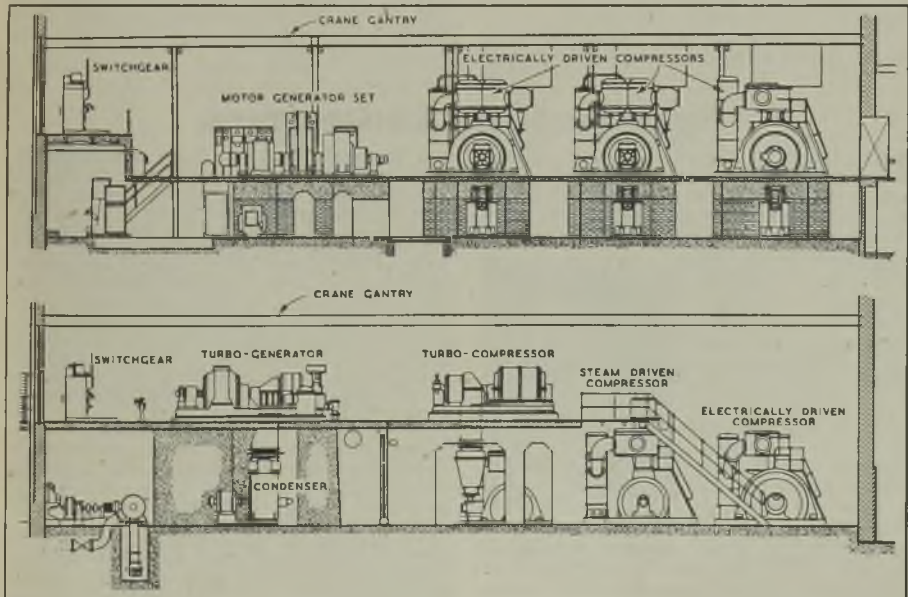
conversion of the power house and of the winders will be of particular interest. Re-equipping the power house involved the removal of two turbo-generators with their condensers, the demolition of the high foundations and rearranging the compressors originally on the ground level up to the new high level.

It was necessary to raise the floor level to create a basement in which could be

housed the pipes, cables and electrical control and auxiliary equipment with sufficient room to permit easy maintenance. The new floor was established without shutting down production in any way, a remarkable achievement which necessitated a carefully arranged programme as follows:—In the first place a temporary connection was made to the Y.E.P. system to permit shutting down the two turbo-generators. The 3-kV switch-



The colliery has a well-appointed charging room for the miners' electric lamps



Re-equipping the power house involved the removal of two turbo-alternators and rearranging the compressors at the new high level; present (above) and original arrangements of power house

board was retained at its original level above the level of the power house working platform to provide sufficient headroom in the basement for the liquid controller and the circuit-breaker for the m.g. flywheel set for the downcast winder. Then a small air compressor was taken out and a new bed for the first motor-driven compressor was made to line up with the new floor. This left the two remaining compressors supplying the pit. The first new compressor was then erected and quickly put into commission.

Temporary Supply Arrangements

Up to this point the supply was limited because the 66-kV substation was not completed, the temporary supply being taken from the local distribution system. In the meantime the supply was increased from the local 11-kV system and this enabled a second new compressor to be installed and the 4,000 cu. ft. steam set to be dismantled and disposed of. By the installation of these two motor-driven compressors with the third compressor in its original position the colliery staff were then in a position to dismantle the Adamson turbo-compressor.

During this period the air consumption was falling in consequence of the progress of electrification underground, and this permitted the release of the third compressor so that this could be taken down and re-erected at the new level. The new floor was constructed section by section as the progress of the change-over permitted.

To accommodate the new downcast winder on the same site as the existing steam

winder would have necessitated considerable alterations to the steam-driven equipment, and this was therefore retained in use while the new electric winder house was erected immediately behind the old steam winder house. Having moved the steam receiver and altered the pipes feeding this, the colliery company was able to proceed with the erection of the new building and winder while the steam winder was still in use. The actual change-over from the old to the new winder and replacement of the existing two-deck cages and ropes was carried out during five days at Christmas, 1943, and with almost negligible interference with the colliery output.

Proceeding on the same lines, the steam-driven upcast winder was replaced by the new electric winder, the actual final change-over of the ropes, etc., being carried out during the normal summer holidays, without loss of output. In this case, however, the new upcast winder was actually erected on the existing foundation with the exception of an extension for the driving motor.

Weekly Consumption

To give some idea of the colliery electrical consumption, the following figures represent a typical week's working:—Of the total of 179,630 kWh for the total mine consumption, 65,150 was used by the compressors, 4,000 by the screens, 17,000 by the washery, 16,000 by the auxiliary surface plant, 34,490 by the winders, 21,645 by the ventilating fan, 14,925 by the underground equipment (excluding pumping), and 6,420 by the pumps.

New Indian Industries

EVIDENCE of India's increasing participation in the field of industry and growing output for the war effort is afforded by news of the completion of a new rolling mill in the vicinity of Calcutta. The opening of the works of the National Rolling Mills, Ltd., was attended by a large gathering composed of representatives of the Indian Government and leading European and Indian industrialists. The opening ceremony was performed by the Hon. Dewan Bahadur Sir A. Ramaswami Mudaliar, K.C.S.I., Supply Member of the Executive Council of the Governor-General.

This extensive factory has been equipped with the most modern British plant. The output is chiefly copper rods for the electrical industry, part of which is destined for a sister concern,



Mr. C. G. Gorton, works manager, National Insulated Cable Co. of India

the National Insulated Cable Co. of India, Ltd., which already has a works in the Central Provinces and will shortly be starting up a new factory erected near the rolling mills. Both concerns are under the management of the Associated Industrial Developments Co., Ltd., of which Mr. G. B. Page, a well-known personality in the electrical industry in this country and India, is managing director. Mr. S. F. Nicholls, formerly of Derby Cables, Ltd., left England recently on his way to India to supervise the installation of the cable-making plant which is designed for the production of all types of v.i.r. and v.c. cables, enamelled, cotton and silk covered wires. In the near future Mr. C. G. Gorton, formerly of the Cable Planning Department, Ministry of Supply, will leave England to take up his duties as works manager of the cable factory; at present he is in this country dealing with the company's affairs.

In addition to the rolling mills and cable factory, plans are well advanced for the establishment by the same managing agents of factories for wire rope, metal pipes and tubes, and steel strip manufacture, all on the same factory estate.

Future Load Conditions

Industrial, Domestic and Rural Trends

IN his inaugural address as chairman of the Transmission Section of the Institution of Electrical Engineers on October 18th, Mr. H. W. GRIMMITT (Electricity Commission) pointed out that many electricity supply undertakings now had nearly all their mains fully loaded. The industry had carried out its work during the war with strict regard for the shortage of materials, only absolutely essential work having been done, so that many systems were now without standby mains or plant. He felt, perhaps due to the excellence of the service rendered during the "blitz" periods, that the industry had been taken for granted and not always given the priorities it deserved.

The time had now come for reconditioning and the transmission engineer could not complain that there were no available statistics to assist him to budget for the future. He did not have to estimate within fine limits; what was required was a rough guide with some knowledge of the degree of its roughness. But it was very important, in the first instance, to study system rate of growth which, in Mr. Grimmitt's opinion, had been satisfactory during the last ten years. He would deprecate any move that would seriously retard or accelerate it. To increase the personnel employed by the industry in order to accelerate its growth abnormally would lead to unemployment when the work was finished, as had occurred in New Zealand and to a minor degree here after the grid contracts were completed.

Meeting Re-housing Needs

The electricity supply industry could take re-housing after the war in its stride in the same way that it had coped with the growth of power load during the war. In 1939 there were a little more than nine million domestic consumers, the number of dwellings existing in Great Britain being about 12½ millions. If it were assumed that 3½ million houses would be built in twelve years after the war, then in the same period seven million houses would need to be electrically connected at the average rate of 580,000 per annum; the pre-war average was 800,000 yearly.

As a guide to the reorganisation of distribution systems in urban areas Mr. Grimmitt estimated that in 1965 the energy sold would approximate to 70,000 million kWh, of which over 35 per cent. would be domestic. Consumers would number 15½ millions, each taking from 1,550 to 1,800 kWh, so that with a 25 per cent. load factor their maximum demands would be 0.71 and 0.825 kW respectively. Several undertakings were already selling more energy per domestic

consumer than those figures indicated. On a housing estate which was "completely electric" the average consumption per annum was from 4,000 to 5,000 kWh with a load factor slightly in excess of 30 per cent.

It was necessary to add a cautionary note about those urban areas in which the domestic load used to be much in excess of that for power. The pre-war tendency for their system load factor to decrease was not a good sign. Its later improvement might have been due to the fuel economy campaign and the better load factor of war-time power load. Rising price of coal might render some domestic tariffs uneconomical, an effect which had been masked in many instances during the war by growing power load with its comparatively high load factor. But when factories reverted to single-shift working an uneconomic domestic tariff might affect the whole economy of a supply undertaking.

Power Load Difficulties

The power load presented a more difficult problem. There were at present two views about this country's post-war position. The completely pessimistic view was that with a coal cost at the power station in excess of 0.3d. per kWh generated it would be absolutely impossible to compete with water power in Canada and the United States for the development of basic industries requiring appreciable amounts of electric power. The less gloomy view was that if the Government's aim of "full employment for all" were achieved, then it would be safe to assume that the power load would increase rather than decline in this country.

Reports and memoranda prepared to assist the Government to make up its mind about the future of electricity supply conveyed the impression that one of the so far ignored branches which needed most urgent consideration was rural development. It seemed that those documents must have been based on pre-1934 information, for they implied that not much work had been done since that date, whereas Mr. Grimmitt suggested that electricity was available to the majority of villages of 250 inhabitants (about 65 dwellings). He did not believe it to be reasonable, or economical, to provide both gas and electricity in every village irrespective of its size. In 1939 electricity was "easily available" to about 70 per cent. of premises in rural areas (meaning that they could be given supplies by means of short service connections) and 65 per cent. of all premises were already consumers. Indeed, if there had not been a war, complete electrification would by now have been achieved.

To provide efficient service, it was essential that the rural population should live in villages; there was no point in scattering cottages about the countryside, and farm cottages should be near farm buildings. Between the two wars rural Council houses had been built in small blocks, very often too far from villages for electricity to be supplied to them economically. The wiring installation must be regarded as an integral part of the house, not an extra.

With agriculture maintained in its present state of prosperity, there should be much rehabilitation that might quite likely extend over a long period of time. But there was less load per consumer in rural than in urban areas. A good sign was that average revenue per farm per year was increasing; the increasing cost of labour would encourage mechanisation. Dairy farms afforded the best load. The large numbers of welding sets now being installed, rated at 10 kW but consuming only about 100 kWh yearly, were being treated somewhat warily, by many supply engineers. Restriction of their use should be discouraged, as should also some of the onerous switching requirements in respect of small motors.

Sympathetic Treatment Advocated

Many poor-load-factor loads in rural areas were an immense boon to consumers, who could often afford to pay a fairly high average kWh charge for them; but a high kW charge with a high minimum guarantee were restrictive and extremely bad propaganda. Broader views needed to be taken of both technical and tariff aspects. Mr. Grimmit made a plea for more sympathetic approach to problems of this kind, for the advertisement value of small power loads was much more important than the revenue they produced. It would be most useful if the industry could agree to one method of charging for the service. It was doubtful whether minimum guarantees were still essential and the suggested standardisation of the form of charge for mains and services could also be applied to new housing estates, particularly in rural areas. Mr. Grimmit did not think that Government financial assistance was necessary to complete rural electrification.

It was fair and reasonable to ask isolated farms to contribute towards service costs, but the assessment should accord with the likely revenue. Meanwhile the cheapening of overhead-line construction and auxiliary gear continued. Transformers, fuse-gear, etc., represented from 25 to 50 per cent. of the total cost; 150,000 transformers ranging from 5 to 25 kVA would be needed to give supplies to all farms. Need all farm services be three-phase? Single-phasing would cost from 10 to 15 per cent. less. Although farm revenue was improving it had not increased in proportion to the growing cost of service.

The Public's Choice

Prospects for Expansion of Electric Cooking

ADDRESSING the recently formed Luton Electrical Society, Mr. C. T. MELLING (borough electrical engineer, Luton), its first chairman, chose as the subject of his address "Electricity in the Post-War Life." After a brief historical survey, indicating the growth of the electricity supply industry, leading up to the present position, the speaker discussed future developments, mainly those relating to the more ordinary benefits of electricity. He expressed the view that electric cooking offered the largest immediate scope for expansion. A curve was exhibited which showed that in the decade before the war the number of cookers connected increased from fewer than 100,000 to more than 1,600,000, and in 1939 there were indications that the time was ripe for more rapid development yet.

A recent inquiry made of men and women in the Forces and in industry as to their cooking preferences showed that 59 and 57 per cent., respectively, favoured electricity; this had received corroboration from other sources, more especially in regard to younger women. In ten years' time the vast majority of housewives would not be satisfied with any other method.

Mr. Melling would welcome the formation of a national fuel policy, provided it maintained a reasonable freedom of choice for the individual consumer. This could be met by building houses with a fireplace in only one bedroom, which would be directly over the living-room fireplace, and relying upon electricity alone for warming the other bedrooms. Assuming four million houses to be built during the next ten years at a cost of between £3,000 million and £4,000 million, the saving so made would amount from £50 million to £100 million. Since most consumers would wish for electricity for lighting, wireless sets, vacuum cleaners and irons (used by 80 per cent. of domestic consumers), electric service would be required in all post-war houses, but opportunities for the use of gas should be available (except in rural areas) in a decreasing proportion of houses built as time went on.

Saving Coal by Electrification

Important economies in the use of coal could be obtained through railway electrification, saving approximately 7 million tons per annum, and through colliery electrification, saving another 6 million—the total being more than half the tonnage consumed in the generation of electricity in 1943 and equivalent to 7 per cent. of the total used annually in this country. The poorest grades of coal could be burned at generating stations designed with this in view. A national fuel policy should aim at exporting derivatives and not raw coal. It should also endeavour to stimulate industrial electrification as a means of improving the export position generally, the soundest foundation of which would be a healthy home market for electrical appliances.

Mr. C. T. Melling, expressed the hope that after the war Luton would become the nucleus of an expanding electrical manufacturing industry—not in the heavier types of machinery, but instruments, control gear, domestic appliances, etc. He considered that great scope for such development existed.

The Grid and the Nation

Meeting the Demands of War Industries

AS the main theme of his presidential address to the Association of Super-vising Electrical Engineers last Saturday, MR. E. R. WILKINSON (Commercial Manager, Central Electricity Board) took the contribution made by the grid towards winning the war. After showing how the present comprehensive national system of inter-connection and bulk transmission in the charge of the C.E.B. arose out of a recognition of the inadequacy of the methods prevailing during the last war he gave particulars of the position in 1938, when the last of the Regional Schemes, delayed by frequency standardisation, came into operation.

During the year immediately preceding the outbreak of the present war the electrical output was nine times that of 1914, and last year's was half as much again as it was in 1939. The grid served 45.2 million of the population of 46 million, covering 67,600 out of the 88,100 sq. miles of Great Britain (the balance being the sparsely inhabited North of Scotland). The Board directed the operation of 137 selected generating stations (8,658,000 kW) and 30 non-selected stations (395,000 kW). Its transmission system comprised 4,430 route miles of lines, including 3,039 miles at 132 kV and 10,971,000 kVA of transformers at 307 points. Capital cost of construction amounted to £34 million with another £7 million for other expenses.

Savings in annual costs through pooling spare generating plant were estimated at substantially the same figure as the annual charges due to the grid itself, so that other economies and advantages (including the operation of the most economical plant at the highest practicable load factor, the availability of supplies at low cost at points remote from generating centres and the standardisation of frequency) were net peace-time benefits.

Flexibility in Wartime

In regard to war conditions, far greater flexibility in operation was coupled with a much enhanced security, since an undertaking's busbars could be fed at need from other stations. Reliability had been further ensured by the expenditure of some £2 million in providing spare equipment at various centres throughout the country. In one instance a new outdoor substation was set to work within twenty-four hours of the destruction by enemy action of a generating station switch-house.

A new situation was the radical alteration in the load curve (exaggerated by continuation of summer time into the winter) due to the loss of outside lighting owing to the black-out,

so that the peak moved from about 5 p.m. to 9 a.m. An appreciable shift of load followed the evacuation from cities and the provision of military accommodation, including that required by soldiers from other countries. At the same time, the construction of hundreds of new factories, with individual loads of from 20,000 to 100,000 kW, and the change-over of existing works to war production caused an unprecedentedly great and rapid expansion in power demand.

The new factories were often, in view of war conditions, situated away from normal industrial centres, which the grid made possible, and this resulted in heavy load transfers. Moreover, with calls on manpower and the need for fuel economy, the convenience and adaptability of electricity brought about its wider use for such purposes as communal feeding and saving domestic labour.

Production Expedited

Practically all factories constructed since the start of the war had obtained their electricity from public systems and in no case had a supply not been available. As war factories could be built more quickly than generating plant, the setting to work of the former had been expedited. Moreover, the additional generating plant had been only the minimum required by the growth of load, partly because the energy could be transmitted from areas where demands had fallen and partly because of pooling of stand-by capacity on account of grid interconnection. This released corresponding materials and labour for the production of armaments. Unified frequency had enabled electrical equipment for numerous similar factories to be of standard design.

For the past five years most of the stations under the Board's direction had been operated continuously, whereas previously a few most economical stations had carried the base load, and the grid had been linked up as one network instead of in seven sections as before. While some damage had been caused by enemy action the effect on war production had been infinitesimal; in the worst cases, supplies had been restored in a day or two.

In conclusion, Mr. Wilkinson discussed the social problems involved in changing over from war to peace, the adverse effect of rising coal prices and decreasing output per man-hour and the dependence of Britain's industrial prosperity on export trade. If backward countries became more prosperous the ensuing expansion of world trade would benefit the more advanced countries, provided their industrial efficiency was raised.

Portable Tools

Low Operating Voltages Advocated

THE majority of portable electric tools sold at the present time are driven by ventilated motors of the universal type for operation off 200-250-V single-phase, 50-cycle, or DC supplies. Some are sold equipped with two-core cables and two-pin plugs. The armatures of the smaller machines are usually wound with 30 SWG wire. Considering the very large number of tools in use, it is very desirable to have a standard frame size for the same range.

The most important electrical trouble is the ever-present risk of shock due to an earth fault in the windings, cable or switch in the handle of the tools. Other faults are: Broken armature leads at the back of the commutator; flash-over at the commutator due either to open circuit in the armature or accumulation round the brush gear of abrasive and or conducting dust drawn into the machine through ventilating ducts; unsuitable location of bearings and tendency of outer bearing race to turn in the housing of light alloy metal; inefficient earth on the tool carcase; and wrong connection.

Necessity for Regular Attention

All types of portable tools should receive frequent inspection and maintenance and a very rigid testing schedule. It is found in practice that the majority of machines do not run hot and there is every justification for making them totally enclosed.

Whilst it is very convenient to house an "on" and "off" switch in the handle of the tools it might well be omitted since, owing to the small space available, reliable switch connections cannot be made. In the majority of cases a wall switch is sufficient, but where this is not suitable a separate switch-plug unit could be introduced adjacent to the work. A steel bush in the end brackets would prevent the bearing turning in the housing.

Small motors working off AC circuits could be wound for 25 V supplied from 200-250/25-V transformers having shields between primary and secondary windings. In such a case only should a two-core cable and two-pin plug and socket be used. With larger tools where the current at 25 V would be excessive, 50-V transformer secondaries could be adopted, with the centre point earthed. Windings for 25 or 50 V would be more robust than for the supply voltage. Wherever possible only 25 or 50 V should be considered, but when this is impracticable, due principally to current limitations, comprehensive earth protection, such as the Butcher-Black & Decker scheme, can be used.

The majority of motor-generators for

By **R. S. Bennett,**
A.M.I.E.E., A.M.J.Mech.E.

supplying tool-motors at higher frequencies are star-connected on the output side and are fitted with rings. The neutral point of the output winding should be connected to a fourth ring, which in turn would be connected through an earth-leakage trip coil, so that in the event of an earth fault the breaker controlling the high-frequency output would be automatically opened.

In order to reduce the risk of accidents due to electric shock which occur with 200-250-V AC portable tools and also the present high cost of maintenance, it is suggested that manufacturers should give very serious thought to producing 25- or 50-V tools.

Reclaiming Cracked Castings

CRACKED castings are now being repaired without risk of heat distortion by an electrolytic process developed some two years ago, and used so far mainly for the repair of petrol-engine cylinder block castings, without complete dismantling, it is stated in the *Production and Engineering Bulletin*. The block is dressed with a portable grinder to expose clean metal round the crack, and the area wiped with a rag soaked in a degreasing solvent. A cell approximately 2 in. deep, made from sheet bitumen, is then built up round the crack, which is plugged with plaster of paris or similar material.

The cell is filled with a mixture of sulphur and nitric acids, in which a lead cathode is immersed, and the block connected to the positive power lead. On passing a current through the electrolyte the surface is anodically etched. The solution is then removed, the cell being refilled with a nickel plating solution. A nickel electrode is then made the anode, and a current passed through the electrolyte for about half an hour to deposit a thin coating of nickel on the surface of the block.

At the next stage a deposit of copper, approximately 0.005-in. thick, is applied on top of the nickel. The nickel plating solution is replaced by an acid copper solution, and a copper anode is used. All anodes are partly encased in a thin piece of filter paper or muslin.

Subsequent stages in the process involve removing the copper solution temporarily, dusting brass powder on to a fresh filling of plaster placed in the crack (to make it conducting), scouring the plated surface with pumice, replacing the copper solution and continuing deposition until approximately 0.1 in. of copper has been deposited. The cell is then removed and the copper deposit trimmed.

Cracks varying from hair lines to $\frac{1}{4}$ in. have been repaired by this process, and it is understood that no failures have been reported. Further information can be obtained from the Secretary, Electrodeposition Technical Advisory Committee, c/o S.T.A.M., Ministry of Supply, Room 1043, Shell Mex House, Strand, W.C.2.

Rules and Registration

Activities of the National Committee

LAST week members of the National Committee on Statutory Wiring Regulations and Registration met the editors of the electrical Press for the purpose of putting before them once again the proposals implicit in the Committee's title. It cannot be said that anything new turned up but the meeting certainly gave an opportunity of piecing together what has hitherto been a somewhat disjointed story which may be worth briefly telling.

