

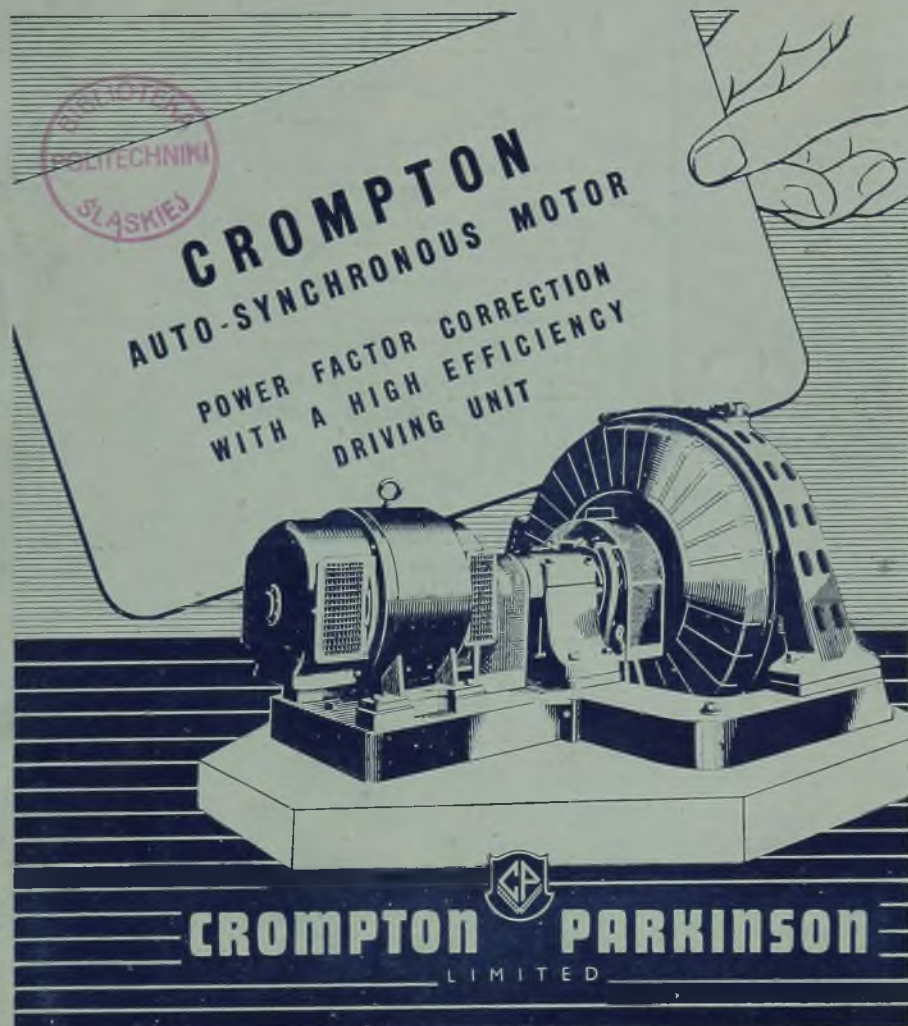
ELECTRICAL REVIEW

FOUNDED
1872

Vol. CXXXIX. No. 3587

AUGUST 23, 1946

9d. WEEKLY



CROMPTON
AUTO-SYNCHRONOUS MOTOR
POWER FACTOR CORRECTION
WITH A HIGH EFFICIENCY
DRIVING UNIT

CROMPTON PARKINSON
LIMITED

Stamp: POLITECHNIKI SLASKIE

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

ALUMINIUM RISING POWER MAINS

In multi-floored factories, office buildings and blocks of flats, bare aluminium busbars have numerous advantages:

Suspended in a vertical metal duct (with non-inflammable baffles where required), they eliminate fire risk

Economical in installation and maintenance costs

Withstand heavy overloads

Easily accessible for extensions, as the load increases with business

Take up minimum space where change of direction is required

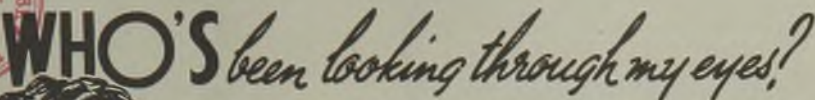


Enquiries:

THE BRITISH ALUMINIUM Co. Ltd.