The Committee was set up in 1938 upon the initiative of the Association of Supervising Electrical Engineers and comprised representatives of all the principal electrical associations with the exception of those of the company-owned electricity supply undertakings. The B.S.I. and B.E.A.M.A. subsequently withdrew on the ground that so few of their members were interested in the installation industry. One of its first activities was to approach the Minister of Transport, who was then contemplating the introduction of a Bill for the reorganisation of electricity supply, and to secure a promise from him that a clause would be inserted empowering the Electricity Commissioners to deal with the subjects of compulsory registration of contractors and wiring rules. This was followed by a Statement of Evidence designed to show the ill-effects of bad installation work.

Although the Committee was concerned principally with domestic installations this statement (for scarcity of evidence relating to domestic electrical accidents) was based largely on industrial experience as evinced in the factory electrical inspectors' reports. The statement was sent to all supply undertakings and the engineers were asked for their views on compulsory registration and rules. Of the 56 per cent. who replied 70 per cent. were said to be in favour while between 40 and 50 per cent. of them favoured a compulsory code.

Then came the war and the Committee's activities were suspended, but when in 1941 post-war planning was in the air there was a resumption and the Committee drew up a scheme for the examination, licensing and registering of contractors and operatives and the enforcement of observance of the Electricity Commissioners' Regulations or other accepted code. The scheme was brought to the notice of Lord Reith, then Minister of Works, who suggested that the proper body to consider it was the Institution of Electrical Engineers. Thereupon the scheme was

handed over to the I.E.E. which passed it to its Post-War Planning Committee.

A sub-committee of this body subsequently reported that "the examination of the relevant statistics from the technical point of view does not in itself provide evidence of a sufficiently serious nature to justify so drastic a measure as that of compulsory registration of contractors and operatives." The sub-committee also considered that there was "insufficient ground for the enactment of compulsory regulations at the present time." It conceded, however, that its proposed basic safety regulations might possibly form the basis of an agreed compulsory code at some future date. Safer installation work, it was thought, could be achieved by the better application of existing methods, e.g., the Commissioners' Regulations and voluntary registration.

In view of this the Institution informed the Committee that although the matter was at an end so far as it was concerned the Committee was at liberty to take whatever further steps it desired. Accordingly the Committee determined to proceed with its campaign and obtain publicity for it and "find out the attitude of the electrical industry by referring the matter to the associations represented on the Committee." Later it is proposed to make a direct approach to the Ministries of Works, Labour, and Fuel and Power and the Home Office.

At last week's meeting, MR. S. B. DONKIN, the Chairman of the Committee, made a brief survey of the Committee's work and said they did not want to restrict electrical development but aimed at popularising the use of electricity by making it absolutely safe. He also referred to the Committee's advocacy of a "clearing house" for the approval of appliances and materials.

MR. W. H. WALTON (E.C.A.) said that although the proposed Distribution Bill had been dropped on account of the war the matter would be revived and another opportunity would occur for securing an enabling clause dealing with registration and rules.

MR. A. BRAMMER (A.S.E.E.) said that good work had been done by the National Register of Electrical Installation Contractors but much more could have been done by means of a compulsory scheme. He said that the British Standards Institution was another example of limitation through lack of compulsory powers.

MR. A. V. SENDELL (E.P.E.A.) said that the



Mr. S. B. Donkin, chairman of the Committee

contractors themselves demanded compulsion. The supply authorities wanted safe installations and could secure these by employing properly qualified electrical contractors.

MR. M. T. GREENWELL (E.T.U.) affirmed his Union's support of the proposals and said that from his own experience there were hundreds of so-called "electrical contractors" who would employ any sort of men. Members of the E.T.U. were craftsmen who were proud of their work and would welcome licensing. He agreed that all the contractors and electricians now operating would automatically receive licences but they would fail to secure re-registration if their work was not up to standard.

MR. W. E. FRY (E.P.E.A.) was inclined to support the attitude of the I.E.E. and put inspection in the hands of the electricity supply authorities. Unless installations com-

plied with a minimum code of regulations connection should be refused.

MR. L. C. PENWILL (E.C.A.) said that the Committee's scheme was not unalterable. In the view of the E.C.A., which was its "father," the N.R.E.I.C. had not been an entire success. The Register had realised this by lately deciding in favour of compulsory registration. It was not the Committee's idea to establish a closed ring but it was only natural that the qualified contractor and operative should resent the intrusion of the unqualified. Registration would be open to anyone with the necessary qualifications whether a member of an association or not. The future of electricity lay largely in the home and this placed a great responsibility on the industry. Frequent visits of inspectors would not be tolerated and therefore the principal safeguard was the employment of qualified workers.

Forthcoming Events

Friday, October 27th.—*London.*—At Institution of Civil Engineers, 3 p.m. Institution of Chemical Industry, Chemical Engineering Group. Fifth Hinchley Memorial Lecture: "Hydro-electric Development in Great Britain and its Influence on Chemical and Allied Industries," by Sir Alexander Gibb.

London.—Institution of Mechanical Engineers, 5.30 p.m. Informal discussion on "The Influence of Engineering on Social Advancement," to be introduced by E. Reeve.

Bristol.—Merchant Venturers' Technical College, 7 p.m. I.E.E. Bristol Students' Section. "Electrical Communications," by J. Morgan, Centre chairman.

Monday, October 30th.—*Birmingham.*—At James Watt Institute, 6 p.m. I.E.E. South Midland Centre Radio Group. Discussion on "Industrial Applications of High-frequency Power," to be opened by E. May.

Tuesday, October 31st.—*Leeds.*—Great Northern Hotel, 6 p.m. I.E.E. North Midland Centre. "Transmission and Distribution of Electricity to Mines," by B. L. Metcalf.

Wednesday, November 1st.—*London.*—Institution of Electrical Engineers, 5.30 p.m. Radio Section. "Theory and Performance of Corner Reflectors for Aerials," by Dr. E. B. Moullin, and "The Measured Performance of Horizontal-Dipole Transmitting Arrays," by H. Page.

Liverpool.—Municipal Annexe, Dale Street, 6 p.m. Liverpool Engineering Society and I.E.E. Mersey and North Wales Centre. "Noise in Engineering," by A. J. King.

Thursday, November 2nd.—*London.*—Institution of Electrical Engineers, 5.30 p.m. "Electrostatic Precipitation of Dust from Boiler Plant Flue Gases," by J. Bruce.

Friday, November 3rd.—*London.*—Institution of Mechanical Engineers, 5.30 p.m. "Stresses by Analysis and Experiment," by Prof. A. J. Sutton Pippard.

Newcastle-on-Tyne.—Neville Hall, 6.30 p.m. I.E.E. North-Eastern Students' Section. "Mutator Practice," by T. W. Berrie.

Birmingham.—Imperial Hotel, 6 p.m. Illuminating Engineering Society (Birmingham Centre). Debate: "That the Lighting of Class 'A' Roads by Stationary Lights is Necessary."

Saturday, November 4th.—*Manchester.*—Engineers' Club, 2.30 p.m. I.E.E. North-Western Centre. "Remote Switching by Superimposed Currents," by J. L. Carr.

Monday, November 6th.—*Birmingham.*—At James Watt Institute, 6 p.m. I.E.E. South Midland Centre. "Thermoplastic Cables," by Dr. W. Barron, J. N. Dean and T. R. Scott, D.F.C.

Polythene as Dielectric

A PAPER presented by PROFESSOR WILLIS JACKSON and MR. J. S. A. FORSYTH before the I.E.E. Radio Section on October 25th discussed the "Development of Polythene as a High-Frequency Dielectric." It was mainly concerned with the power factor of polythene (the high polymer of ethylene) which, being normally of the order of 0.00015-0.0003, was considered to render the material highly suitable as a high-frequency dielectric. It had been found, however, that oxidation might occur during the processing of the material in the manufacture of cables and mouldings, and that this increased the power factor and might also lead to difficulties in extrusion. These effects could be virtually eliminated, however, by the use of small amounts of anti-oxidants.

The measurable, albeit low, power factor of pure polythene was hardly concordant with the supposedly non-polar nature of the substance, and a number of possible explanations of the small basic power factor had been investigated. Measurements of power factor over wide frequency and temperature ranges showed that its variation for pure polythene was extremely sluggish, but that oxidation caused the appearance of marked peaks; these observations were examined in the light of present theories of dipole loss. The paper gave a brief account of the structure of polythene and of its main physical and mechanical properties.

CORRESPONDENCE

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

Freedom of Choice

MR. MURPHY'S letter in your issue of October 13th impels me to reply. I did not realise the drawbacks of gas cooking until I returned to it recently, after fifteen years, as the result of enemy action. My experience was this: toast took much longer and was spoilt by the drying action of the open flame, grilling was erratic, and to fry one either burnt in the centre of the pan or had too low a temperature for proper cooking in the outer parts of the pan. On Sundays, there being no compulsory pressure on the gas mains, between 11 a.m. and 12.30 the pressure dropped to half and cooking under this condition was very slow.

I was heartily glad to return to my electric cooker and can honestly say that if authorities were wise enough to fit high-speed multi-heat plates and thermostatic oven control they could excel any gas cooker for any cooking operation at equal cost, not to mention cleanliness, absence of fumes and life of decorations.

Hastings.

E. P. NYE.

WHILE Mr. D. Murphy is in the electrical industry and presumably earns his livelihood by it, he is not convinced of the superiority of electricity over other media, particularly for domestic use. The matter of cheapness depends entirely on the quantity of electricity used by the public, and Mr. Murphy is no doubt aware of the technical reasons for this. It is therefore necessary that as many people as possible shall be persuaded to use electricity.

I like a coal fire but could soon become accustomed to an electric fire. Very many people in flats are using them every day. My wife says that the next house we have must have electric heating in the kitchen and possibly all over the house, the chief reasons being that the storage of fuel, laying fires, clearing away ashes and the extra cleaning entailed are done away with.

In our opinion electrical means are the best way of heating water for domestic use. An electric cooker has been used in my house for twelve years with absolute satisfaction. The cooling down period has proved an advantage. I have used both gas and electric cookers and there is no doubt in my mind at all that electric are best.

My house has four bedrooms, lounge, dining room, kitchen, etc., and there is a family of four (two away at present).

The house is twelve years old and is fully equipped with electrical apparatus including five electric fires. I carry out occasional

experimental work in a laboratory and do occasional gardening heating experiments. During the last eleven years the average annual consumption has been 5,925 kWh at a cost of £16 6s. 3d., giving an average cost per kWh of 0.66d.

There is no gas on the premises, we live normally and like plenty of comfort, and as my principal load is cooking and water heating I consider these figures prove the matter on cost alone.

Sutton Coldfield. J. ASHMORE, M.I.E.E.

ALTHOUGH I do not wish to enter into any controversy on the various items mentioned in the letter from Mr. D. Murphy in your issue of October 13th, since the supply of electricity in Wonersh is afforded by the Guildford Corporation undertaking, I feel that it is my duty to acquaint your readers with the position in this district. At present at least 6,000 of our consumers do their cooking solely by electricity and they have all had electricity installed entirely at their own request, as gas is available throughout the whole of our area.

With regard to Mr. Murphy's extravagant remarks on the inefficiency and the undesirability of electric cooking, it is at least significant that he has in use in his own house an electric cooker, which was installed by the Guildford Corporation 5½ years ago, and up to the present no complaint whatever has been received from him during the whole of that period. Further, I suggest that it cannot be a very expensive proposition to him under the Guildford domestic all-in tariff. Undoubtedly also he had complete "freedom of choice" as he selected electric cooking without any persuasion whatever from this undertaking, when he could easily have had gas installed. It would have been much more appropriate and in compliance with the fitness of things in general if his letter had been signed by some rabidly enthusiastic consumer of gas. From the foregoing it is obvious that Mr. Murphy's remarks are quite inconsistent with his own policy.

Guildford.

W. E. AFFLECK,
Electrical Engineer & Manager.

THE remarks of Mr. D. Murphy in your issue of October 13th may provide a little merriment for a number of electrical people, but what the ladies of the E.A.W. will think of your correspondent can only be conjectured. If Mr. Murphy is in the electrical industry his observations seem to indicate a lack of knowledge of what the public desire. Although I am an electrical engineer I write also as a user of an "all-

electric" home. Needless to state I did not adopt the all-electric method to increase the supply company's revenue, neither did I do so for advertisement. Nobody in my home has ever felt the necessity for even one coal fire and we are of the opinion that coal is dirty stuff in any house.

It is, of course, a fact that in certain areas the cost of electric heating and cooking is prohibitive, but that does not mean that the unfortunate people in those areas prefer coal or gas. A properly designed electric cooker does not take a long time to heat up and as the heat retained after switching off can be used economically, what does it matter how long the cooling off process takes? If a census of opinion were taken in Britain from householders for or against "all-electric" I venture to predict that the majority would be "for."

Glasgow.

ALEX. MILNE.

Domestic Plugs and Sockets

THE terms of the Edinburgh Electricity Department's circular letter, from which Mr. P. d' E. Stowell quotes one paragraph in your issue of October 20th, have had rather a dubious reception among the architects, contractors, Scottish Special Housing Association and Ministry of Works, to all of whom it was recently addressed. It would be unfortunate if your readers gained the impression that all—or perhaps any—of these bodies have been consulted or are in agreement with it.

The letter is at least enlightening on the Department's favouring of a nebulous standard plug and socket (of which there is no experience in practice) and setting no limit to their number on the smallest permitted cables for plug circuits. It strongly recommends also, "that no sockets of any size shall be connected to any final sub-circuit to which the fixed lighting installation is connected": this would prevent bedside lamps or modern wired furniture being attached to the lighting circuits.

Many must question the advisability of making floor area a factor in deciding cable or fuse sizes and it is decidedly harsh to insist that all flexibles smaller than 70/0076 must have fused plugs.

There are other debatable points in the official letter, but surely the I.E.E. is the proper authority to issue recommendations or suggest "additional exemptions" to their own rules.

Edinburgh.

D. SMEATON MUNRO.

ALTHOUGH the ring main system is undoubtedly attractive for new installations, what of the many existing installations using a hundred-and-one different types of connection?

If the problem is to be solved satisfactorily some drastic regulations will have to be

drawn up and rigidly enforced by the supply undertaking. For instance, the present standard plugs and sockets would be abolished and one standard substituted, *i.e.* 12 to 15 A, preferably metalclad with adequate provision for earthing.

The supply undertaking would notify consumers that existing installations must be brought up to the new standard (fusing, cable capacity and outlets) by a specified time governed by the material supply and labour situation then existing; new installations would naturally be made to conform.

Instead of the fused plug as suggested requiring a range of fusing currents but all the same size, every appliance manufactured would be required to incorporate a small fuse unit consisting of a withdrawable cartridge fuse, probably of a screw-in nature.

If necessary these fuses could be manufactured in a range from 0.5 to 15 A in 0.5-A steps, each a different size or thread to prevent using an incorrect rating. All appliances should be fitted with a standard flexible capable of carrying sufficient current to rupture the main fuse.

There then remains the question of existing appliances. Taking a large proportion of these as at least five years old with a further life expectancy of five to ten years, within a short time 80 per cent. of the problem will automatically solve itself by replacements. The bayonet-cap adaptor should be abolished along with our many existing types of two-way adaptors.

The scheme must be simple and universal in application. As the handyman at home will never be stopped from tampering with the installation, it will be safer to remove the possible sources of danger by making available to him *only* the correct accessories. If the supply undertakings used their powers to a much greater extent the proportion of unauthorised extensions would decrease rapidly. The scheme has to be approached not from the angle of economy, but safety from fire and electrocution.

Andover.

JOHN A. HILL.

Industry's Contribution to Red Cross

APPROXIMATELY 10 million employees of 60,000 firms and organisations in England and Wales are members of the Red Cross Penny-a-Week Fund. Of these more than one-third are contributing a minimum of twopence a week, whilst in many instances workers have voluntarily raised their weekly contribution to as much as sixpence. So marked is the enthusiasm for the work which the Red Cross is doing for the prisoners of war and the sick and wounded that in the majority of these 60,000 firms every employee from the general manager downwards is a contributor. Total contributions to the Fund, which provides one-half of all Red Cross revenue, now amount to an average of £100,000 a week.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE President of the Board of Trade has appointed **Sir Charles Bruce-Gardner** to be his Chief Executive for Industrial Reconversion. His duties will cover the planning of the change-over (subject to the prior claims of the war effort) of British industry from war to peace production. For the past two years Sir Charles has been a member of the Council of the Ministry of Aircraft Production and Controller of Labour Allocation and Supply in the Ministry, as well as chairman of the Production Efficiency Board.

Mr. Cecil Bentham has been released at his own request from his executive responsibilities as Deputy Controller General of Machine Tools to the Ministry of Supply. He will continue to act as honorary adviser to the head of the Department.

At the annual meeting of the British Standards Institution, a report of which appears on page 602, **Lord Woolton, C.H., P.C.**, was elected president and **Sir Percy Ashley, K.B.E., C.B.**, was elected vice-president. **Sir William Larke, K.B.E.**, succeeds **Sir Percy Ashley** as chairman of the General Council. The meeting terminated with a high tribute to the exceptional services rendered by **Sir Percy Ashley** to the Institution and to industry as a whole during his long association with the work of the B.S.I.

Mr. B. G. Churcher, M.I.E.E., who for many years has been associated with the research work of the Metropolitan-Vickers Electrical Co., Ltd., has been appointed manager of the company's Research Department. Following his apprenticeship with the original British Westinghouse Co. he was in 1915 placed in charge of the insulation test laboratory attached to the Transformer Department, developing the scope of the laboratory to cover electro-magnetic problems of interest to the engineering departments. Later this became the electric and magnetic laboratory which, with the chemical laboratory, formed the two original sections of the Research Department, established in 1917. In 1919 Mr. Churcher set up the in-plant workshop for the construction of experimental apparatus and in 1923 he formed the oscillograph section of the Department to provide a testing service for the engineering departments. The laboratory for this work was re-built in 1926 and again in 1939. The acoustics section was formed by Mr. Churcher and the laboratory for this work was built in 1928 and extended in 1933. In recent years he has been increasingly concerned with the executive and financial side of the Department's work.

On several occasions Mr. Churcher has visited the United States where he has read

papers before the Acoustical Society of America and the American Institute of Electrical Engineers. He was one of the British delegation to the International Acoustical Conference, Paris, in 1937. He has written a large number of papers on electrical, magnetic and acoustical subjects and for his work on acoustics the University of Manchester conferred on him the honorary degree of M.Sc. in 1940. He was chairman of the North-Western Centre of the Institution of Electrical Engineers in 1940-1941.

Mr. F. S. Mitman, C.B.E., has joined the board of the Brush Electrical Engineering Co., Ltd. Mr. Mitman, who is a graduate of the Lehigh University, U.S.A. (degree of Engineer of Mines, 1923), has for a number of years been associated with the light alloy industry, serving with the Ministry of Aircraft Production between 1939 and 1942 successively as Director of Light Alloys and Magnesium (Sheet and Strip) Control, Co-ordinator of Aircraft Supplies for Fighter and Naval Aircraft, and Adviser on Light Metals Fabrication. Since 1942



Mr. F. S. Mitman

he has held the position of chairman and managing director of the Messier Aircraft Equipment, Ltd., with which company he is retaining his connection.

Though selected by the Stirling Town Council to succeed **Mr. W. R. Murray** as burgh electrical engineer, **Mr. Norman Hunt**, district engineer to the Dumfries County Council Electricity Department, has decided not to accept the position.

Councillor T. J. Sillitoe, O.B.E., J.P., who has been selected as Mayor of Shoreditch for the seventh time and for the sixth consecutive year, has in the past been chairman of the Electricity Committee at Shoreditch for several years, and is a member of the District Council (No. 10) (Greater London Area) for the Electricity Supply Industry.

Mr. C. B. Kent has resigned his post as sales manager with the Aston Chain & Hook Co., Ltd. For the present **Mr. N. I. Bond-Williams**, managing director, is taking charge of the sales department.

Mr. A. C. Swaffield, who recently resigned from the board of Arrow Electric Switches, Ltd., has joined A.B. Metal Products, Ltd., as sales manager.

Mr. C. H. Phillips has just retired, owing to ill-health, from the service of the Sun Electrical Co., Ltd. He has been engaged in the electrical industry for over fifty years, having served his apprenticeship with one of the earliest electricity supply companies in the London area, then known as the Hampstead Battery Co., which has since been superseded by the Hampstead Borough Council Electricity Supply Department.



Mr. B. G. Churcher

Later he was employed for about twelve years in the electrical installation department of Maple & Co., Ltd. After a short period as engineer to Miller & Son, Ltd., of Piccadilly, he became manager of the electrical plant and contracting department of the Army & Navy Stores, Ltd. For the past twenty-six years he has been departmental manager of the Sun Electrical Co., Ltd., being for some years in charge of installation materials and switchgear, and subsequently the motor and plant section.

Mr. E. Hywel Jones has been recommended by the Swansea Corporation Electricity Committee as deputy chief electrical engineer in succession to Mr. A. C. Thirtle, who recently became city electrical engineer of Carlisle. Mr. Hywel Jones, who was very recently appointed as generation engineer at the Tir John power station, Swansea, was previously with the Liverpool Corporation for eighteen years, serving in various capacities at the Lister Drive and Clarence Dock power stations. He was educated at Liverpool University, and served his apprenticeship in the engine department of Cammell Laird's Works, Birkenhead. He is an associate member of the Institutions of Electrical and Mechanical Engineers.

With the recent retirement, after fifty-two years' service, of Mr. Richard Hayes, foreman of general services of the mechanical department, British Insulated Cables, Ltd., a notable record of service comes to an end. Mr. Hayes, who is seventy-nine, has three sons serving the company on the works side and together the four members of the Hayes family can claim a total of 171 years' service. The three sons are Messrs. John Hayes, foreman, mechanical department (43 years' service); Richard Hayes, jun., shift engineer, light and power department (40 years) and James Hayes, sheet metal worker, mechanical department (36 years).

After seven years as chief of the Post Office telephone engineering department on Tyneside, Mr. F. Hopps has been appointed telephone manager at Plymouth. He entered the National Telephone Co.'s service in 1906 and continued when it was taken over by the Post Office. Before going to Newcastle-on-Tyne he had held appointments at Nottingham, Belfast, Coventry and Sheffield.

Flying Officer Derek Fortescue Flannery, 22-year old only son of Sir Harold Flannery and grandson of the late Sir James Fortescue Flannery, consulting engineer and chairman of Callender's Cable & Construction Co., Ltd., is reported missing from air operations.

Southwark Borough Council Electricity Department is advertising in this issue for an electrical engineer and manager to succeed Mr. F. S. Naylor, who has been appointed borough electrical engineer and manager at Gravesend.

Obituary

Mr. W. C. Moore, who retired from the position of chief assistant to the chief electrical engineer of the Southern Railway at the end of March last, died on October 2nd, at the age of sixty-three. The funeral took place at Findon, near Worthing, on October 14th, among those present being Messrs. J. R. Ward, distribution engineer, A. E. Roberts, rolling stock engineer,

and other members of the Chief Electrical Engineer's Department of the Southern Railway, and representatives of the English Electric Co., Ltd., Taylor Tunnicliff, Ltd., Asea Electric, Ltd., Bruce Peebles, Ltd., and Pirelli-General Cable Works, Ltd.

Mr. S. Copléston, chief clerk to the Swansea Corporation Electricity Department, died recently.

Mr. Frank Wood, who died on October 19th aged eighty-two, joined the Vaughan Crane Co., Ltd., Manchester, in 1887 and held the position of managing director for many years until his retirement in 1941.

I.E.E. Students

North-Western Section Luncheon

THE North-Western Students' Section of the I.E.E. opened the new session (the fortieth) on October 14th with a well-attended annual luncheon followed by the chairman's address, at the Engineers' Club, Manchester.

At the luncheon MR. J. B. HIGHAM, B.Sc., the new chairman, proposing a toast to the Institution, said that there were a number of young members who desired the Institution to be more active in national politics. He deplored this and hoped that they would refrain from associating their professional name with their political activities. The next speaker, MR. W. KIDD (Centre chairman), noted that, although the number of student members had nearly doubled in the last few years, the number of graduate and associate members remained about the same. He confessed ignorance of the reason for this paradox but urged the younger members to work harder in order to qualify for the higher grades of membership.

Following the luncheon, Mr. Higham gave an address entitled "An Introduction to the High-voltage Cathode-ray Oscillograph." He talked ably on his subject for over an hour, illustrating it with numerous slides and diagrams. A lengthy discussion followed in which quite a few members showed themselves well acquainted with recent developments in c.r.o. operation and design. Mr. Kidd presided and the paper was admirably reviewed by Dr. Miller.

London "Brains Trust"

The first meeting of the London Students' Section of the I.E.E. for the 1944-45 session was held at the Institution on October 16th, when 250 members and friends attended. Subjects as diverse as international standards and trade, radio-frequency cooking, marine propulsion and the generation of bad tempers by electric fields were dealt with by a "Brains Trust" comprising Sir Noel Ashbridge, Mr. H. Faulkner, Sir John Kennedy, Dr. Clifford C. Paterson, Mr. A. G. Ramsey and Mr. J. W. J. Townley. The discussion was lively and instructive and on the more controversial subjects such as nationalisation proved that there are more than two sides to a question. Several members of the Trust were able humorists and kept the meeting from becoming too studious. Without doubt the "Trust" proved an unqualified success. The next meeting of the Section is on November 7th at 7 p.m. (tea 6.30) when the chairman will give his address.

Electrical Exports in Wartime

Figures for 1942 and 1943

DETAILED information on Britain's export trade during the years 1942 and 1943, hitherto withheld for security reasons, is contained in a return just published by the Board of Trade (Stationery Office, price 1s.). For comparison, 1938 figures are also given.

The outbreak of war necessarily caused a considerable dislocation of export trade, and low figures were recorded for September and October, 1939. The export drive, with a view to increasing our supplies of foreign exchange for the war effort, started in February, 1940. By April and May it was beginning to have notable effect, but the successive German invasions and the entry of Italy into the war resulted in the loss of further markets. In August the severe air raids on this country started and had a further adverse influence. Early in 1941 the position began to change radically. The substitution of Lease-Lend for Cash and Carry greatly reduced the need for foreign exchange. At about the same time shortages of raw materials and the increased diversion of man-power to the armed forces and the munition industries began to be reflected in the export figures. The entry of Japan into the war in December, 1941, coupled with German domination of the Balkans, still further restricted the trading area.

Between 1938 and 1943 the total value of all exports dropped by more than half (from £470.8 million to £232.2 million), but, as the

accompanying table shows, those of electrical goods and machinery suffered a smaller reduction (from £21.3 million to £17.6 million); this is in line with experience during pre-war depression periods.

In considering the values given, account must be taken of the rise in prices which commenced soon after the outbreak of war; the fall in volume is thus greater than the values indicate. The average value index for the last quarter of 1939 was 7 per cent. higher than in the first half, and in the next quarter there was a rise of 10 per cent. Thereafter average values rose less rapidly and the increase between the last quarters of 1942 and 1943 was only 4 per cent.

For exports of all types the volume figure for 1943 was under 30 per cent. of that for 1938. Taking electrical exports only, some idea of the effect of the rise in average values may be gained by comparing the details of quantities given in respect of certain items with the values in the table, although it is necessary to bear in mind that bulk does not necessarily bear relation to value. Thus the weight of generating plant exported decreased from 10,292 tons in 1938 to 5,246 tons in 1942 and 5,286 tons in 1943.

In the case of motors the corresponding weights were 11,129, 8,010 and 4,812 tons, and for transformers, switchgear and other types of electrical machinery, 23,224, 10,477 and 18,347 tons. In this latter group it will

TABLE I.—ELECTRICAL EXPORTS BY VALUE

Description	1938	1942	1943
	£	£	£
Submarine telegraph and telephone cables	207,473	122,544	284,668
Telegraph and telephone wires and cables (not submarine)	861,638	977,479	1,198,471
Other rubber-insulated wires and cables	1,410,403	787,273	894,009
Wires and cables, insulation other than rubber	1,839,077	1,463,790	1,297,313
Radio receivers, not radiograms (excluding valves)	441,065	193,455	113,586
Radio transmitters (excluding valves)	339,558	1,250,988	1,060,253
Radio valves	495,270	297,465	678,405
Other radio parts and accessories	519,226	402,929	373,355
Telegraph and telephone apparatus (other than radio)	2,912,595	1,376,871	1,543,813
Electric lamps	593,282	769,858	556,318
Other lighting apparatus	582,783	530,993	343,922
Primary batteries	162,862	142,312	112,495
Accumulators, portable		249,576	263,013
Ditto stationary	583,757	135,523	124,857
Ditto parts and accessories		179,902	137,401
Electrical cooking and heating apparatus, including industrial	367,964	161,289	82,555
House service meters	189,496	134,796	100,636
Other electrical instruments	305,886	257,205	309,277
Unenumerated electrical goods	1,385,948	1,483,933	1,428,688
Insulating materials not elsewhere specified	232,122	244,714	176,212
Electric generators up to 200 kW	456,853	312,510	340,922
Ditto over 200 kW	1,740,540	1,331,039	1,241,027
Electric motors	1,215,654	761,802	931,573
Converting machinery and transformers	41,558	37,367	1,067,371
Rectifiers for power-house use	610,392	471,599	36,018
Starting and controlling gear for motors	2,214,402	1,074,552	1,365,272
Switchgear	185,960	98,881	1,279,771
Other electrical machinery			
Total	21,324,717	16,170,702	17,654,476

be noted that the weight and value for 1943 are not far short of the 1938 figures; this was due to a very large increase in exports of unspecified electrical machinery (7,000 tons in 1943 as against 148 tons in 1938).

Among goods and apparatus, information as regards quantity is given in a few cases. The number of radio sets exported has fallen from 84,639 in 1938 to 25,316 in 1942 and 10,952 last year, while the numbers of valves shipped were respectively 2,205,914, 596,876 and 973,762. Electric lamp exports rose in number from 19.7 million in 1938 to 20.7 million in 1942, dropping last year to 13.1 million. Shipments of house service meters were considerably curtailed, being 165,336, 81,634 and 58,572 in the three years. In the case of accumulators, quantities are given only for the two latest years, when the numbers exported were 188,062 and 209,844.

The table giving destinations of exports of goods and apparatus shows that consignments to South Africa substantially increased in value last year as compared with 1938, the total of £2,439,362 being ahead of that for Australia, which had previously held first place.

The chief destinations of two of the more important classes of goods and apparatus—wires and cables and telegraph and telephone apparatus—are given separately. Values for 1943 and 1938 are as follows:—

Rubber-insulated wires and cables: South Africa, £211,550 (£218,167); British India, £112,881 (£209,316); Australia, £364,021 (£417,443); New Zealand, £46,224 (£106,343); other British countries, £86,316 (£253,445); and foreign countries, £73,017 (£205,689).

Electric wires and cables, insulation other than rubber:—South Africa, £158,223 (£454,607); British India, £197,399 (£369,997); Australia, £276,486 (£401,733); other British countries, £326,710 (£384,389); foreign countries, £338,495 (£228,351).

Telegraph and telephone apparatus other than radio:—South Africa, £302,553 (£312,911); Australia, £481,776 (£799,907); other British countries, £374,131 (£777,320); Argentina, £14,563 (£241,410); and other foreign countries, £370,790 (£781,857).

In the machinery class, exports of generators to foreign countries almost doubled, as is shown by the following analysis (1943 values with those for 1938 in parentheses):—South Africa, £219,816 (£479,906); British India, £210,404 (£283,518); Australia, £269,677

(£343,276); Canada, £86,243 (£38,466); other British countries, £194,929 (£439,306); foreign countries, £600,800 (£301,334).

Shipments of electric motors to most countries were much reduced, exceptions being British India and New Zealand:—South Africa, £229,741 (£353,165); British India, £275,316 (£215,040); Australia, £52,966 (£242,336); New Zealand, £108,417

TABLE II.—DESTINATIONS

Country	Goods and Apparatus		
	1938	1942	1943
	£	£	£
Eire	450,746	354,875	188,439
Channel Islands	143,582	—	—
Palestine	100,452	112,192	84,004
British West Africa	154,374	189,716	210,960
Union of South Africa	1,891,223	1,945,963	2,439,362
British India	1,475,140	1,231,859	954,311
British Malaya	387,361	78,749	—
Ceylon	179,170	82,851	82,737
Hong Kong	154,485	10,650	—
Australia	2,361,872	2,160,706	2,276,884
New Zealand	1,150,218	1,020,073	1,221,831
Canada	149,783	371,094	439,675
Other British Countries	679,523	621,454	690,583
Egypt	154,464	216,239	200,163
Brazil	133,476	53,812	56,520
Argentina	544,642	257,021	56,388
Enemy and Occupied Europe	999,091	—	—
Other Foreign Countries	2,320,803	2,455,641	2,177,390
Total	13,430,405	11,162,895	11,079,247

(£72,734); Canada, £5,619 (£70,980); other British countries, £79,264 (£249,586); foreign countries, £180,250 (£536,699).

Apart from the machinery included in the electrical group, steam and electric winding equipment is listed under "mining." Exports of this kind were last year only a sixth of the value in 1938 (£37,891 against £289,890). Even more drastically curtailed were exports of vacuum cleaners, with a value last year of £2,433 against £319,941 in 1938.

H.F. Induction Heating

IN a paper submitted to the Birmingham Electric Club on October 23rd Mr. T. G. Tanner outlined the various stages in the development of high-frequency induction heating. He gave an explanation of the fundamental principles of induction heating, with particular reference to the significance of skin-effect, stirring in molten baths, different frequencies and other electrical phenomena associated with the use of high-frequency energy in the metallurgical industry. After dealing with the various methods of generating high-frequency energy, the application of induction heating to industrial processes was discussed and illustrated by slides of English and American installations. The developments which have taken place during the last few years in the use of high-frequency energy for bar and billet heating, localised heating and surface hardening were all dealt with in turn and the author concluded by expressing his firm conviction that the post-war era will witness a very appreciable growth of this newest method of heating metals.

Experimental Research

Requirements for Obtaining the Best Results

THE organisation of experimental research was the subject of the inaugural address given last Friday by Dr. W. G. RADLEY (Post Office Research Station) as chairman of the Measurements Section of the Institution of Electrical Engineers.

Dr. Radley anticipated a considerable post-war increase of research, fundamental as well as applied. Discoveries during fundamental work might lead to the creation of entirely new industries while those already established would sometimes become dependent on the results of fundamental investigations. For instance, one of the most obvious needs of the electrical industry was for new materials, and the development of telecommunications had persistently demanded fresh insulating substances. The materials of the future would appear, mostly, as the logical end-products of experiments carried out to obtain fundamental knowledge of the relationship between the atomic and molecular structures of substances on the one hand and their electrical and mechanical properties on the other.

Getting the Right Atmosphere

It was almost impossible to plan work of this kind. The most important discoveries were frequently made unexpectedly and sometimes while the experimenter was pursuing some other line of investigation. Results could be encouraged by introducing the research worker to the right atmosphere and giving him adequate experimental facilities for trying out his ideas. Very much was to be gained by that association of workers in different fields which helped the "cross fertilisation" of ideas; it was one of the reasons why fundamental research flourished in universities where engineers, physicists, chemists and mathematicians met in common rooms. The value of such opportunities was emphasised by experience, which had shown that research in industrial laboratories directed continuously towards specific applications would languish unless those engaged in it also had opportunities of dealing with fundamental problems.

Conversely, many advantages were to be gained from bringing scientists principally concerned with fundamentals, even of the most abstract kinds, into intimate contact with the practical needs of industry. Within the P.O. there was an interchange of scientific staff between research laboratories and field work. A further lesson could be learned from the formation of operational research groups by certain of the fighting services during the present war. In the same way that applied research has preserved this nation

during the war, it could help it in peace to regain its position as one of the premier exporting countries of the world.

Since applied research had a more definite objective than fundamental work, it could be planned to a much greater extent; as it proceeded the following aspects became successively of importance. First, the need to survey work already done in the same field, in which connection a comprehensive library and effective information service were essential to any large organisation and should be under the control of an officer possessing sufficient technical knowledge to enable him to appreciate the significance of his colleagues' inquiries.

Second, the need for theoretical study of the problem to be solved, for correct interpretation of previous failures would often indicate that the way along which success was sought was wrong, not that success was impossible. Adequate theoretical study before experimental work was undertaken would quite certainly save time and money.

Third, the preparation of a programme of experiments, planned step by step in an ordered logical way, in consultation with members of the team of workers actually undertaking the investigation. In this respect universities were sometimes at fault because post-graduate students were not encouraged to think out for themselves their programmes of work, which were instead decided by their professors. Ability to decide on a line of attack on a new problem had had to be inculcated into many research workers after their introduction to industry.

Need for Accurate Instruments

Fourth, the provision of measuring apparatus of the required degree of accuracy; not infrequently investigators had to put aside their experiments while they devised means of more accurate observation, or of making measurements not anticipated at the outset. The peculiar nature of some of the problems encountered in communication research had necessitated new techniques and apparatus. Often there would not have been any progressive development at all if suitable devices had not appeared opportunely. Research workers were often keen to develop their own measuring equipment; they should be encouraged to do so for effort spent in this way, although subsidiary to the main work, was seldom without profit.

Fifth, interpretation of experimental data, in which connection statistical tests could be safely applied. They did not require full knowledge of the mathematical theory on

which the procedures were based and it was most important that their practical value should be fully realised. Engineering problems were essentially of a quantitative nature, yet statistical theory was often the only means by which the value of the data could be assessed. Systematisation of data was not less essential in the laboratory than

in the factory inspection department and the more general use of simple statistical tests would obviate much unnecessary multiplication of measurements. The application of such methods had imparted much greater meaning to many of the results obtained in the laboratories of the Post Office research station.

Electric Heaters

Should They be Portable or Fixed?

IN his article in the *Electrical Review* of September 8th Mr.

By R. D. Reynolds, A.M.I.E.E.

the room) and that would not give me the same comfort, as it would

E. A. Pinto quotes as a North American observation the question "why have portable fires at all?" and adds "Quite logically it seems, they point out that dwellings which are heated by coal or gas fires, as well as those blessed with central heating, do not have portable fires. Must electricity suffer from an inferiority complex?"

be some time before I experienced warmth from it. Alternatively, some built-in tubular heater or other fixed system of heating might be switched on which would be wholly unnecessary, unsatisfactory and uneconomical for the requirements of the moment.

Excluding all consideration of the question of ring mains *versus* other wiring systems which gives rise to Mr. Pinto's remarks, there is, as I see it, another side of the picture—that one of the supreme advantages of electricity lies in its great flexibility. Need this give electricity an inferiority complex? I think it should give it a superiority complex.

As we are all aware, the need for economy in fuel will not end with the war; therefore, on these grounds alone I should still, under the conditions described, use a portable electric radiator even though there be an alternative fixed heating system installed for colder periods and long-hour use.

Reading almost co-incidentally with the *Review* an E.D.A. report of a recent "Homes of To-morrow" exhibition at Leeds, I was particularly struck by certain observations by Mr. L. H. Keay, city architect and housing director of Liverpool. Addressing the electricity industry he said "... it appears to me that you start with the advantage of not creating any gases which have to be led away to the open air and with a flexibility governing the position of power and heating points not possessed by your competitors. . . ."

That is only one very small example of the advantages which under certain conditions the portable radiator has over fixed heating systems. But why does this tendency to extremism so frequently arise when the merits of different ways of doing things are under consideration? Frequently a combination of systems provides the best solution. In our climate the combination of a fixed electric heating system with portable electric radiators will often provide the ideal in comfort and economy and maybe our ideas on heating are not always so obsolete as some may suppose. It would be interesting to know how many electric heating systems, be they fixed or portable, have originated and been developed in this old country.

Unquestionably, other systems must of necessity have fixed heating points, but is that any reason why we should have to follow suit in regard to electricity? Without doubt the fixed electric heater is the proper thing to use in certain situations and under certain conditions, but do not let us go to the extreme of thinking that the portable heater should be entirely superseded by one or other of the fixed systems of electric heating.

In our climate the portable electric radiator has many advantages. Whilst penning these notes I am experiencing one of its advantages, namely, the warmth from a portable 600-W radiator placed close to my writing table remote from the fireplace. Dispense with it and what is the alternative? Presumably to switch on a fixed radiator at the fireplace position. At least 2 kW would be necessary instead of the 600 W I am using (alone in

Electronic Heating for Food Processing

THE American journal *Food Industries* states that electronic heating has been used experimentally to finish-dry dehydrated vegetables and powdered milk, melt chocolate slabs, roast cocoa beans and sterilise cereal products. The last-mentioned is the most important potential application. Insects or their eggs can be killed by heating the product to 130 or 140 deg. F. as packages pass on a conveyor which travels between the two electrodes. The cost of dielectric heating is said to be competitive with that of other sources of heat in applications for which it is particularly suited. In sterilising operations 480 1-lb. packages can be treated at a power cost of 5 cents. The total cost, including the valves and a 10-year amortisation, is 17 cents per hour. Maintenance is low; the power valves last 5,000 and the rectifier valves 10,000 hours.

COMMERCE and INDUSTRY

Girl Apprentices. Portable Switchboards for E.N.S.A.

Electric Vehicles for the Seaside

A NEW use for electric vehicles after the war is foreseen by Partridge, Wilson & Co., Ltd. In a circular to town clerks of the larger seaside resorts the company suggests that the vehicles lend themselves admirably for the conveyance of visitors along the promenades, etc. A drawing is included indicating the general design of the vehicle in mind, but an accompanying questionnaire seeks guidance from the municipalities on such matters as maximum speed, range per charge, seating capacity and type of body, e.g., completely open touring "bus" type, with fabric concertina roof, or, as shown in our picture, with a roll canvas roof and open

Suggested design of the Wilson electric seaside promenade vehicle

sides with a detachable reversible curtain to fit on the windward side and full length steps on both sides of the vehicle. The local authorities are also asked if they would consider free rides as an added attraction to their holiday resort or, alternatively, whether their regulations would permit the driver, who could be a woman, acting also as a conductor to collect fares when the vehicle is stationary.

Equal Pay

A Royal Commission on Equal Pay has been set up under the chairmanship of Mr. Justice Asquith. It is to examine the report on the existing relationship between the remuneration of men and women in the public services, industry and other fields of employment, and the social and financial implications of the claim of equal pay for equal work.

Fuel Economy Exhibition

The Electrical Association for Women, in co-operation with the British Electrical Development Association, Central London Electricity, Ltd., and the St. Marylebone Electricity Department, was responsible for the electrical side of a domestic fuel economy and efficiency exhibition which the Ministry of Fuel and Power held on Thursday last week at the Royal Institute of Public Health and Hygiene. Demonstrations were given of meter reading, fuse replacement, lagging of tanks and pipes, and maintenance and simple repairs to electrical apparatus. On the two preceding days an instructional course was given to delegates from London sections of women's organisations.

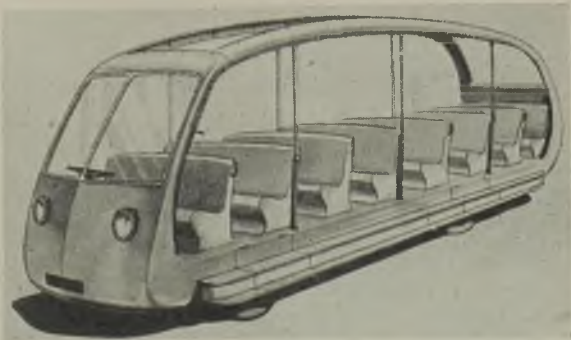
Contract Price Adjustment Formulæ

The following are the latest figures for the B.E.A.M.A. contract price adjustment formulæ:—(a) "Rates of Pay": the rate of pay for adult male labour at October 14th shall be deemed to be 90s. 6d. (b) "Costs of Material": the index figure for intermediate products last

published by the Board of Trade on October 14th is 176.2 and is the figure for the month of September. Both are unchanged.

Careers for Girls

The Brush Electrical Engineering Co., Ltd., has recently expanded its apprentice training programme to include girl student apprentices



of School Certificate standard, who, on completion of their training, will be absorbed into the permanent staff on secretarial, costing and accountancy or technical work. There has always been a considerable shortage of well-trained young women in these categories and although there are many well-paid permanent positions available, suitable candidates for them are relatively few. The Brush scheme provides a three years' course to which the girls are indentured and it is believed that this is the first time that any comprehensive scheme has been instituted by industry with indentures for girls, including candidates for secretarial or costing and accountancy careers. The company hopes to recruit from girls' high schools and public schools from all parts of the country.