(Electrical Sales)

SALISBURY HOUSE, LONDON, E.C.2

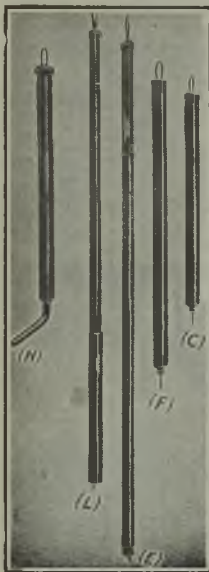


"I have to be nice to Consumers AND our Engineers when both address me in something baser than basic English. Heatrae must have anticipated my problem by producing Heaters which so seldom go wrong—that IF they do—the Consumer speaks more in surprise than anger."

HEATRAE

leaders in electric water heaters

GRAMS : HEATRAE, NORWICH



IS IT ALIVE?

THE "PARTRIDGE" PRESSURE DETECTOR

**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

THE WESTMINSTER ENG. Co. Ltd.
Victoria Road, Willesden Junction, N.W.10
Telephone: Elgar 7372 (2 lines) Telegrams: "Regency, Phone, London."



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

STEEL EYES



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



M.C. Land REPETITION LTD.
Pool Lane Langley Birmingham.



In Volta's day

At the moment when Alessandro Volta was visiting the scientific celebrities of this country, the firm of Thomas Bolton & Sons was founded. It was a prophetic coincidence. The science of electricity was emerging from the unknown but its coming influence on industry was yet the dream of a few imaginative minds. Similarly the founders of Thomas Bolton and Sons could have no conception of the part the firm would play in the development of the electrical industry from its birth. Succeeding generations, however, were quick to seize the opportunity. That they have played their part efficiently and helpfully is recognised throughout the electrical manufacturing field.

ESTABLISHED 1783

THOMAS

BOLTON

& SONS, LTD.


Specialists since 1783

COPPER AND COPPER ALLOY MANUFACTURERS,
WIRE, SHEET, STRIP, STRAND, PLATES, BARS,
RODS, TUBES, SECTIONS, MACHINED PARTS.

Contractors to Home, Colonial & Foreign Government Services; Railway & Transport Companies
HEAD OFFICE: WIDNES, LANCs. (Telephone WIDNES 2022); LONDON OFFICE: 168 REGENT ST., W.1. (REGENT 8427-8-9)

CVS-11



THE SMALLEST TRIPLE POLE SWITCHFUSE
EMINENTLY SUITABLE FOR MACHINE TOOLS
 RADETTE. 10 AMPERES. 500 VOLTS. CATALOGUE N° Q1438

BILL SWITCHGEAR LTD
ASTON LANE, PERRY BARR
BIRMINGHAM-20

LONDON: AMZELLE
73, ST. PETER ST.
WESTMINSTER SW1

MANCHESTER: CLAXSON
BELFAST
BURTON-ON-TRENT

PHONE BIRCHFIELDS 5011. GRAMS. BILSWITCH BHAM

for Commutators of all types and sizes



Consult Watliff

WE MAKE THEM FROM THE
SMALLEST TO THE LARGEST

A commutator made by Watliff is expertly produced and gives no trouble in service.

Advice from commutator experts is always available to users of our products.

We recommend that designers should use our standard sizes (full details on request) wherever possible, but we can always

supply specials to customers' exact requirements where needed.

We have been making commutators and slip rings for over 25 years and are confident that we know our business.