Plymouth Apprentice Training

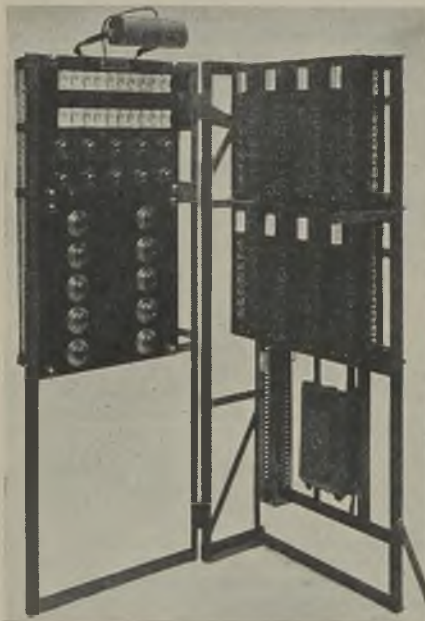
In the technical training of apprentices, members of the Plymouth Branch of the Electrical Contractors' Association anticipated the Government's post-war proposals by many years. Some ten years before the war they had a scheme in operation which necessitated apprentices attending the City Technical College on two half-days a week, in addition to evening tuition. This year all the members have adopted period daytime technical training which will allow the apprentices to attend College for an approximate period of one month in four, their fees and wages being paid by the contractors. This period training scheme is on similar lines to that of Marryatt & Place, Ltd., who have long proved its success. At an apprentices' dinner and entertainment held to inaugurate the scheme, the guests included Messrs. E. S. Leatherby (chairman of the Education Committee), F. Leatherby (chairman of the Electricity Committee), C. J. Hocking

(deputy city electrical engineer), and A. R. Boeree and S. G. Monk (principal of the Technical College and head of the Electrical Department, respectively). The chairman, Mr. R. D. Nichols, welcomed the guests on behalf of the Branch, and Councillor E. S. Leatherby, in reply, congratulated the contractors on anticipating and improving on the Government's scheme. Electrical installation work should be done thoroughly or left alone; he could visualise the time would come when only certificated electricians or firms would be allowed to carry out such work. Mr. Boeree having explained the possibilities of the scheme, Mr. J. Penrose, vice-chairman of the Branch, proposed a vote of thanks to the speakers, which was seconded by Mr. F. R. Madge, secretary. Afterwards there was an interesting film entertainment arranged and operated by the apprentices.

Switchboards for E.N.S.A.

Since the war began over a thousand stage lighting switchboards have been made in the workshops of the Engineering Department of E.N.S.A. at Drury Lane Theatre to meet the various needs of the Services. New designs of equipment of all types have been produced suitable for the wide field of operations and different climatic conditions to be found in such destinations as the Middle East, North-West Africa, India, Italy, Iraq, Burma, etc.

Among many interesting designs available,



Portable folding stage-lighting switchboard developed for E.N.S.A. work

the latest portable type unit, the "P3," is a 12-way switchboard with sliding dimmer control on all circuits, each way sub-fused and sub-switched. As it is designed to fold up book fashion it can

be installed at various angles (according to the available space off stage) and, owing to the small amount of room it occupies when folded (4 ft. 9 in. by 1 ft. 10 in. by 1 ft. 2 in.), is invaluable to units constantly on the move. Plug bases enable the various pieces of equipment to be quickly assembled and to be interchangeable. The total weight of the unit is less than 2 cwt. Mr. L. J. Henry, chief engineer to the E.N.S.A. Engineering Department, who is responsible for these designs, has been at Drury Lane Theatre for over twenty-five years.

Turkey's Increased Trade

The Turkish Ministry of Commerce has announced that in view of the increasing volume of trade with the United Kingdom and the United States, the Turkish trade missions in both countries are to be increased. Sukur Beiker, vice-president of the Foreign Trade Department, has been appointed trade counsellor to the Turkish Embassy in London.—*Reuter*.

Plugs and Sockets

In a statement published in our advertisement pages the Standing Committee of the Electrical Accessories Section of B.E.A.M.A. points out that the only recognised British Standard socket outlets and plugs are those manufactured in accordance with the various Specifications compiled and issued from time to time by the British Standards Institution. The proposed introduction of an entirely new and additional Standard, non-interchangeable with any of the existing B.S.I. Specifications, is now the subject of discussion between the appropriate authorities and the manufacturers, but it is not correct that the industry has prepared a design for a new Standard. The discussions are still continuing and until a decision is reached the only British Standard socket outlets and plugs are those made in conformity with existing British Standard Specifications.

Retail Distributors' Conference

The second annual conference of the Council of Retail Distributors takes place at the Caxton Hall, London, S.W.1, on Thursday and Friday, November 23rd and 24th. All retail traders' organisations interested in the activities of the Council are invited to send delegates. The Council, having as its primary aim the protection of the interests of the independent retail trader and shopkeeper, was formed in October, 1943, at a conference of 256 delegates of traders' organisations from all over Great Britain.

Correspondence with Liberated Italy

The Board of Trade has made a General Licence (S.R. & O. 1944 No. 1179) authorising business correspondence with liberated Italy. Banks and other financial institutions may now reply to requests for information from their depositors in liberated Italy, and British and Italian firms may exchange business information with a view to the future resumption of business relationships. The resumption of private trade is not yet permissible. The dispatch of powers of attorney and proxies is subject to the normal procedure under the Defence (Finance) Regulations. Correspondence which is sent to Italy cannot be registered or insured.

Italian-owned property in the United Kingdom will continue to be under the control of the Trading with the Enemy Department and the Custodians of Enemy Property. Arrangements have been made for the release of British-owned property in Italy to its original owner or his authorised agent.

Monmouthshire Industrial Exhibition

The Monmouthshire industrial exhibition which has just closed has proved an outstanding success in presenting, in a visual and model form, the potentialities and resources of the district as a site for existing and new industries. A display of water heating apparatus by Santon, Ltd., included

Santon water-heating display at the Monmouthshire industrial exhibition

thermal storage heaters and immersion water heaters for both domestic and industrial applications, among the latter being the heating of acids, oils and fats. An automatic water boiler was of particular interest to the factory personnel, while the public had an opportunity of examining a post-war heater of the under-the-draining board type. Also displayed was a comprehensive range of rotary switches and the Santon "Multi-plug." The heating display earned the high praise of Lord Woolton, who officially opened the exhibition.

Post-war Transport

After the war an efficient and economical transport system will be more than ever necessary to maintain an adequate export trade. A report prepared by the Joint Committee of the Association of British Chambers of Commerce and Federation of British Industries declares that industry is opposed both to nationalisation and to monopoly of transport. Any modification of existing legislation to effect closer co-ordination of transport should, it is recommended, be secured following a public inquiry into existing transport regulations either by a Parliamentary Committee or other appropriate body. After surveying the various forms of transport, the report concludes that after the war an independent tribunal on the lines of that established under the Railways Act, 1921, should be set up, with jurisdiction over all forms of transport, and that a panel of expert advisers, including traders, should be appointed.

Fatality

Works Accident.—An error in diagnosing an electrical fault led to the death on October 13th of Charles Thomas Thatcher, aged forty, of Amblecote, Stourbridge, who was killed by a 3,000-V shock at a works of the British Thomson-Houston Co., Ltd., where he was employed as a tester. At the inquest it was stated

that Thatcher was one of a team testing a new electric generator at the works when he received a slight warning shock. The power driving the generator was switched off while the fault responsible for the shock was sought and an adjustment was made. Thatcher signalled a workmate to switch on again, thinking he had diagnosed and remedied the fault correctly, and he received a fatal shock.

Mr. F. H. Tapper (in charge of the electrical department at the works) said it was subsequently found that the fault was not in the



generator, but in the motor driving it. If Thatcher had heeded a warning posted up where he was working, not to hold a certain lead while the motor was being started he would not have received the shock. Thatcher knew of this danger because he had warned other testers about it. It was, he said, a temporary lapse on the part of an experienced and conscientious workman.

The coroner recorded a verdict of "accidental death."

Equipment for Egypt

An English company is desirous of getting into touch with manufacturers of fans and fuse units (bases and carriers) who wish to export these to Egypt. We shall be glad to pass on the names of any interested readers.

Change of Address

Hendry Relays, Ltd., have moved their registered office to their works at Oakfield Road, Bourne End, Bucks.

Trade Publications

Johnson & Phillips, Ltd., Charlton, London, S.E.7.—Illustrated folder (G.5) dealing with the transportable AC arc welding set for a single operator in small works and semi-skilled users, described in the *Electrical Review* of June 23rd, 1944.

Enfield Rolling Mills, Ltd., Brimsdown, Enfield, Middlesex.—Data leaflet on "ERM" high-speed copper, developed during the present war, which can be machined as fast as free-cutting brass and with the same tools.

Copies can be obtained from the companies by bona fide trade applicants.

Electricity Supply Questions

Birmingham Chief Electrical Engineer's Views

ALTHOUGH the electricity supply industry is doubtless capable of improvement, the effect of many post-war plans, which seem to be based on opinions rather than on knowledge, would be to erect an imposing edifice in which to imprison posterity. This warning was given by Mr. F. W. LAWTON in his chairman's address to the I.E.E. South Midland Centre on October 21st, when he referred to the Weir and McGowan Reports as providing a firm and impartial foundation for future developments.

He believed that the administrative separation of distribution from generation would not be advisable for a large and complex area which might include a number of power stations. Such divided responsibility would affect not only the fundamental planning of generating plant and main transmission lines, but also the station loading and system switching, all of which determined the cost of the finished product, which was made up of 34 per cent. generation and 66 per cent. distribution.

Tariff Forms

Difficulties of unification of tariff forms had been exaggerated, as an undertaking could with a little trouble ascertain the average cost of supply to different classes of consumer. When established, standard tariff forms should be obligatory on the whole country. Reliability of supply would be regarded by most industrialists as of more importance than a lower price for electricity. Often, however, comparisons of costs as between private and public supply were made without due allowance for stand-by with the private plant. Distribution costs could be reduced by probably one-third if reliability were ignored. Rural areas varied greatly from compact communities to remote farms. In the latter case the few kW required might sometimes be provided by water power. A small addition to the rent could be made to cover the capital expenditure on electrical facilities. Alternatively, a special local rate could reasonably be imposed, as rural rates were generally less than urban, though wages tended to rise to the urban level.

The present measure of national control exercised by the Electricity Commissioners and the Central Electricity Board had been effectual in co-ordinating the industry without destroying individual initiative, which had been largely retained by the undertakings in power station design and operation as well as in load distribution and administration. Since electricity supply was a rapidly expand-

ing industry, in order to secure progress local initiative must be preserved. Complete nationalisation would lead to stereotyped practice which could not be beneficial to a still adolescent industry. Within the existing framework of national direction and control there was ample room for reorganisation on an area basis, such as was recommended in the Weir and McGowan Reports, which would secure the measure of freedom necessary for continued expansion.

It could not be assumed that for all time electricity would be produced by present methods and no scheme for the reorganisation of the supply industry should be put into effect that would in any way stultify fundamental investigation or comparative technical progress. Present controversies were insignificant in the light of the consideration that without electricity modern civilisation, or war, would be impossible.

British Standards Institution

Increased Membership and Activities

AT the annual general meeting of the British Standards Institution in London on October 17th, a statement presented by Dr. E. F. ARMSTRONG, F.R.S., chairman of the finance committee, showed that the income and expenditure for the year had increased by 28 per cent. to about £69,000. The sales of copies of British Standards had gone up 39 per cent. The Government grant-in-aid was nearly double and was now £12,900. There was an increase of about 15 per cent. in the number of subscribing members, but Dr. Armstrong stressed the need for greater support from local authorities and industry.

SIR PERCY ASHLEY, chairman of the General Council, paid a tribute to Mr. C. le Maistre, C.B.E., on his retirement after forty years' official connection with the Institution, and to Sir William Reavell, on his retirement from the chairmanship of the Engineering Divisional Council.

Sir Percy reviewed some of the special work done by the Institution during the war years and concluded by saying that industrial standards—providing for accurate and precise trade descriptions, methods of sampling and testing and standards of performance—were likely to be increasingly desirable. If they were to meet with general acceptance they must be prepared and promulgated by either a Government Department or an independent body of the nature of the British Standards Institution. He had no doubt that British industry would prefer the B.S.I. to any form of Government standards bureau, although it might be necessary in some cases for the Government to enforce the observance of standards, yet broadly progress would be most widespread and continuous if the policy of "standardisation by consent" was consistently pursued.

Fire-Resisting Cable

"Pyrotanax" Mineral Insulated Cable Shows Its Worth

A CONVINCING practical demonstration of the fire-resisting properties of "Pyrotanax" mineral insulated cables was provided recently by a severe fire which occurred in a furniture depository on the North East Coast. The building in which the cables were installed is a five-storey brick and steel structure with reinforced concrete floors, and in it were stored furniture and other

discoloration caused by water and heat. At the terminals, the p.v.c. sleeving used for insulating the tails of these cables had suffered, due to the heat; also the compound used for sealing had "run" in a number of cases, indicating that the termination would have to be re-made. Apparently, too, most of the switch boxes, switches and distribution boards will need to be replaced.

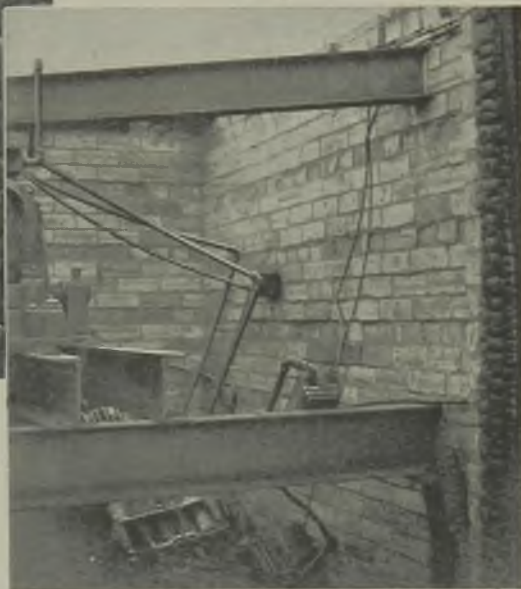
Owing to the great heat generated, the supporting girders have been badly distorted with the result that the cables carried across the ceiling to the lighting units on the various floors have suffered a certain amount of mechanical damage and in most cases they have been torn out of their fittings. The general condition of these circuits, however, is good, and from a superficial examination the cable could be re-used as it stands.

The remarkable fire-resisting qualities and mechanical strength of the cable thus demon-



Above: "Pyrotanax" cable and conduits entering a switch-unit in burnt-out warehouse. V.i.r. cable inside the conduit is completely destroyed due to the fierce heat, which is indicated by the charred timber door post.

Right: Top of the lift shaft on the roof of the warehouse, showing more "Pyrotanax" and conduit. The lift motor and control gear are completely burnt out.



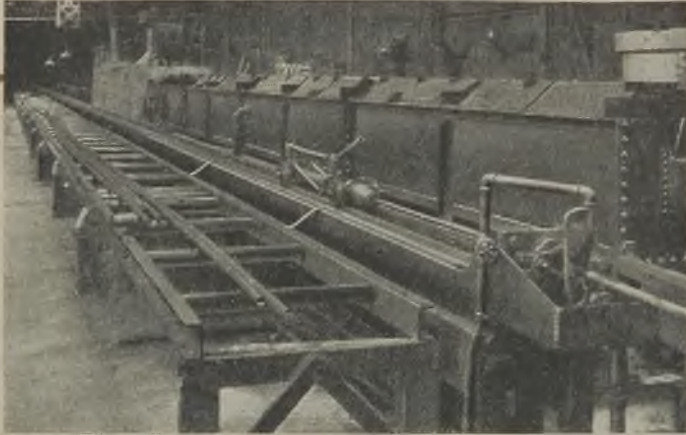
inflammable goods. The cause of the fire is unknown, but it originated in an adjoining single-storey building, which was wired with conduit and v.i.r. cable, and it entered the main building through a doorway, sweeping through all five storeys before being brought under control.

In inspecting the premises after the fire, we found that the "Pyrotanax" lighting cables which are carried from the ground to the top floors on the inside of the wall, appeared to be undamaged beyond a certain amount of

strated are being successfully utilised to a rapidly increasing extent for all kinds of situations requiring special precautions. In most of the latest power stations, as well, "Pyrotanax" cable is now to be found employed extensively. The fact that the manufacturers do not install the cable, but only give preliminary instructions when requested to do so, indicates that the technique of installing the cable is remarkably simple.

The only two tools not found in the normal kit of an electrician are a small tube cutter for securing a clean edge when removing the

conductors. Before they are loaded in the tube, the insulating blocks are heated to remove moisture and other volatile material in electrically heated resistance furnaces, which have been specially designed by the company's engineers, and are fitted with a Brookhirst contactor and a



186-ft. draw bench used in the factory; the continuous annealing furnace can be seen in the background

end portion of the exterior copper sheath, and when a ferrule-type seal is used there is a simple device for excavating magnesium oxide from the inside of the cable sheath to make room for the ferrule.

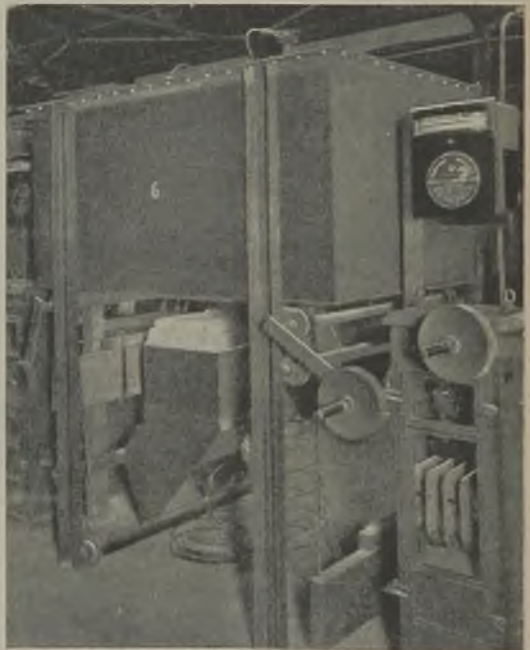
Besides being shown the methods adopted for sealing, and the latest types of sealing glands now available, we were also given the opportunity at one of the company's works not only of seeing how the cables can be employed in especially exacting conditions, but also how manufacturing methods have been improved during the six years or so since production of the cable was commenced on a commercial scale.

A considerable amount of new plant designed to secure continuity of production has recently been installed, much of it constructed by the company's own engineers. A standard and practically continuous process has been established for manufacture of all sizes of cable from the smallest made (0.0015 sq. in.) to the largest (0.2 sq. in. single conductor). An important feature of the process is the attention given to ensuring complete cleanliness of all the component parts, copper tubes, copper rods and insulating material.

The insulating material (pure magnesium oxide) is first pressed in cylindrical block form of suitable diameter for slipping easily into the copper tubes, which ultimately form the sheath of the cable and pierced to take the required size and number of copper rods which form the

which have previously been straightened out from the coils in which they arrive at the factory. Special precautions are taken at the filling stage to prevent oxidation of the copper due to the high temperature of the blocks.

Cambridgeregulator. The insulating blocks are then loaded by hand into the tubes, and are kept in register to receive, while still hot, the copper core rods



Magnesia block heating furnace for removing all traces of moisture. The "Pyrotanax" spring leads to the movable portion of the furnace have been in use for a number of years without attention

From this stage the whole process of manufacture consists of a continuous process of alternate cold drawing and bright annealing. For the initial drawing, a new continuous draw-bench has just been put into operation, which is 186 ft. in length. The final drawing is carried out by means of bull blocks ranging from 72 to 48 inches in diameter.

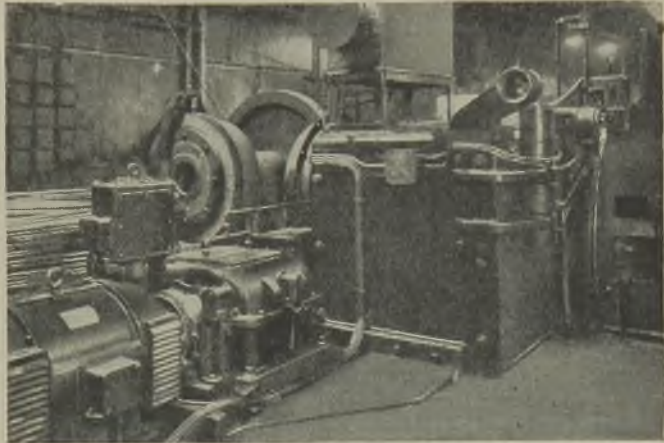
A continuous annealing plant loaded at 105 kW and providing a constant temperature of 520 deg. C. is employed for the primary annealing processes, through which the filled tubes from the draw-bench travel slowly, at a predetermined speed. The final annealing from the bull blocks is done by means of a standard 440-V, 3-phase, 270-kW resistance bright annealing furnace, large enough in diameter to take the coils from the bigger bull blocks. This is loaded up with coils of cable during the day, and brought into service during the night off-peak period. This apparatus, which is gas-filled and water sealed, is operated at 520 deg. C. and, like the continuous furnace, was built for the company by the Electric Resistance Furnace Co., Ltd.

After final annealing the ends of the lengths of cable are temporarily sealed in preparation for testing. "Megger" tests are then carried out followed by pressure testing at 3 kV for one minute, insulation and resistance tests, micrometer measurements for the outside diameter of each coil, low voltage (4 V) continuity tests, and tests of resistance of the conductors by means of a deflection galvanometer. Capacity tests are also taken at frequent intervals. The coils of cables are then measured and tied up for despatch.

Demonstration of Qualities

In the demonstration and instruction room adjoining the test department facilities are provided for showing the remarkable way "Pyrotanax" cable stands up to mechanical stresses, exceedingly high temperatures, immersion in oil and sea water for long periods and considerable overloads. Further proof of this, if proof is needed, is forthcoming in the factory itself, where some of the cables are mounted directly on to the furnaces and vibrating machinery and in situations in which they become coated with oil. The simple way in which the cables can be in-

stalled by merely slinging them over brackets is also to be seen, as well as the way in which, by means of loops, the cable can be employed in situations where a certain amount of flexibility is required, as for example, for connecting the bottom elements of the furnaces



72-in. diameter bull block for later stages of cable drawing. The machine is wired with "Pyrotanax" including the spring connection to the machine control buttons mounted on the swivelling die head

used for baking the blocks of insulating material, and for wiring motors mounted on slide rails.

Brazilian Post-War Plan

THE Brazilian Commission for Inter-American Development has drawn up an extensive programme for the electrification of the country after the war. The most ambitious plan at present under consideration is the utilisation of the water power resources of the San Francisco River. Other projects recommended by the Commission aim at the development of the light metal industry in the Pocos de Caldas area in Minas Gerais. Recent studies have shown that the waters of both the River Pardo and the River das Antas have large possibilities for electric developments which could be used in exploiting the bauxite deposits in that region. The Commission further recommends the carrying out of the following four schemes: Extension and improvement of the Ribeirac das Lages stations in the State of Rio de Janeiro with a view to increasing their power generation by about 40,000 kW; extension and improvement of the Cubatao station in San Paulo, increasing generation by 55,000 kW; construction of a new hydro-electric power station housing two 10,000-kW sets in Avandava by the Empresas Electricas Brasileiras (State of San Paulo); and utilisation of the power of the River Manhacu or the River Jose Pedro (Rio Doce Valley) with a view to exploiting the nickel deposits in that area.

Meanwhile, work on the development of the Paulo Alfonso Falls, capacity 400,000 HP, is progressing.—*Reuter's Trade Service.*

ELECTRICITY SUPPLY

Glasgow Power Station Site. Cotton Mill Electrification.

Barrow-in-Furness.—EXTENSIONS.—The Electricity Committee has purchased land in Union Street at a cost of £1,700 for electricity extensions. Supplies are to be provided to premises at Goadsbarrow, Backbarrow, Kirby, and Greenold, the last necessitating mains extensions and the installation of a voltage regulator at a cost of £466.

Billingham-on-Tees. — POST-WAR PLANS. — The Urban District Council has approached the North-Eastern Electric Supply Co., Ltd., regarding future electrical developments in the town. The company has asked to what extent electricity will be used for housing, before preparing its post-war plans for the area.

Birkenhead.—LOANS.—The Electricity Committee has obtained permission to borrow £1,500 for substation equipment and is seeking sanction to borrow £3,000 for mains and services.

Brierfield.—LIGHTING CHANGE-OVER.—The electrical engineer has been authorised to proceed with the conversion of additional street lamps from gas to electricity.

Glasgow.—POWER STATION SITE.—The Clyde Navigation Trustees have unanimously agreed not to grant an application by the Corporation for a site at Shieldhall for an electricity generating station. Another site, however, is offered, and the Trustees request an early decision because of pressing applications for land in the area by industrial companies.

Inverness.—CHARGES STILL AT PRE-WAR LEVEL.—Referring to the electricity undertaking in his budget statement to the Town Council the treasurer said that it was a matter for gratification that during the whole of the war electricity had not been charged a penny more. He did not think there were many towns in Scotland that were able to say the same. It was very creditable to Mr. MacArthur, the engineer, and his staff.

Leith.—DOCK MACHINERY.—The Leith Dock Commissioners have drawn up a programme of post-war improvements. The proposals include the provision of electric cranes at various quays and jetties, and the gradual substitution of electric for hydraulic power in the dock machinery, except in the case of coal-loading appliances.

Lowestoft.—LIGHTING LOAD.—The borough electrical engineer recently informed the Electricity Committee that he had made a request that the Yarmouth power station should be in operation during the initial stages of the restoration of public lighting. The Yarmouth electrical engineer replied that the matter came within the province of the Central Electricity Board with which he was in communication on the subject.

Nelson.—POWER FOR COTTON MILLS.—The *Northern Daily Telegraph* reports that the Electricity Committee is considering the question of supplying cheap electricity to cotton mills, and the possibility of electric power taking the place of steam for looms.

Northern Ireland.—POSITION OF DERRY UNDERTAKING.—Replying to a question in the Ulster Parliament Mr. Brian Maginess, Parliamentary Secretary to the Ministry of Commerce, said that no representatives of Londonderry had been invited to take part in the recent discussions by the committee which made the recommendations for the distribution of electricity in the Province. The position of the Derry undertaking was a special problem which, however, had little influence on the general considerations governing the matters dealt with by the committee. Separate discussions had been held with representatives of Londonderry and it was hoped soon to reach an amicable agreement.

RATE AID.—In answer to another question Mr. Maginess said that the Belfast Corporation Electricity Department had not made a contribution in aid of rates during the last three years. The last contribution, paid in 1942 out of the previous financial year's revenue, was £11,000. The total amount contributed since the inauguration of the undertaking nearly 50 years ago was £250,000.

Portland.—YEAR'S SURPLUS.—In our issue of September 29th we gave the net surplus on the past year's working of the U.D.C. Electricity Department as £660 against £1,239 for the previous year. These figures should be reversed, the profit for 1943-44 being £1,239 and that for 1942-43 £660.

Renfrew.—ADVICE ON LIGHTING.—Mr. E. J. Stewart, inspector of lighting, Glasgow, is to advise the Corporation on the equipment for street and stair lighting and the reorganisation of the lighting department.

Stockton-on-Tees.—EXTENSIONS.—The Town Council is to supply electricity to the works of the Stockton Stone & Concrete Co., Ltd., and plans are to be prepared for the West Row and Outram Street substation extensions, including mains, plant and equipment. The Council's post-war plans for the electricity undertaking are estimated to cost nearly £70,000.

Warrington.—CHANGE-OVER.—The Electricity Committee has obtained consent for the change over of supplies of certain consumers from DC to AC.

TRANSPORT

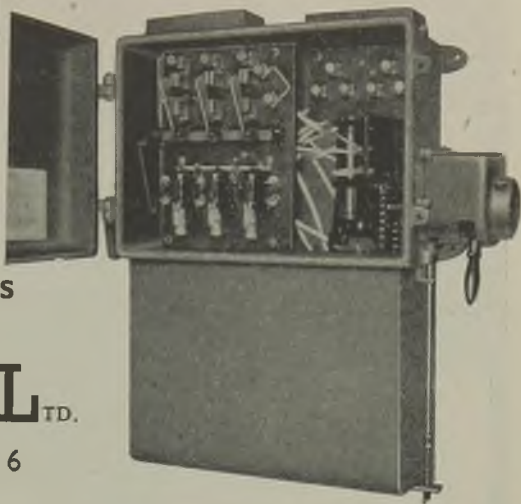
Darlington.—ADDITIONAL TROLLEY-BUSES.—The Town Council is to borrow £20,000 for the purchase of eight trolley-buses needed under the 1944-45 programme.

Argentina.—UNDERGROUND RAILWAY EXTENSIONS.—Proposals for the extension of the underground railway services in Buenos Aires are reported to be under consideration by the Buenos Aires Transport Corporation. The *Review of the River Plate* states that the city to Palermo, Chacarita, Primera Junta and Boeda lines will, if the plan materialises, be carried further westwards, while the Retiro—Constitución line will continue south to Avellaneda. A new line connecting all the east-west routes is planned to run from Barrio Parque to Puente Urriburu.

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Company News. Stock Exchange Activities.

Reports and Dividends

British Vacuum Cleaner & Engineering Co., Ltd.—In his address at the company's annual meeting, Mr. H. C. Booth (chairman) said that as electrical development was essential to the expansion of their industry, so in no small way the vacuum cleaner assisted in the development of electricity supply, for it had never been found possible to clean the home by gas. More than ever after the war the vacuum cleaner would be looked upon as an essential feature of the equipment of a modern home. In industry vacuum cleaners helped to protect the health of the workers while the company's suction conveying plant and air filtration units increased fuel efficiency and improved working conditions. In reviewing the accounts he stated that since the date of the balance sheet one of their factories had been seriously damaged by enemy action, but as it was not in the occupation of the company production was not affected.

Herbert Morris, Ltd., from a profit of £145,683 (against £125,445) are maintaining the ordinary dividend at 20 per cent., free of tax, by a final payment of 15 per cent. A sum of £40,000 (against nil) is put to general reserve. Demand for the company's products has been maintained and orders in hand remain high.

The Nigerian Electricity Supply Corporation, Ltd., reports a net profit of £134,471 (£138,853). The final dividend is 5 per cent., again making 8 per cent., but, in addition, a bonus of 2 per cent. is being paid.

Richard Johnson, Clapham & Morris, Ltd., are paying a final dividend of 11½ per cent., again making 15 per cent. for the year. Profits have risen from £32,253 to £42,163, the carry-forward being £6,895 (£6,088).

The Brush Electrical Engineering Co., Ltd., has declared an interim dividend of 4 per cent. There was no interim distribution last year, when 9 per cent. was paid for the year.

The Cables Investment Trust, Ltd., reports an income of £344,902 for 1943-44 (against £326,271 for 1942-43). The ordinary dividend is again 3 per cent.

Ferranti, Ltd., reports a profit of £96,237, as compared with £71,285 in the previous year, and is maintaining its dividend at 6 per cent., tax free.

Babcock & Wilcox, Ltd., have declared an interim ordinary dividend of 4 per cent., as last year.

The Britannia Electric Lamp Works, Ltd., is paying a dividend of 7 per cent. in respect of the past year (same).

The Calcutta Electric Supply Corporation, Ltd., is maintaining its interim dividend at 3 per cent., free of tax.

New Companies

Associated Installation Services, Ltd.—Private company. Registered October 13th. Capital, £2,500. Objects: To carry on the business of manufacturers of, and dealers in, electrical and mechanical apparatus and accessories, wireless

sets and valves, etc. Directors: C. E. Parrott, 9, Edgeworth Crescent, N.W.4; A. J. May, 44, Third Avenue, W.3, and E. J. Buck, and Elizabeth I. W. Parrott. Registered office: 9, Edgeworth Crescent, N.W.4.

William H. Garson (Southampton), Ltd.—Private company. Registered October 11th. Capital, £3,000. Objects: To acquire the business of electrical equipment dealer carried on by W. H. Garson at 9, Carlton Crescent, Southampton. First directors: W. H. Garson and Amy Garson, both of 48, The Avenue, Southampton. Registered office: 9, Carlton Green, Southampton.

Companies' Returns Statements of Capital

Lancashire United Transport & Power Co., Ltd.—Capital, £600,000 in £1 shares (300,000 preference and 300,000 ordinary). Return dated April 13th. 300,000 preference and 276,208 ordinary shares taken up. £101,306 paid. £474,902 considered as paid. Mortgages and charges: £232,995. (A further £50,000 of this stock is deposited with bankers as security for possible advances.)

A. Reyrolle & Co., Ltd.—Capital, £1,250,000 in 115,000 preference, 816,711 ordinary and 318,289 unclassified shares of £1 each. Return dated May 4th. 102,500 preference and 816,711 ordinary shares taken up. £875,500 paid. £43,711 considered as paid. Mortgages and charges: Nil. Return of allotments, made up to June 30th, 1944, shows a further 11,606 shares allotted otherwise than for cash.

City of Buenos Ayres Tramways (1904), Ltd.—Capital stock, £1,240,000. Return dated May 25th. All stock taken up. £1,240,000 paid. Mortgages and charges: £91,050.

Receiver Released

Whitehead Switchgear & Inventions, Ltd.—E. T. Granger, Dowlais Chambers, West Bute Street, Cardiff, ceased to act as receiver on October 5th.

Winding-up Order

Claybury Electrical Supplies, Ltd.—In the Companies Court on October 16th Mr. Justice Cohen had before him a judgment creditor's petition for the compulsory winding-up of the company. The company did not appear and his Lordship made an order for its compulsory winding up.

Liquidations

Mosbrough Electric Supply Co., Ltd.—Meeting November 23rd, at Trinity Schoolroom, Cadman Street, Mosbrough, to receive an account of the winding up by the liquidator, Mr. J. Gadsby.

Bankruptcies

H. A. Mayhew, electrical contracting engineer, 96, London Road, Apsley, Herts., and 30, Elmer Gardens, Edgware.—Proofs for dividends by November 4th to the trustee, Mr. A. H. Ward, 42, Tavistock Square, W.C.1.

STOCKS AND SHARES

TUESDAY EVENING.

STOCK Exchange markets are pursuing an uneventful course. Investment seems to be emulating Mr. Micawber in waiting for something to turn up, without knowing in which direction to look for fresh news. Prices remain firm on the whole, but absence of business tends to have a slightly depressing effect on prices. The Home railway market finds that money is going into the junior stocks on account of the high returns which these offer by comparison with shares of industrial companies. Ordinary shares of front-rank industrial undertakings remain in steady demand. In more speculative sections, radio shares continue moderately active.

Electricity Supply

Electricity supply ordinary shares are rather easier where any change has occurred. South Londons hardened to 29s. 6d., but County of London and Metropolitans lost 6d. Bournemouth & Poole and Midland Electric Power, in the provincial group, are down by 1s. and 6d. respectively. Among overseas shares, Cawnpore Electrics are better at 39s. 9d. Calcutta Electric Supply remain at 47s., while Calcutta Trams, the volatile, have recovered a further 2s. to 67s. 6d. Interest in their speculative possibilities has largely subsided now it is recognised that no important developments can occur until next year. Perak Hydro-Electrics eased off to 13s., on the idea that two or three years may elapse after the war before Malayan dredging companies resume normal working.

Brush Interim Dividend

The Brush Electrical Engineering Company has declared, for the first time in many years, an interim dividend, and the 4 per cent. announced last week is taken as an earnest that the final will be 6 per cent., to make 10 per cent. for the year. Last year's dividend was 9 per cent., an increase of 1 per cent. over the previous payment. The price of Brush ordinary is unchanged at 10s. 9d., at which, or a little more, a line of shares could probably be obtained. On a 9 per cent. dividend, the yield at 10s. 9d. is 4 3s. 9d. per cent.; a 10 per cent. dividend at this price would afford 4 13s. per cent.

Equipment Shares' Recovery

British Insulated, Callender's and Henley's are all better on the week. The spasm of nervous selling which lowered the prices three weeks ago has been followed by renewal of the previous support. A general improvement lifted Lancashire Dynamo shares by 2s. 3d. to 98s. 9d. Ransome & Marles and De la Rue have risen $\frac{1}{2}$. Johnson & Phillips,

Siemens, Hopkinsons and Enfield Cables are higher. Tube Investments hardened to 96s. Associated Electric and Thorn Electrical have gone ahead. Mather & Platt at 53s. 3d. put on 9d. and, in the heavy industries, Babcock & Wilcox at 50s. 6d. are 1s. to the good. Automatic Telephones at 63s., and Telephone Rentals and Telephone Manufacturing both at 12s., have shared in the market's upward tendency. On the other side of the account, Chloride Electrical Storage at 85s. are half-a-crown down, and Ever Ready at 40s. 6d. are 6d. easier.

Radio Shares

Electric & Musical Industries are quoted ex dividend and the market has settled down to quieter conditions. The daily turnover of shares is still on a fairly large scale (unlike the New York Stock Exchange, the Stock Exchange in London has no machinery for recording the actual number of shares in any individual company that changes hands day by day). E. K. Cole at 33s. 6d. are 6d. harder. Cossors fluctuate narrowly round about 25s. 6d. and Pye deferred seldom move from 33s. 9d. The Philco market has lost part of its recent vitality and the price keeps about 13s. McMichael Radios are better at 8s. People who buy these radio shares do so without regard to the current rate of income they receive from the dividend on them. Post-war prospects are the attraction that creates the demand.

Ransome & Marles

The price of Ransome & Marles ex dividend is 86s. 3d., which, although not quite at the peak, is nearly as high as it has stood over a period of years. The company has been paying a dividend of 20 per cent. per annum for the past seven years, 1938-1944 inclusive. Engaged in the manufacture of ball and roller bearings, Ransome & Marles owns freehold land at Newark, and it has branches in London, Birmingham, various provincial centres, Glasgow, Dublin and Belfast. The capital of £700,000 is all issued, and there is £150,000 in debenture stock. The shares are regarded as being a sound industrial investment and yield at the present price 4 12s. 10d. per cent. on the money.

"A Cleaner Place"

The chairman of British Vacuum Cleaner made a neat point in his speech at last week's meeting when he said that the company turned out a variety of equipment which has made the world a cleaner place. British Vacuum Cleaner celebrated its 40th birthday by reporting a larger production-output than ever. Net profits came out rather under those of the previous year, but, as mentioned in last week's *Electrical Review*, a final dividend

(Continued on page 610)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend		Middle Price Oct. 24	Rise or Fall	Yield p.c.	Company	Dividend		Middle Price Oct. 24	Rise or Fall	Yield p.c.	
	Previous	Last					Previous	Last				
Home Electricity Ordinary						Equipment and Manufacturing						
Bournemouth and Poole	12½	12½	63/6	-1/-	3 18 9	Aron Elec. Ord.	10	15	61/-	..	4 18 4	
British Power and Light	7	7	33/6	..	4 3 7	Assoc. Brit. Eng. Assoc. Elec.	6	7	57/6	..	2 8 9	
City of London	7	5½	30/-	..	3 13 4	Ord.	10	10	52/-	+6d.	3 17 0	
Clyde Valley	8	8	42/-	..	3 16 0	Pref.	8	8	39/6	+6d.	4 1 0	
County of London	8	8	44/-	-6d.	3 12 9	Automatic Tel.&El.	12½	12½	63/-	+2/-	3 19 4	
Edmundsons	6	6	31/-	..	3 17 5	Babcock & Wilcox	11	11	50/6	+1/-	4 7 2	
Elec. Dis. Yorkshire	9	9	45/6	..	3 19 6	British Aluminium	10	10	47/-	..	4 5 1	
Elec. Fin. and Securities	12½	13½	60/-	..	4 10 0	British Insul. Ord.	20	20	5½	+½	3 13 0	
Elec. Supply Corporation	10	10	48/6	..	4 2 4	British Thermostat (5/-)	..	18½	18½	20/-	..	4 12 6
Lancs. Light and Power	7½	7½	37/-	..	4 1 1	British Vac. Cleaner (5/-)	..	30	30	29/-	..	5 3 5
Llanely Elea.	6	6	26/6	..	4 10 7	Brush Ord. (5/-)	8	9	10/9	..	4 3 9	
Lond.Assoc.Electric	3	4	26/-	..	3 1 6	Burco (5/-)	15	17½	17/-	..	5 3 0	
London Electric	6	6	30/6	..	3 18 8	Callender's	15	20	5½xd	+1/9	3 15 6	
Metropolitan E.S.	8	8	43/6	-6d.	3 13 9	Chloride Elec.Storage	15	15	85/-	..	3 10 7	
Midland Counties	8	8	41/6	..	3 17 0	Christy Bros.	12½	17½	75/-	..	4 13 4	
Mid. Elec. Power	9	9	44/-	-6d.	4 1 10	Cole, E. K. (5/-)	10	15	33/6	+6d.	2 4 10	
Newcastle Elec.	7	7	31/6	..	4 9 0	Consolidated Signal	24	24	8½	..	4 3 6	
North Eastern Elec.	7	7	35/-	..	4 0 0	Cossor, A. C. (5/-)	7½	10*	25/6	..	1 19 4	
Northampton	10	10	50/-	..	4 0 0	Crabtree (10/-)	17½	17½	41/-	..	4 5 4	
Northmet Power	7	7	43/6	..	3 4 4	Crompton Parkinson Ord. (5/-)	20	22½	32/-	..	3 7 3	
Richmond Elec.	6	6	26/-	..	4 12 4	De La Rue	35	40	9½	+½	4 2 0	
Scottish Power	8	8	40/6	..	3 19 0	E.M.I. (10/-)	6	8	35/-xd	-6d.	2 5 9	
Southern Areas	5	5	23/-	..	4 7 0	Elec. Construction	10	12½	57/-	..	4 7 9	
South London	7	7	29/6	+6d.	4 15 0	Enfield Cable Ord.	12½	12½	62/-	+1/-	4 0 8	
West Devon	5	5	23/6	..	4 5 1	English Electric	10	10	50/6	..	3 19 0	
West Gos.	4½	3½	25/-	..	2 16 0	Ensign Lamps (5/-)	25	15	21/3	..	3 10 8	
Yorkshire Elec.	8	8	43/-	..	3 14 5	Ericsson Tel. (5/-)	22*	20*	50/-xd	-½	2 0 0	
						Ever Ready (5/-)	40	40	40/6	-6d.	4 18 9	
						Falk Stadelmann	7½	7½	34/6	..	4 7 0	
						Ferranti Pref.	7	7	31/3	..	4 9 7	
						G.E.C.:						
						Pref.	6½	6½	32/9	..	3 19 4	
						Ord.	17½	17½	83/3	..	3 15 1	
						General Cable (5/-)	15	15	15/-	..	5 0 0	
						Greenwood&Batley	15	15	45/-	+½	6 13 4	
						HallTelephone(10/-)	12½	12½	31/-	..	4 0 8	
						Henley's (5/-)	20	20	26/6	+1/-	3 15 6	
						4½% Pref.	4½	4½	24/-	..	3 15 0	
						Hopkinsons	15	17½	69/9	+6d.	5 0 6	
						India Rubber Pref.	5½	5½	23/-	..	4 15 9	
						Intl. Combustion	30	30	6½	..	4 10 8	
						Johnson & Phillips	15	15	74/6	+6d.	4 0 6	
						Lancashire Dynamo	22½	22½	98/9	+2/3	4 11 0	
						Laurence, Scott(5/-)	12½	12½	13/-	..	4 16 2	
						London Elec. Wire	7½	7½	37/6	..	4 0 0	
						Mather & Platt.	10	10	53/3	+9d.	3 15 2	
						Metal Industries (B)	8	8½	50/6	..	3 7 6	
						Met. Elec. Cable Pref.	5½	5½	21/3	..	5 3 6	
						Mid. Elec. Mfg.	25	25	7½	..	3 10 3	
						Murex	20	20	95/-	..	4 4 4	
						Newman Ind. (2/-)	20	20	6/-	..	6 13 4	
						Philco (2/-)	13/-	
						Power Securities	6	6	29/-	..	4 2 9	
						Pye Deferred (5/-)	25	25	33/9	..	3 14 5	
						Ransome & Maries	20	20	86/3	+½	4 12 10	
						Revo (10/-)	17½	17½	40/-	..	4 7 6	
						Reyrolle	12½	12½	87/8xrs.	..	3 14 5	

(Continued on next page)

* Dividends are paid free of Income Tax.

Company	Dividend		Middle Price Oct. 24	Rise or Fall	Yield p.c.	Company	Dividend		Middle Price Oct. 24	Rise or Fall	Yield p.c.	
	Previous	Last					Previous	Last				
Equipment and Manufacturing (Continued)						£	s.	d.				
Siemens Ord.	7½	7½	35/6	+6d.	4 4 6				25/6		4 14 1	
Strand Elec. (5/-) . . .	10	12½	10/9		5 16 3				45/6		4 8 0	
Switchgear & Cowans (5/-)	20	20	18/6		5 8 1				75½	+½	6 12 5	
T.C.C. (10/-)	5	7½	22/6		3 6 8				115½	+1	4 7 0	
T.C. & M.	10	10	56/-		3 11 6				60/-		3 6 8	
Telephone Mfg. (5/-) . . .	9	9	12/-	+6d.	3 15 0				46/-		4 7 0	
Thorn Elec. (5/-)	20	20	26/-	+1/-	3 17 0							
Tube Investments	20	20	96/-	+6d.	4 3 4							
Vactric (5/-)	Nil	22½	16/6		6 16 3							
Veritys (5/-)	7½	7½	8/-		4 13 9							
Walsall Conduits (4/-) . . .	55	55	50/-		4 8 0							
Ward & Goldstone (5/-)	20	20	30/-		3 6 8							
Westinghouse Brake	12½	14	75/-		3 14 8							
West, Allen (5/-)	7½	7½	7/6		5 0 0							
Traction and Transport												
Anglo-Arg. Trans. :												
First Pref. (£5)	Nil	Nil	2/6		—							
4% Inc.	Nil	Nil	7½		—							
Brit. Elec. Traction :												
Def. Ord.	45	45	11/95		3 15 4							
Pref. Ord.	8	8	180		4 9 0							
Bristol Trams	10	10	57/-		3 10 2							
Brazil Traction	1½	2	27½	+½	7 8 7							
Calcutta Trams	6½	7½	67/6	+2/-	2 4 6							

* Dividends are paid free of Income Tax.

Stocks and Shares (Continued from page 608)

of 17½ per cent. is again declared, bringing the total for the year up to 30 per cent. At the present price of 29s. the yield comes to £5 3s. 5d. per cent. The ordinary shares are of 5s. each. There is also an issue of 5½ per cent. redeemable preference of £1 each, the price of which stands about 23s.

Reyrolle

The price of Reyrolle is now quoted ex the rights to the new shares, valued at 2s. 6d. per old share. The new were issued at 60s. in the proportion of one new share for each complete multiple of £4 7s. 6d. of ordinary stock held. The new shares are quoted at 7s.-8s. premium, making the price practically the same as that of the senior issue.

"Not to Press"

The Stock Exchange method of dealing "not to press" is by no means confined to shares in electricity supply companies. It is applied to a good many transactions in shares where the market is a limited one. The term "not to press" is treated elastically. Shares may not come to market for literally months after a bargain in them has been booked. The buyer is fully protected, of course, during the period of waiting, so far as dividends and other rights are concerned. The fact of his not being on the register of the company in no way affects his ownership of shares which he has bought. Nor need he pay for them

until the transfer into his name is actually delivered. This mode of dealing can scarcely be described as satisfactory. Often it leads to impatience and misunderstanding, but where a dealer in the market has not got, and does not know where to obtain, the shares which a buyer particularly wishes to acquire, and for the delivery of which he, the buyer, is prepared to wait, a bargain can be done on this basis.

Price-list Alterations

It may be noticed this week that various alterations have been made in the catalogues of stocks and shares quoted in the weekly price lists. Times change, and investments with them. Securities which attract considerable public attention for ten or twenty years may, and occasionally do, fall out of what may be called the active list. Little business passes in the securities, and although the quotations remain in the Stock Exchange official lists, they become more or less nominal. In the meantime, other issues come to the front, achieving a greater popularity for various reasons, such as increase of dividend or developments in the particular branch of industry. For such reasons the shares attract a greater amount of public attention than the securities of the class referred to. In the effort to increase the service afforded by quotation of stocks and shares, certain additions have been made to this week's lists, and a few of the seldom-negotiated securities are taken out.

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.

AUTOMATIC Telephone & Electric Co., Ltd., J. Bylewski and A. Davison.—“Magnetic dust cores.” 5206. April 1st, 1943. (564621.)

British Thomson-Houston Co., Ltd.—“Production of transient electric arcs.” 2457/42. February 26th, 1941. Addition to 538154. (564569.)

“Resinous condensation products.” 15822/42. November 19th, 1941. (564576.) “Dish-washing apparatus.” 14168/43. September 1st, 1942. (564694.)

British Thomson-Houston Co., Ltd. (General Electric Co.)—“Snap-action devices particularly suitable for electric switches.” 13135. August 13th, 1943. (564681.)

Creed & Co., Ltd.—“Electrosensitive recording blank.” 12573/43. August 4th, 1942. (564676.)

Dubilier Condenser Co. (1925), Ltd. (W. Dubilier).—“Electrical condensers.” 7306. May 8th, 1943. (564661.)

English Electric Co., Ltd., and W. E. M. Ayres.—“Electromagnetic slip couplings, brakes and dynamometers.” Cognate applications 21115/43, 11059/43 and 20923/43. December 18th, 1942. Divided out of 564635. (564665.)

English Electric Co., Ltd., H. S. Carnegie, R. J. Welsh and E. K. Wood.—“Ship propulsion power plant.” Cognate applications 1360/43 and 4134/43. January 27th, 1943. (564639.) Ditto 1361. (564640.)

R. S. Foster.—“Mercury switches for electrical circuits.” 18539/42. December 9th, 1943. (564604.)

Igranic Electric Co., Ltd. (Cutler-Hammer, Inc.)—“Electric circuit control and protection arrangements.” 13920. August 26th, 1943. (564687.)

G. Liebmann and Cathodeon, Ltd.—“Cathode-ray tubes.” 15392. November 2nd, 1942. (564546.) “Electronic valves.” 15191. October 29th, 1942. (564601.)

Londex, Ltd., and W. S. F. Brown.—“Device for operating sequences of electric current impulses.” 5843. April 12th, 1943. (564654.)

Okonite-Callender Cable Co., Inc.—“Electric power cable systems.” 12999/43. October 24th, 1942. (564680.)

Philips Lamps, Ltd., and W. A. Stickley.—“Thermal electric switches.” 16446. December 20th, 1942. (564579.)

Spencer (Melksham), Ltd., and B. D. Milne.—“Power-transmission mechanism.” 3898. March 10th, 1943. (564648.)

Sperry Gyroscope Co., Inc.—“Directional radio receiving systems.” 9260/42. July 3rd, 1941. (564572.)

Standard Telephones & Cables, Ltd.—“Insulated electric conductors.” Cognate applications 13798/43 and 13799/43. August 28th, 1942. (564685.) “Cord connectors for telephone instruments.” 13994/43. December 11th, 1942. Addition to 560586. (564690.)

Standard Telephones & Cables, Ltd., and G.

Gilliver.—“Joining of wires, particularly fine wires used in the manufacture of electrical coils.” 5099. March 30th, 1943. Addition to 558472. (564617.)

Standard Telephones & Cables, Ltd., and W. E. Laycock.—“Manufacture of metal dust.” 5296. April 2nd, 1943. (564651.)

A. V. Tomlinson (Union Switch & Signal Co.).—“Electromagnetic relays.” 14613. October 19th, 1942. (564545.)

T. G. L. Tustin and B. C. Williams.—“Cigarette and/or pipe lighter for use on motor vehicles, or for use where a high-tension electric current is available.” Cognate applications 1935/43 and 5129/43. February 5th, 1943. (564554.)

A. E. Watkins.—“Electric or gas heaters for water or other liquids.” 3435. March 2nd, 1943. (564644.)

Westinghouse Electric International Co.—“Alternating-current measuring instruments.” 13150/42. September 26th, 1941. (564544.)

“Bearings.” 8395/43. May 28th, 1942. (564662.) “Electrical insulators.” 9176/43. July 25th, 1942. (564669.)

TRADE MARK APPLICATIONS

THE following applications have been made for trade marks. Objections may be entered within a month from the dates stated:—

October 11th

PROMONTORY. No. 624,718, Class 1. Preparations (other than metals) for soldering or welding. Also No. 624,720, Class 9. Electrical welding apparatus.—Thos. P. Headland, Ltd., 164-168, Westminster Bridge Road, London, S.E.1.

WESTERN ELECTRIC (Design). No. 626,254, Class 10. Electrical instruments and apparatus for aiding the deaf.—Western Electric Co. Inc., New York. Address for service: c/o F. C. Tomlins, 5, Mornington Road, Woodford Green, Essex.

MAGNODIC. No. 629,729, Class 11. Parts (not included in other classes) of installations for lighting, heating, steam generating, cooking, refrigerating, drying, ventilating, etc., all made principally of common metal or of alloys of common metal.—High Duty Alloys, Ltd., 89 Buckingham Avenue, Trading Estate, Slough.

October 18th

INSUL. No. 630,278, Class 11. Installations for heating, cooking and refrigerating.—A.V.E. Co., Ltd., 1343, London Road, Norbury, S.W.16.

CHARGOLYTE. No. 630,422, Class 11. Portable electric lamps.—Eric Lewis Eastell and Margery May Eastell, trading as Easco Electrical Service, 6 & 8, Brighton Terrace, London, S.W.9.

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.

Australia.—Western Australian Government Electricity Supply, Perth. Boilers, pulverised coal equipment, economisers, feed pumps, air heaters, mechanical draught plant, pipework, buildings, etc.; two 25,000-kW turbo-alternators and condensing plant, etc.; and one 25,000-kW frequency changer. (See this issue.)

Manchester.—November 8th. Electricity Committee. Street lanterns. (See this issue.)

Orders Placed

Ashton-under-Lyne.—Electricity Committee. Accepted. Cables.—British Insulated Cables.

Australia.—New South Wales.—Sydney County Council. 11-kV cables, Spec. 712 (£3,198).—Johnson & Phillips. Current-limiting reactors for Bunnerong, Spec. 697 (£2,725).—Australian General Electric. 11-kV and 440-V switchgear for graving dock, Specs. 698-9 (£45,914).—Westinghouse Rosebery.

Consett.—Urban District Council. Accepted. Traffic lights, Leadgate cross-roads.—Siemens & General Electric Railway Signal Co.

Durham.—County Education Committee. Accepted. Electrical installation, Tow Law Dan's Castle Council School (£95).—J. Warren.

Glasgow.—Municipal Transport Committee. Accepted. Supply of armature coils.—Oldfield Engineering Co.

Montrose.—Governors. Accepted. Electric lighting installation in Dorward House.—R. Kilpatrick & Co., Dundee.

Newport (I. O. W.).—Water Committee. Accepted. Electric pumps (£342).—Mather & Platt. Electric motor (£180).—Geo. Cohen & Sons.

Swansea.—Electricity Committee. Accepted. Vacuum cleaning plant for Tir John power station (£8,955).—Sturtevant Engineering Co.

Warrington.—Gas Committee. Accepted. Renewal of electrical plant at carbonising plant, Longford gasworks (£1,284).—W. A. Boulting.

West Hartlepool.—Corporation. Accepted. 500-kVA transformer for the Powlett Road factory site.—Bryce. Switchgear.—A. Reyrolle & Co.

Contracts in Prospect

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

Corby.—Proposed civic centre; U.D.C. surveyor, The Jamb, Corby, Northants.

Douglas (I.O.M.).—Generator house, Castle Hill Works; Crown Welding Co., Ltd.

Dufftown.—Cinema; H. C. Stewart, Nethy-bridge.

Eccles.—Works canteen, Monton Cotton Mill; Architect's Department, Hopwood Hall, Hopwood, Middleton.

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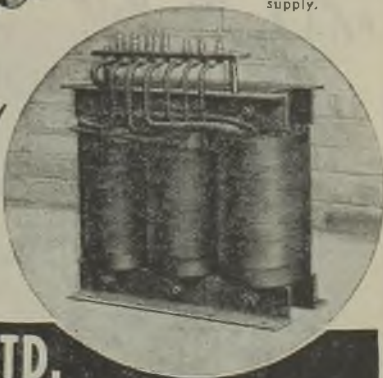
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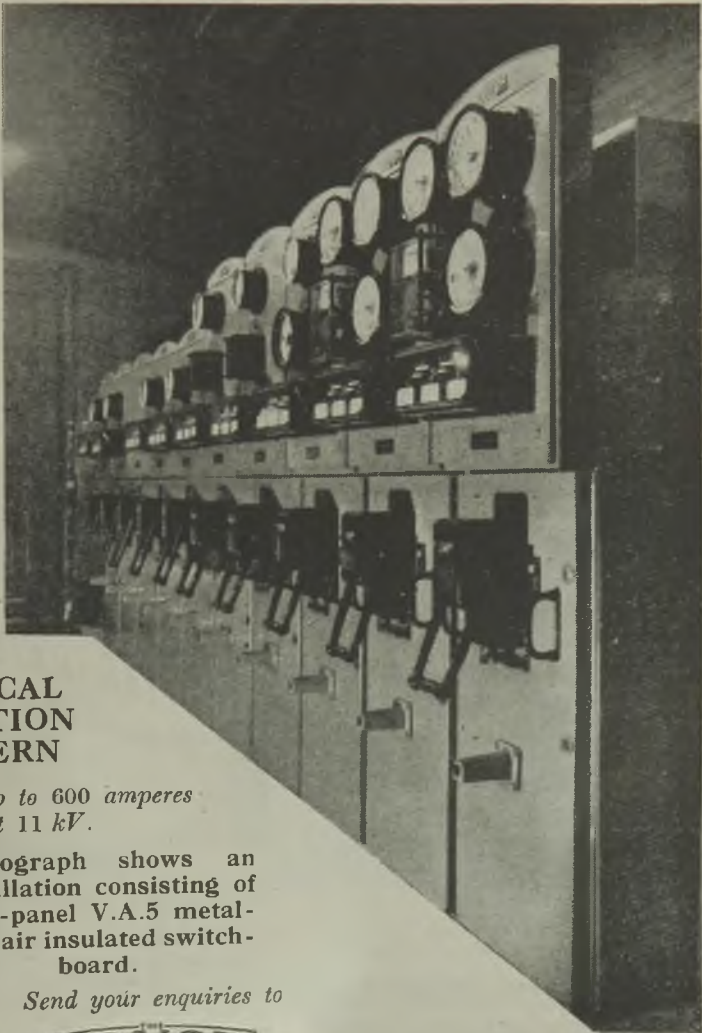
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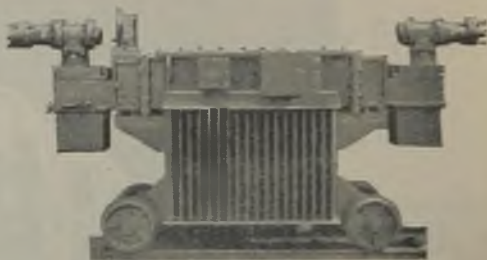
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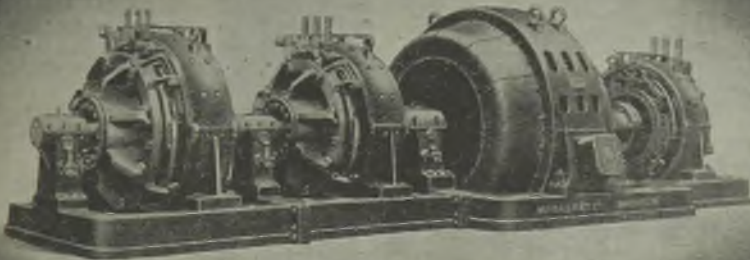
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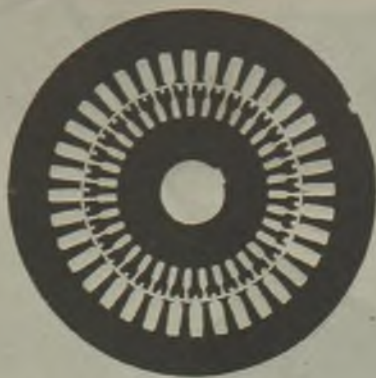
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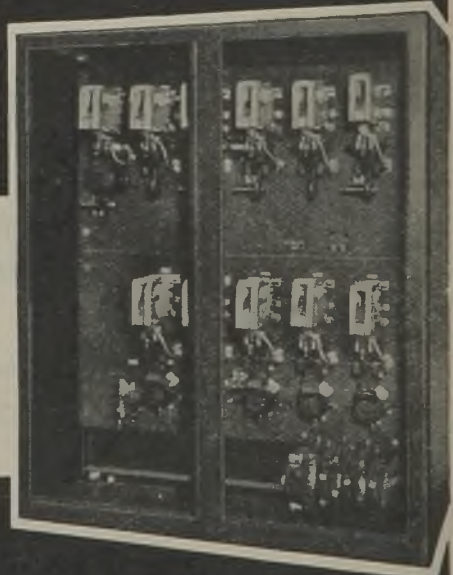
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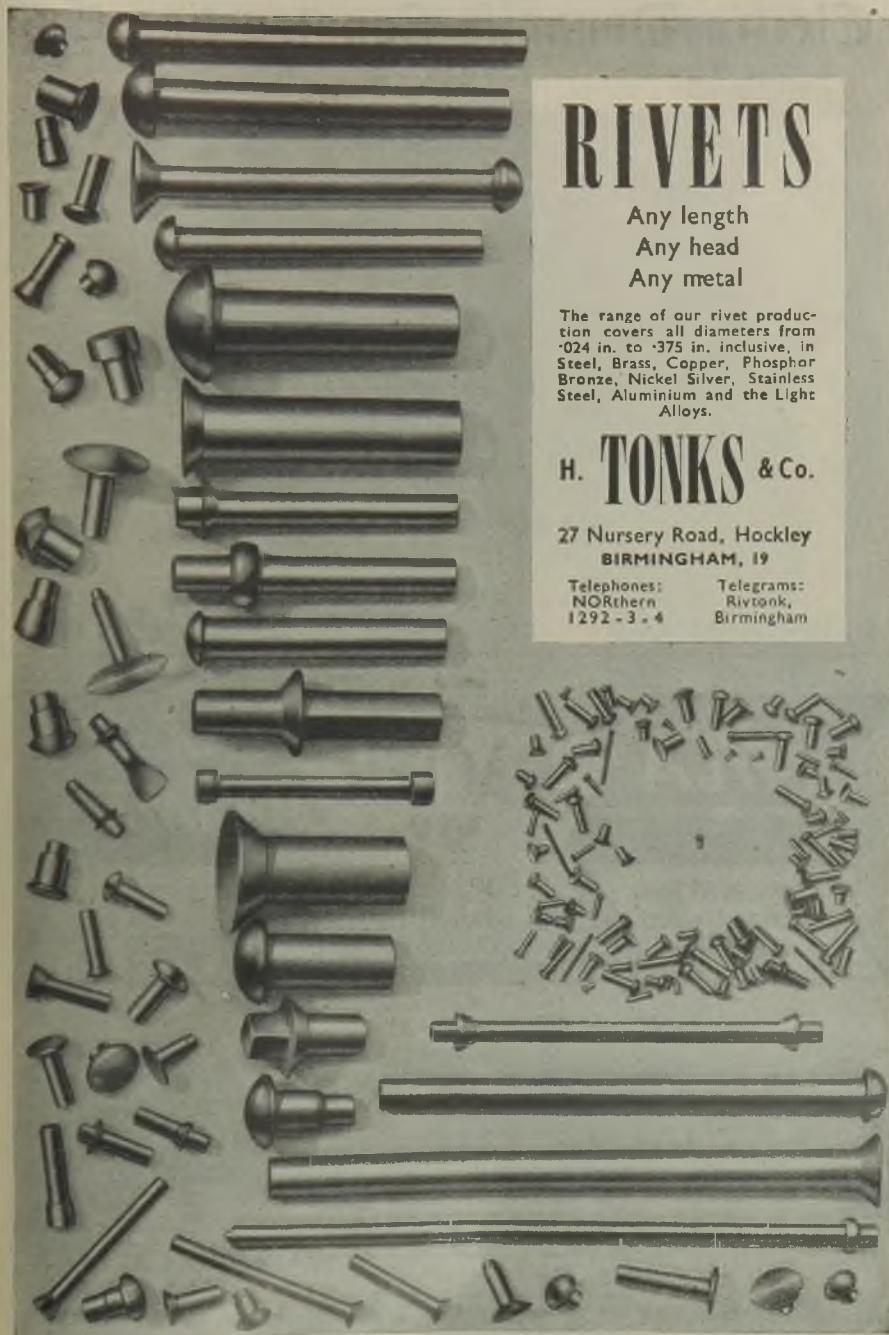
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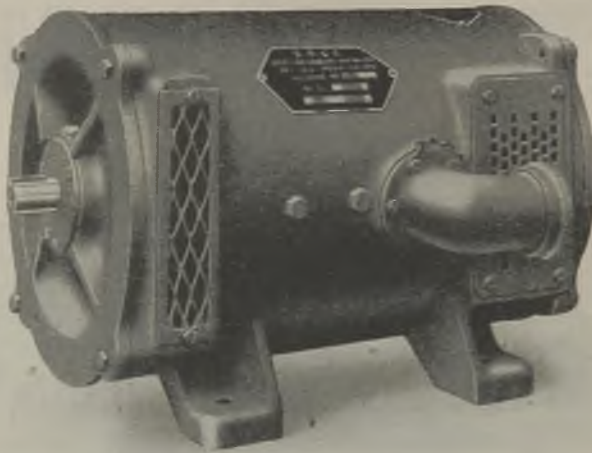
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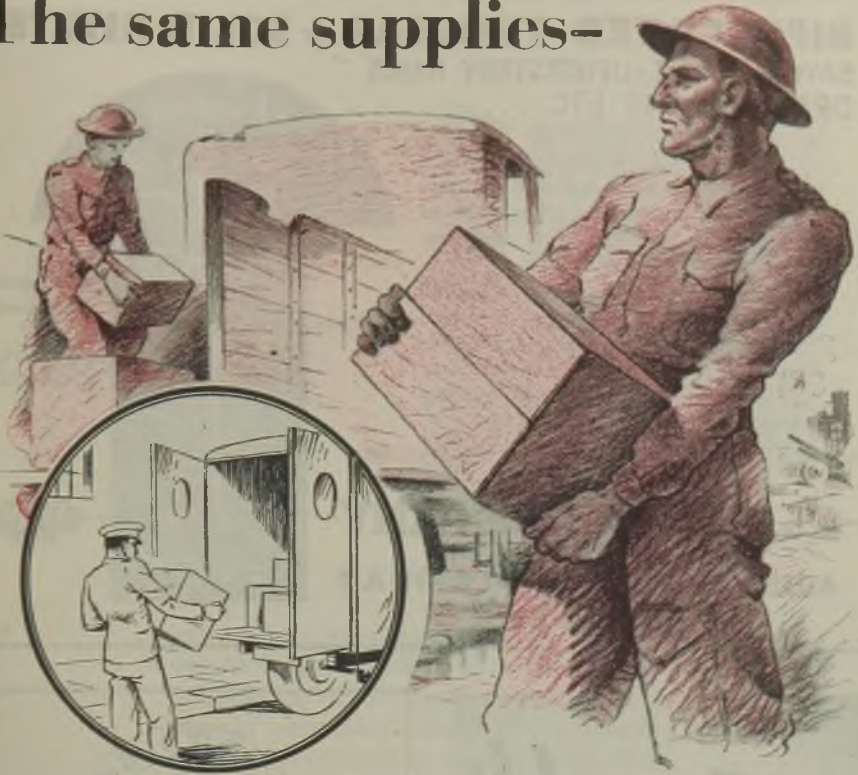
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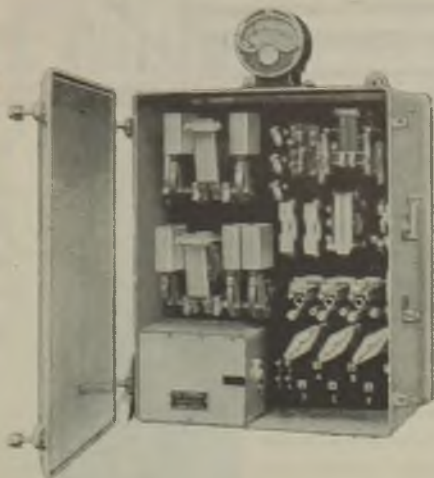
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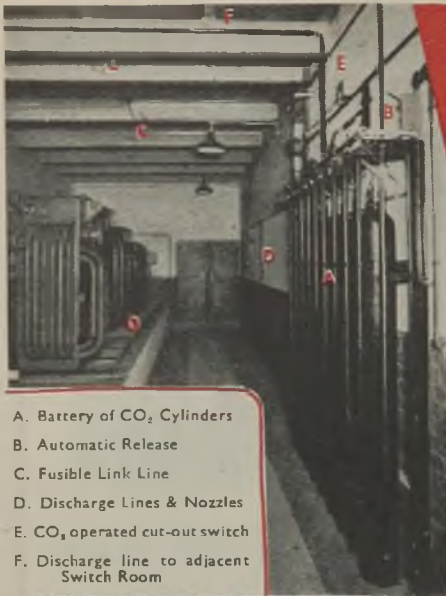
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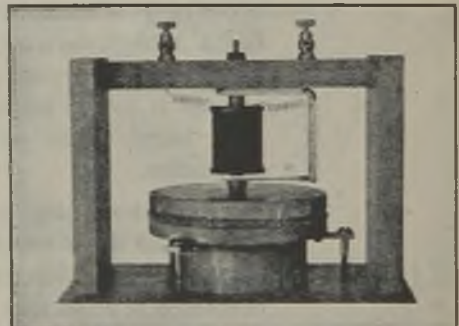
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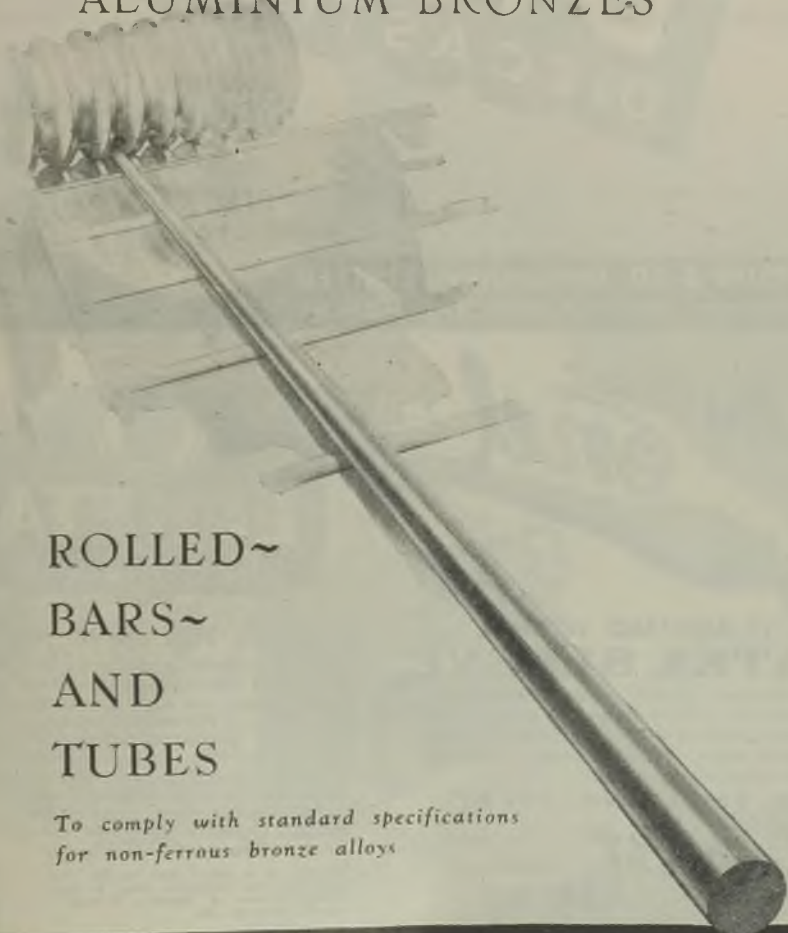
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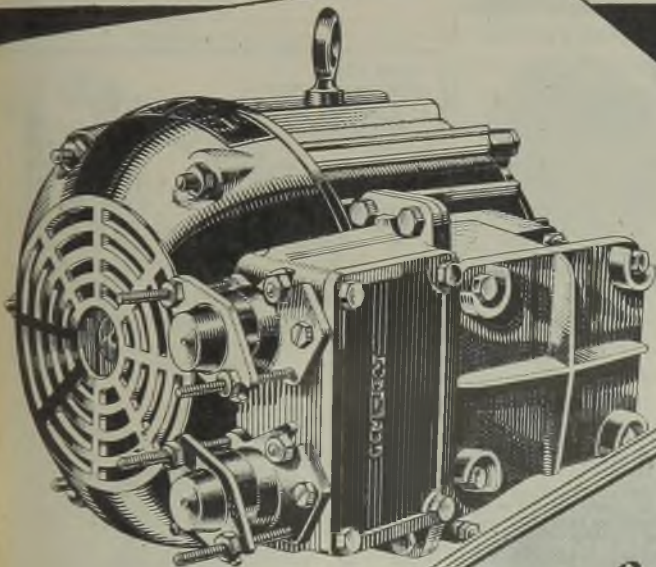
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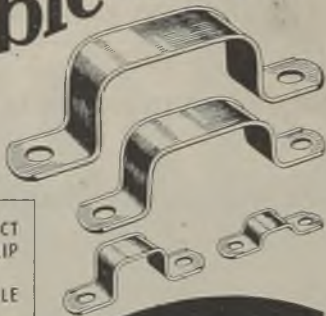
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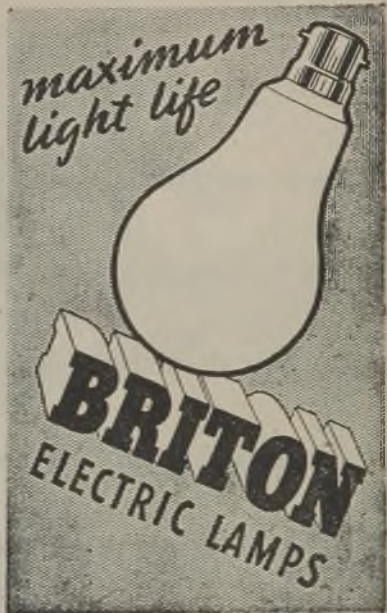
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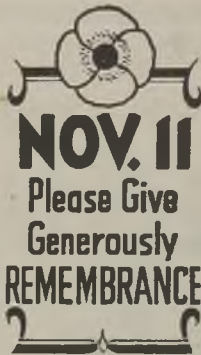
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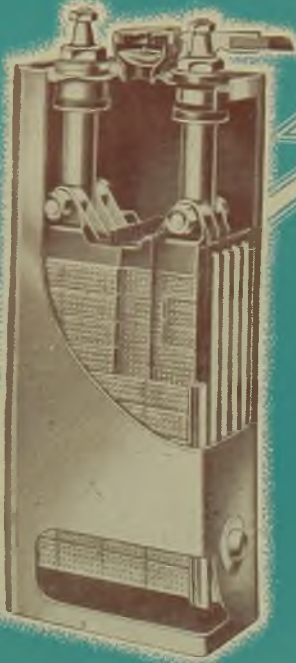
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The Manufacturers desire to make it clear to the Trade and all interested Users that this is not correct, and that the discussions between them and the Authorities concerned are still continuing. Until these are finalised and a decision reached, *the only British Standard Socket Outlets and Plugs are those made in conformity with existing British Standard Specifications.*

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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. 8 words) per insertion, minimum 2 lines 4/-, or for display advertisements 30/- per inch, with a minimum of one inch. Where the advertisement includes a Box Number there is an additional charge of 6d. for postage of replies.

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

Original testimonials should not be sent with applications for employment.

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.

OFFICIAL NOTICES TENDERS, ETC.

WESTERN AUSTRALIAN GOVERNMENT ELECTRICITY SUPPLY, PERTH

THE Government of Western Australia is prepared to receive tenders for the following:—

- (a) BOILERS, PULVERISED COAL EQUIPMENT, ECONOMISERS, FEED PUMPS, AIR HEATERS, MECHANICAL DRAFT PLANT, PIPE WORK, BUILDINGS, ETC.
- (b) TWO 25,000-KW TURBO-ALTERNATORS AND CONDENSING PLANT, ETC.
- (c) ONE 25,000-KW FREQUENCY CHANGER.

Specifications, General Conditions of Contract and Form of Tender may be obtained from the Agent-General for Western Australia, Savoy House, Strand, London, upon written application by post, or from the W.A. Government Tender Board, Perth, Western Australia, on and after the 30th October, 1944.

Any further information required by tenderers may be obtained from the above.

Tenders are to be lodged with the Agent-General for Western Australia, Savoy House, Strand, London, or the Chairman, W.A. Government Tender Board, Perth, Western Australia.

Specifications and General Conditions of Contract may be obtained from the above on payment of one guinea for each specification:—

Boiler House Equipment, etc.	£1 1s.
Two 25,000-kW Turbo-Alternators, etc.	£1 1s.
One 25,000-kW Frequency Changer	£1 1s.

Such amounts being returned on receipt of bona fide tender.

C. C. HILLARY, Secretary.

Office of the Agent-General
for Western Australia,
Savoy House, 115/116, Strand. 812
London, W.C.2.

CITY OF MANCHESTER

THE Electricity Committee invites tenders for the supply and delivery of:—

250 REFRACTOR STREET LANTERNS.

Specification, etc., from Mr. R. A. S. Thwaites, Chief Engineer and Manager, Electricity Department, Town Hall, Manchester, 2.

Tenders to be delivered by 10 o'clock a.m. on Wednesday, 8th November, 1944.

R. H. ADCOCK,
Town Clerk.

Town Hall,
Manchester, 2.
19th October, 1944. 832

SITUATIONS VACANT

None of the vacancies for women advertised in these columns relates to a woman between 18 and 41 unless such woman (a) has living with her a child of hers under the age of 14, or (b) is registered under the Blind Persons Acts, or (c) has a Ministry of Labour permit to allow her to obtain employment by individual effort.

SUNDERLAND EDUCATION COMMITTEE

The Technical College

(Principal: F. H. Reid, B.Sc., Wh. Ex., M.I. Mech. E.)

APPLICATIONS are invited for the post of LECTURER in the ELECTRICAL ENGINEERING DEPARTMENT, to commence duties as soon as possible. Salary (Burnham Technical Scale), £234-£15-£480, plus £52 war bonus.

The commencing salary will include an allowance for approved industrial or professional experience. An addition to the scale of £20 per annum will be paid after three years' service, under Clause 5 (c) of the Burnham Report, in respect of "special work of an advanced character."

The standard of the full-time course is that required for an Honours Degree and of the evening courses for Higher National Certificates.

Candidates must possess a good Honours Degree in Engineering, or its equivalent, with qualifications in Electrical Machine Design, and should also have had industrial and teaching experience. A knowledge of Telecommunications will be an advantage.

Forms of application and further particulars may be obtained by sending a stamped addressed envelope to The Registrar, Technical College, Sunderland. Applications should be returned to the undersigned not later than 13th November, 1944.

W. THOMPSON,

Director of Education.

Education Offices,
15, John Street,
Sunderland, co. Durham. 826

CONTINENTAL REPRESENTATIVE

A leading firm of electrical and mechanical engineers in Southern England desires to appoint for the Continent of Europe, with headquarters in London, a REPRESENTATIVE whose duties will include the sale of highly specialised electrical equipment to organisations mainly state-owned; the appointment and supervision of selling agents; and the granting of manufacturing licences in certain countries. Preference will be given to a qualified electrical engineer, but successful Continental sales experience is of prime importance. The appointment will carry a salary of £1,500 to £2,000 per annum, according to the successful candidate's qualifications. Applications will be treated in strict confidence.—Box 847, c/o The Electrical Review.

BOOKKEEPER with knowledge of s/hand typewriting for electrical contractors' office. Write, stating age, experience and salary required.—Box 6399, c/o The Electrical Review.

COUNTY BOROUGH OF SWANSEA

Electricity Department

Appointment of (a) Boiler House Superintendent
(b) Mechanical Maintenance Engineer

APPPLICATIONS are invited for the above positions from qualified engineers not over 45 years of age. Applicants for both positions must have had a first-class practical training as mechanical engineers and experience in large modern power stations employing pulverised fuel. It will be considered an advantage if applicants have electro-technical knowledge and experience, corporate membership of the Institution of Mechanical Engineers and/or Electrical Engineers.

Boiler House Superintendent

The salary will be in accordance with Grade 4, Class J. of the N.J.B. Schedule of Salaries (at present £642, rising to £673 per annum). Applicants must have had actual experience in the organisation of operation and maintenance programmes of one or more large power station boiler houses, and be competent to carry out a large-scale reorganisation, and take complete responsibility under the supervision of the Station Superintendent.

Mechanical Maintenance Engineer

The salary will be in accordance with Grade 5, Class J. of the N.J.B. Schedule of Salaries (at present £583, rising to £612 per annum). Applicants must have had actual experience in the whole of the mechanical maintenance of a large power station, including boilers, coal pulverising equipment, turbines and all auxiliary plant wherever situated in the station. The person appointed will be responsible to the Station Superintendent for preparing and maintaining a complete programme of repairs and maintenance.

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

Applications, which must be made on a prescribed form obtainable from the Borough Electrical Engineer and Manager, Guildhall, Swansea, together with copies of not more than three recent testimonials, must be delivered to the undersigned, not later than Saturday, the 11th November, 1944.

Canvassing, either directly or indirectly, is prohibited, and will be a disqualification.

T. B. BOWEN,

Guildhall, Swansea.

Town Clerk.

21st October, 1944.

835

METROPOLITAN BOROUGH OF SOUTHWARK

Appointment of Electrical Engineer and Manager,
Electricity Department

APPPLICATIONS for the above appointment are invited from qualified engineers with the necessary experience in the management and administration of an electricity undertaking.

The salary will be in accordance with the agreement made by the National Joint Committee of Local Authorities and Chief Electrical Engineers, dated 9th July, 1941, with a commencing salary of £950 per annum, rising by two annual increments of £100 to £1,150, plus war bonus, at present £33 16s. per annum, and thereafter in accordance with the agreement scale in excess of the above gross figure.

The successful candidate will be required to pass a medical examination and be subject to the Shoreditch and Other Metropolitan Borough Councils (Superannuation) Acts, 1922-1937.

Forms of application and particulars of terms of the appointment can be obtained from me, and applications must be accompanied by copies of three recent testimonials, and must be addressed to me, and endorsed "Electrical Engineer and Manager," and received by me not later than Wednesday, the 8th November, 1944.

Canvassing, directly or indirectly, will disqualify.

D. T. GRIFFITHS,

Southwark Town Hall,

Town Clerk.

Walworth Road, S.E.17.

820

ASSISTANT to Manager required for elec. contr., Baker St. district, good prospects, suit young disch. man. Apply—Box 6408, c/o The Electrical Review.

CLERK required, male, as assistant to general manager, good at correspondence and figures, knowledge of electrical trade and export desirable but not essential. Letters only.—Metway, King Street, Brighton. 796

DEVELOPMENT Engineer for investigation of new applications of electric heat and power. Must have first-class technical education, initiative and ability to solve a wide variety of problems from first principles, also practical knowledge of equipment design. Experience with power co. or similar organisation desirable. State present salary and age, under 35 preferred. Our own staff have been advised. Location London.—Box 785, c/o The Electrical Review.

ESTABLISHED Cable Co. in London area require for estimating department an Assistant, preferably under 30, with V.I.R. cable experience.—Box 841, c/o The Electrical Review.

EXPERIENCED Cable Foreman wanted by non-association cable company, Manchester area. Small rubber and P.V.C. cables. Preferably one familiar with all processes. Write in confidence, giving age and experience.—Box 825, c/o The Electrical Review.

EXPERIENCED Sales Engineer required by wholesale electrical engineers, London, for Oxon, Beds, and Northants. Own car desirable. Write, giving full particulars of age, experience, connections, etc., to—W & W., 13, Bloomsbury Square, W.C.1. 840

JUNIOR for electrical contractors' office, general office routine and switchboard. Write, stating age and salary required.—Box 6400, c/o The Electrical Review.

LEADING firm of electrical manufacturers has a number of vacancies for post-war Sales Representatives. Sound technical education with works and drawing office training essential. Experience in the installation and maintenance of distribution equipment an advantage. Applications will be considered now. Reply, giving particulars of age, education, training and experience, to—Box 15, c/o The Electrical Review.

LIFT Engineers. Old-established firm requires experienced man as General Manager. Salary and participation in profits. Applications, accompanied by details of experience, will be considered in confidence.—Box 824, c/o The Electrical Review.

MEN or Women Packers, by electrical and radio wholesale salers. Applications writing, stating age, experience and salary required, to—Box 853, c/o The Electrical Review.

SALES Engineer Assistant, able to take charge of office staff, correspondence, contracts, etc., required by West London firm manufacturing electrical measuring instruments. Write, stating age, experience and salary required.—Box 811, c/o The Electrical Review.

SALES Estimators and Representatives. Permanent progressive positions for adaptable men. Some knowledge of power application of A.C. and D.C. motors desirable. Apply—Higgs Motors, Birmingham, 6. 823

SALES Representative required for Glasgow office of A.C. electric motor manufacturers. Reply, giving details of age, education, training, experience and salary required, to—Box 337, Reid Walker, Salisbury Square House, E.C.4. 848

SALES Representative required for post-war development by manufacturers of lighting fittings, London area. State age, experience and salary required to—Box 839, c/o The Electrical Review.

SMART Business Man required for office of East London manufacturers of electrical materials. One capable of dealing with customers' correspondence and generally adaptable. Progressive post for right individual. Reply, giving details of age, experience and salary required.—Box 844, c/o The Electrical Review.

SWITCHBOARD Attendant required for steel works power station in North-East area. Must be experienced in operation of E.H.T. switchgear, synchronising and control of turbo-alternators. Salary £314 12s. per annum. Apply—Manager, Employment Exchange, South Bank, Yorks. 799

TECHNICAL Manager (Electrical) required, to take charge of all electrical equipment and also design work in firm manufacturing F.H.F. and H.F. motors and appliances. The post requires a young electrical engineer not afraid of responsibility and prepared to keep abreast of the times. Firm employs 400 and post-war prospects are excellent. Write in first instance, stating experience, salary, etc.—Box 805, c/o The Electrical Review.

THE Electricity Board for Northern Ireland invite applications from suitable qualified engineers for positions as Shift Charge Engineers. Applicants should have experience in the running and maintenance of steam generating plant in a modern generating station, preferably with steam pressures up to 650 lbs. per sq. in. The salary will be in accordance with the National Joint Board Schedule, Grade 8, Class H. Application forms can be obtained on request from the Secretary of the Board, Rosemount House, Greyabbey, County Down, and the completed forms should be returned to the same address. Applicants, who should state the earliest date upon which they could take up duties in Northern Ireland, may be asked to attend an interview in Belfast. 851

THE London Power Company Limited has a vacancy for a Combustion Expert who is accustomed to the application of scientific principles to large steam generators. A good degree in chemistry with physics subsidiary (or vice versa) and research experience are desirable. Duties will include research on chemico-technical problems, and collaboration with the engineering staff in order to obtain maximum efficiency and availability in the combustion process. The salary, which will depend upon qualifications and experience, will not be less than £600. Applicants should write, quoting C.2240XA, to the Ministry of Labour and National Service, Room 432, Alexandra House, Kingsway, London, W.C.2, for the necessary forms, which should be returned completed on or before 7th Nov., 1944. 833

TRADER Counter Salesmen required by electrical wholesalers. Previous experience of electrical installation supplies material essential. Applications in writing, stating age, previous experience and salary required, to—Box 852, c/o The Electrical Review.

WORKS or Production Manager (30-45) required by well-known radio and electrical component manufacturer employing 400/500, N.W. London. Intimate knowledge of press work, press tool design and mass production assembly methods. Position is permanent and will carry a salary consistent with qualifications. Applicants should give concise details of experience, education and salaries previously earned. Do not apply unless of proved ability.—Box 846, c/o The Electrical Review.

APPOINTMENTS FILLED

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

COUNTY Borough of Swansea—Deputy Chief Engineer and Generation Engineer.

SITUATIONS WANTED

ADVERTISER, energetic, 23 years' experience contracting, seeks position as Sales Representative, prefer London and South Coast.—Box 6376, c/o The Electrical Review.

ADVERTISER (50), Technical Sales Electrical Engineer. A desires position in London and Southern Counties. Ten years in area contacting government departments, manufacturers, electrical trade. Good general experience, contracting, heating equipment and installations, resistances, transformers. Representative or agent. Car.—Box 6412, c/o The Electrical Review.

ALL-round Engineer (42), organisation, design, layout, small scale production, also breakdown and repair work, very wide experience medium size electrical apparatus, seeks position scope responsibility, for post-war. Transfer now under certain conditions.—Box 6401, c/o The Electrical Review.

CHARTERED Electrical Engineer, A.M.I.E.E., A.I.Mech.E., versatile technician with 15 years' industrial experience, design, administration, planning, lecturing, technical journalism, etc., seeks responsible and progressive position, immediate or post-war.—Box 6378, c/o The Electrical Review.

ELECT. Eng. requires position end of war, 18 yrs. traction maintenance, includes trolley bus, Diesel exp., Grad. I.E.E., H.N. Cert. Mech. Eng.—Box 6398, c/o The Electrical Review.

ELECTRICAL Engineer (31), A.I.E.E., now serving with Forces, desires post-war situation with supply company as engineer or assistant. Experience of generation, transmission and administration. Similar position held, technical qualifications, excellent references.—Box 6409, c/o The Electrical Review.

ELECTRICAL Engineer (45) seeks responsible post. 30 years' experience installation and maintenance, used to organising, planning, supervision, Government specs. Manchester area preferred.—Box 6345, c/o The Electrical Review.

ELECTL., Mechl. Engineer-Foreman, 28 yrs. exp. construction, maintenance installations, steam and diesel plants, factory, ships, hospitals, home and abroad.—Box 6334, c/o The Electrical Review.

ELECTRICIAN desires position as Maintenance Engineer, age 46, disengaged, all round elec. experience, also commercial, refrigeration and air conditioning.—5, Lady Margaret Road, N.W.5. 6379

ELECTRICIAN (24), ex-R.A.F. pilot, at present on essential Government work, wishes to contact firm with a view to post-war employment. Experienced all ordinary installation and maintenance work, accustomed to the operation and maintenance of diesel sets. Please write—BM/AMWD, London, W.C.1. 6403

ELECTRICIAN (40) desires responsible position, maintenance, installation, etc., anywhere.—Advertiser, 9, Frank Road, Cardiff. 6406

ENGINEER (35) desires appointment to permanent progressive position, post-war or immediate. Electrical, mechanical and administrative training, good general education, Buent French, A.M.I.E.E. examination. Experienced in supply distribution, plant manufacture and technical representation. Minimum salary £500 p.a. Would consider investment.—Box 6341, c/o The Electrical Review.

ENTERPRISING Gentleman (36, exempt), seeks change. 20 years' experience power companies' administration, sales organization (domestic electrical appliances), electrical contracting. Would consider any reasonable proposition as sales executive, buyer or area representative.—Box 6416, c/o The Electrical Review.

EXECUTIVE Engineer desires change with post-war time position. Expt. radio compt., manu. electr. and mech. equipt., motors, switchgear, engines. Any area.—Box 6411, c/o The Electrical Review.

GRAD. I.E.E., public school, 29 years, requires progressive post, preferably on sales side, 6 years' experience of aircraft instruments and light engineering.—Box 6350, c/o The Electrical Review.

PRODUCTION Control Manager desires change, experienced all branches (progress, production planning, stock and material control, purchase, plant balancing, London/Essex districts preferred.—Box 6395, c/o The Electrical Review.

PROGRESSIVE young man desires Foreman's or Manager's position in fluorescent lamp or neon sign factory, only position with large firm considered. Many new ideas for production; 13 years' experience in vacuum industry.—Box 6383, c/o The Electrical Review.

SUBSTATION Charge Engineer desires change. 28 years' experience of central station and substations. London area.—Box 6418, c/o The Electrical Review.

TECHNICAL Engineer, age 25, desires change, 3 years' experience in design, manufacture and testing of automatic control gear, good organiser and accustomed to responsibility. Release obtainable.—Box 6384, c/o The Electrical Review.

YOUNG Man (22), experienced rewinds, fractional to 50 h.p., and maintenance, desires position. Ord. and Higher National Certificates, Stud.I.E.E.—Box 6414, c/o The Electrical Review.

YOUNG man (23) exempt, seeks a progressive electrical Technical Assistant's position. Secondary education, excellent testimonials, intelligent and reliable. North London area preferred but others considered. Replies to—Box 6381, 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.

REBUILT MOTORS AND GENERATORS

LONG deliveries can often be avoided by purchasing rebuilt secondhand plant. We can redesign or replace surplus plant of any size.

SEND US YOUR ENQUIRIES.

OVER 1,000 RATINGS ACTUALLY IN STOCK HERE.

DYNAMO & MOTOR REPAIRS LTD.,

Wembley Park, Middlesex.

Telephone: Wembley 3121 (4 lines).

Also at Phoenix Works, Belgrave Terrace, Soho Road, Handsworth, Birmingham.

Telephone: Northern 0898. 26

BRASS NUTS

0, 2, 4, 6, 8 and 10 BA. Full and Lock. 1/2" and 5/16" Whit.

STEEL NUTS

0, 2, 4 and 6 BA. Full and Lock; 10 BA. Full. 1/2" and 5/16" Whit. and B.S.F.

STEEL AND BRASS STUDDING AND SCREWS.

APEX SALES,

6, Leaside Road, London, E.5.
STA. 7131. 6336

WANDSWORTH BOROUGH COUNCIL

For Sale—Modified Street Lighting Fittings

OFFERS are invited for the purchase of new modified street lighting fittings which are surplus to the requirements of the Council. All the fittings are certified to comply with BS/ARP 1937.

GAS FITTINGS.

Approx. No.	Size	Type	Pressure	Units
620	20"	E	high pressure	Supervia Units.
"	7, 15"	E	"	"
"	2,520	15"	G	" Units. "
"	166	10"	G	"
"	984	15"	F	"
"	30	10"	F	"

Approx. No. 960, F type, 302 Gas Lighting Conversion Units, manufactured by Sugg & Co.
Approx. No. 2782, G type, do. do. do.

ELECTRIC FITTINGS.

599 Z3200/6467, Modified Public Lighting Fittings, manufactured by the General Electric Co. Ltd.

Quotations are to be addressed to the Town Clerk, Municipal Buildings, Wandsworth, S.W.18. Envelopes to be marked "Quotation for Lighting Fittings," and should be received not later than 10 a.m. on Wednesday, 22nd November, 1944.

H. W. TEE,

Borough Engineer.

Borough Engineer's Office,
Municipal Buildings, S.W.18.
13th October, 1944.

821

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

RADIATORS FOR PETROL OR DIESEL ENGINES

WE have 26 radiators, new and of recent production (made by Spiral Tubes, of Derby), for disposal. These radiators are fitted with shutters, fan and pulley, fan cowl, and complete with guards to fan and belt, etc. They are suitable for engines up to 35/45 b.h.p. continuous rating at 80/90° F. or 15/24 b.h.p. continuous rating for ambient air temperature at 122° F. These radiators are in perfect condition, and being complete are ready for immediate use. A low price will be accepted for them in one lot. Inspection by appointment only, or blue print of radiators can be had if required.

HARBOUR ARC MANUFACTURING CO. LTD.

Lower Coombe Street, Croydon.

817

MODINSTAL ELECTRIC COMPANY LIMITED
INDUSTRIAL INFRA-RED APPARATUS FOR PAINT DRYING.

COMPLETE EQUIPMENTS OR SINGLE UNITS PROVIDED.

GUARANTEED HEAT GENERATORS.

OLDHAM WORKS, OLDHAM TERRACE,
ACTON, W.3, LONDON.

Telephone: Acorn 3504/5.

M.E.C. APPARATUS, DULL EMITTER SYSTEM.

59

A.C. MOTORS, 400/440/3/50

All Complete with Starting Gear

H.P.	Make.	Speed.	Type.	Brgs.	Price.
75	Mather & Platt	720	Slipring	R.O.	£170
40	Met.-Vick.	580	Sq. Cage	R.O.	£95
40	B. Peebles	720	"	R.O.	£80
30	Mather & Platt	720	Slipring	R.O.	£100
30	Met.-Vick.	720	Sq. Cage	R.O.	£60
20	Mather & Platt	1,500	"	R.O.	£30
20	B. Peebles	750	Slipring	R.O.	£80
18	Mather & Platt	1,450	"	R.O.	£65
15	Mather & Platt	750	"	R.O.	£60
10	Mather & Platt	750	"	R.O.	£50
10	Harland	720	Sq. Cage	R.O.	£18

NO LICENCE REQUIRED.

ELECTRIC MACHINERY CO. (M/CR) LTD.,

New Union Works, New Islington, Ancoats, Manchester 801

COUNTY BOROUGH OF WOLVERHAMPTON

Electricity Supply Department

OFFERS are invited for the purchase of:—One G.E.C., 1,000-kW Rotary Converter with Transformer, 1,100 kVA, 6,300 volts, 3-phase to 440/480 D.C., complete with A.C. Starter Panel and Field Rheostat, without A.C. or D.C. Control Gear.

Additional information can be obtained from the Borough Electrical Engineer, 83, Darlington Street, Wolverhampton.

Tenders, endorsed "Rotary Converter," are to be submitted to the undersigned not later than 8th November, 1944.

J. BROCK ALLEN,

Town Hall,

Town Clerk.

Wolverhampton.

834

WATER TUBE BOILERS IN STOCK

Four	25,000 lbs. evaporation.	175 lbs. W.P.
Three	20,000 lbs. "	175 lbs. "
One	15,000 lbs. "	175 lbs. "
One	12,000 lbs. "	175 lbs. "
One	12,000 lbs. "	200 lbs. "
One	12,000 lbs. "	160 lbs. "
One	9/10,000 lbs. "	200 lbs. "

We install complete, including brickwork. Economisers, Pumps, Piping Valves, Generating Sets and Motors in stock. Please send us your enquiries; we can give immediate delivery.

BURFORD, TAYLOR & CO. LTD.,

Boiler Specialists, Middlesbrough.

Telephone, Middlesbrough 2622.

32

"CANNING" PLATING MOTOR GENERATOR SETS FOR DISPOSAL

Three	—	1,000 amp.	7 volts
Two	—	500 amp.	6 volts
Two	—	250 amp.	6/8 volts

All with 400-volt, 3-phase, 50-cycles, ball bearing, squirrel-cage driving motors and switchgear.

Box, 775, c/o The Electrical Review.

ALTERNATORS

Suitable for 400-350, in perfect condition.

65 kVA	1,000 r.p.m.	with exciter
160 kVA	300 r.p.m.	for coupling
170 kVA	1,000 r.p.m.	with exciter
235 kVA	300 r.p.m.	for coupling
600 kVA	300 r.p.m.	for coupling

J. GERBER & CO. LTD.,

Wembley, Middx.

829

ELECTRIC MOTORS AND DYNAMOS

WE hold one of the largest stocks of New and Second-hand 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.
22-23, BRITANNIA STREET,
CITY ROAD, LONDON, N.1.

Telephone: 5512-3 Clerkenwell. 13

ARC WELDING MACHINES FROM STOCK

WE offer our latest type No. 2 Max-Arc Welder for immediate delivery, 15/250 amperes. Operates off any A.C. supply voltage. Send for details.

MAX-ARC WELDERS LTD.,
190, THORNTON ROAD, CROYDON.
THORNTON Heath 4276-8.

35

ECONOMISERS IN STOCK

TWO Green's Economisers, 208 tubes, 250 lbs. W.P.

Guaranteed re-insurable and first-class condition only, low prices. Quotations per return. Installations delivered and erected complete.

BURFORD, TAYLOR & CO. LTD.,

7, Commercial Street, Middlesbrough. Telephone 2622.

65

A large stock of Winches of our self-sustaining types, also Searchlights (sale or hire), Mirrors, Lenses, A.I.D. Turnbuckles, etc., also surplus Carbon Rods, Ebonite and Fibre. Hundreds of thousands supplied during the last 40 years to Government departments, corporations and innumerable traders.—London Electric Firm, Croydon. 42

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 4422). 6115

A C.-driven Plating Dynamo, 1,000 amps., 16 volt, 570 r.p.m., direct coupl. on bedplate, reconditioned.—J. Gerber & Co. Ltd., Wembley, Middx. 828

A C. Motors, 1/50th h.p. to 3 h.p., from stock, for essential work only.—The Johnson Engineering Co., 5, Spencer Street, Learnington Spa. 57

A ERIAL Cables, all sizes quoted for; good deliveries against Government contract numbers.—Edwards Bros., 20, Blackfriars Road, London, S.E.1. 6418

A IR Compressor, 40 cu. ft./min., complete with 400-volt, 3-phase motor, air receiver, flat belt drive, completely overhauled, as new. £70. Apply—Black & Decker Ltd., Bath Road, Harmondsworth, Middx. 849

A IR Compressor, 80 cu. ft./min., complete with 400-volt, 3-phase motor, vee belt drive, air receiver, water tank, switchgear, very good condition, £140. Apply—Black & Decker Ltd., Bath Road, Harmondsworth, Middx. 850

A LTERNATING Petrol/paraffin Sets, 400/3/50, direct coupled on bed. First-class order. 25 kVA, 35 kVA, 50 kVA, 70 kVA. Fully tested, for quick delivery.—Gerber & Co. Ltd., Wembley, Middx. 804

A LTERNATOR, 500 kVA, 3-p., 50 c., 400/440 v., 750 revs., direct coupled exciter, 2 brgs., on bedplate.—Stewart Thomson & Sons, Fort Road, Seaforth, Liverpool, 21.

B AKELITE Accessories, Switch-Plugs, R/C Adaptors, Lampholders, Iron Connectors, Batten Holders, Insulation Tape, etc. We carry large stocks. Wholesalers' enquiries and export orders solicited. Send 1d. stamp for complete list.—Marcus Fisher & Co. Ltd., 37, Aylmer Parade, London, N.2.

B EIT Grinders or Sanders, 4" wide belt, £5 5s.; 6" wide belt, £10 10s.—John E. R. Steel, Clyde Mills, Bingley. Phone 1066. 22

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NOTICE is hereby given that Zenith Radio Corporation seek leave to amend the specification of Letters Patent No. 552943, entitled "Wave amplitude limiting device for signal transmission systems." Particulars of the proposed amendment were set forth in the Official Journal (Patents), No. 2906, dated October 4th, 1944. Any person may give Notice of Opposition to the amendment by leaving Patents Form No. 19 at the Patent Office, 25, Southampton Buildings, London, W.C.2, on or before the 4th November, 1944. 822

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Index to Advertisers

	PAGE
Aerialite Ltd.....	30
Agro Electrical Co. Ltd.....	62
Armordur Cable Co. Ltd.....	Cover iii
Association of Steel Conduit Manufacturers.....	Cover ii
Baldwins Ltd.....	19
B.E.N. Patents Ltd.....	78
Berry's Electric Ltd.....	40
Bill Switchgear Ltd.....	3
Birkbys Ltd.....	79
Bolton, Thomas, & Sons Ltd.....	61
Howker, S. O., Ltd.....	36
Britannic Electric Cable & Construction Co. Ltd.....	65
British Electrical & Allied Manufacturers Assoc.....	66
British Insulated Cables Ltd.....	18
British Thomson-Houston Co. Ltd.....	5
Brook Motors Ltd.....	15
Brookhirst Switchgear Ltd.....	55
Bruce Peebles & Co. Ltd.....	2
Brush Electrical Engineering Co. Ltd.....	45
Bulpiitt & Sons Ltd.....	Cover iii
Canning, W., & Co. Ltd.....	12
Chloride Electrical Storage Co. Ltd.....	48
Clarke, H., & Co. (Manchester) Ltd.....	50
Concordia Electric Wire & Cable Co. Ltd.....	3
Cork Manufacturing Co. Ltd.....	Cover iv
Crompton Parkinson Ltd.....	4, 23 & 59
Crypton Equipment Ltd.....	34
Cryselco Ltd.....	28
Dacier Ltd.....	52
Daly (Condensers) Ltd.....	44
De La Rue Plastics Ltd.....	7
Dennis, G. P., Ltd.....	75
Donovan Electrical Co. Ltd.....	80
Drake & Gorham Wholesale Ltd.....	8
Drayton Regulator & Instrument Co. Ltd.....	60
Dyson & Co. Enfield (1919) Ltd.....	58

	PAGE
Easco Electrical Service.....	48
Edison Swan Electric Co. Ltd.....	Cover i
Elcordia Ltd.....	60
Electro Dynamic Construction Co. Ltd.....	52
Electro Methods Ltd.....	78
Elliott Bros. (London) Ltd.....	24
English Electric Co. Ltd.....	9
Ensel Electric Co. Ltd.....	44
Epheta Manufacturing Co.....	58
Evans, F. W., Ltd.....	80
Ferranti Ltd.....	11
Fowler, John, & Co. (Leeds) Ltd.....	65
Gibson, Todd & Co. Ltd.....	48
Godwin, H. J., Ltd.....	27
Harrison & Co. (Lincoln).....	52
Heatrae Ltd.....	1
Heayberd, F. C., & Co. Ltd.....	43
Heenan & Froude Ltd.....	37
Henley's, W. T., Telegraph Works Co. Ltd.....	13 & 77
Heyes & Co. Ltd.....	8
Igranic Electric Co. Ltd.....	50
Ingram, Kemp & Joyner.....	62
Ismay, John, & Sons Ltd.....	60
Johnson & Phillips Ltd.....	31
Johnson, Richard, Clapham & Morris Ltd.....	75
Kimber, B., Allen & Co.....	60
Londex Ltd.....	80
London Electric Wire Co. and Smiths Ltd.....	16
Low, Archibald, Electrics Ltd.....	76
Mallory Metallurgical Products Ltd.....	43
Manganese Bronze & Brass Co. Ltd.....	57
Martindale Electric Co. Ltd.....	41
Mather & Platt Ltd.....	47
McKechnie Bros. Ltd.....	39
M.C.L. & Repetition Ltd.....	1
Medway Corrugated Paper Co. Ltd.....	53

(Continued on page 78)



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Index to Advertisers

(Continued from page 76)

	PAGE
Mercury Switch Mfg. Co. Ltd.	74
Metallic Seamless Tube Co. Ltd.	27
Metropolitan-Vickers Electrical Co. Ltd.	17 & 33
Metway Electrical Industries Ltd.	80
Midland Dynamo Co. Ltd.	62
Midland Electric Mfg. Co. Ltd.	29
Moulded Products Ltd.	80
Mullard Wireless Service Co. Ltd.	46
Multicore Solders Ltd.	75
New Insulation Co. Ltd.	46
Newalls Insulation Co. Ltd.	44
Nife Batteries Ltd.	63
Photostat Ltd.	25
Pirelli-General Cable Works Ltd.	14
Pope's Electric Lamp Co. Ltd.	20
Pressed Steel Co. Ltd.	27
Pritchett & Gold & E.P.S. Co. Ltd.	56
Pyrene Co. Ltd.	56
Revo Electric Co. Ltd.	26
Reyrolle, A., & Co. Ltd.	22
Robinson, Lionel, & Co. Ltd.	25
Ross Courtney & Co. Ltd.	1
Rotoplunge Pump Co. Ltd.	60
Rowlands Electrical Accessories Ltd.	10
Runbaken Electrical Products.	78
Sangamo Weston Ltd.	40
Sankey, Joseph, & Sons Ltd.	49
S. & D. Rivet Co.	54
Siegrist, E., Ltd.	58
Siemens Electric Lamps & Supplies Ltd.	2
Simplex Electric Co. Ltd.	35
Spicers Ltd.	Cover iii
St. Helens Cable & Rubber Co. Ltd.	38
Statter, J. G., & Co. Ltd.	32
Sternaw Co. Ltd.	74
Symonds, R. H., Ltd.	74
Thorn Electrical Industries Ltd.	64
T.M.C.-Harwell (Sales) Ltd.	62
Tonks, H., & Co.	51
Transradio Ltd.	54
Tungstallite Ltd.	76
Uhlhorn Bros. Ltd.	54
Vandervelde, L.	78
Veritys Ltd.	41
V. G. Manufacturing Co. Ltd.	75
Walsall Conduits Ltd.	6
Ward & Goldstone Ltd.	42
Westinghouse Brake & Signal Co. Ltd.	21
Westminster Engineering Co. Ltd.	1
Wright, Bindley & Gell Ltd.	77
Yorkshire Electric Transformer Co. Ltd.	46

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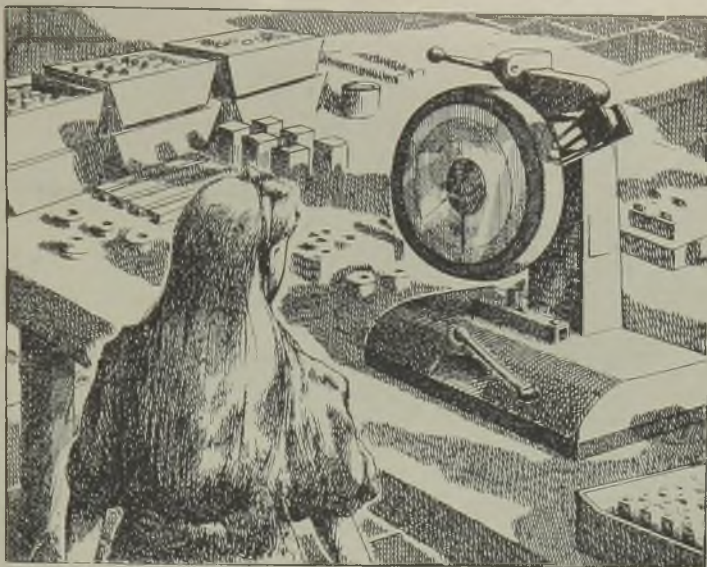
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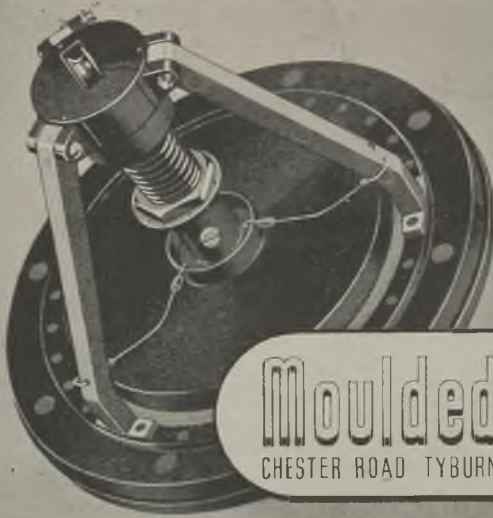
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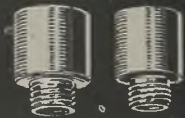


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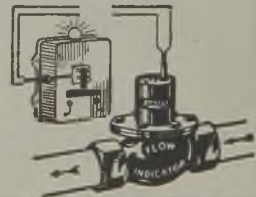
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