We produce over one million commutators yearly and we are still growing.

WATLIF

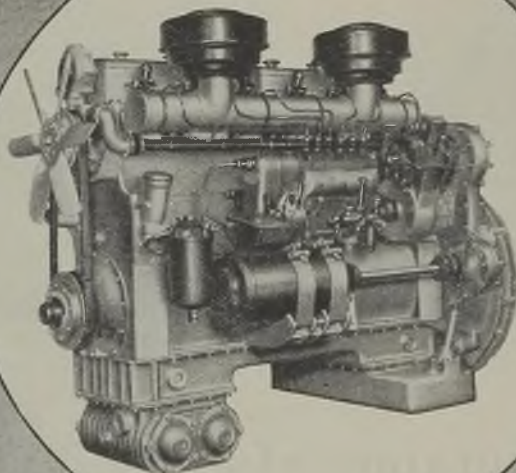
MANUFACTURERS OF COMMUTATORS
FOR OVER 25 YEARS

THORNHILL LONDON W6 1BB - W6 1BB
THORNHILL LONDON W6 1BB - W6 1BB

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

TAYLOR SP5

AUTOMOTIVE • INDUSTRIAL • RAILCAR • MARINE



**AUTOMOTIVE
MODEL**

130 b.h.p. AT
1900 r.p.m.,
LENGTH ONLY
50 $\frac{1}{4}$ "

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

MEADOWS

"630" SERIES

OIL ENGINES

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

M-W.68

This, in the field of
physics, is the
symbol for
absolute temperature



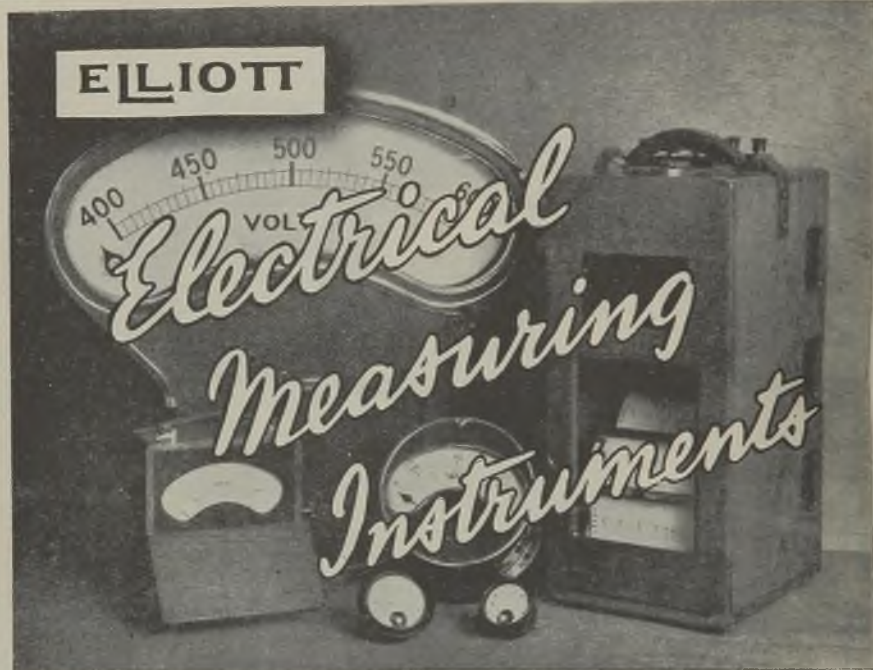
This, in the field of
electrical products,
is the symbol for
absolute dependability

PHILIPS

**LAMPS • RADIO • X-RAY • COMMUNICATIONS EQUIPMENT
AND ALLIED ELECTRICAL PRODUCTS**

PHILIPS LAMPS LIMITED • CENTURY HOUSE • SHAFTESBURY AVENUE • LONDON • W.C.2

(148D)



Manufacturers of :

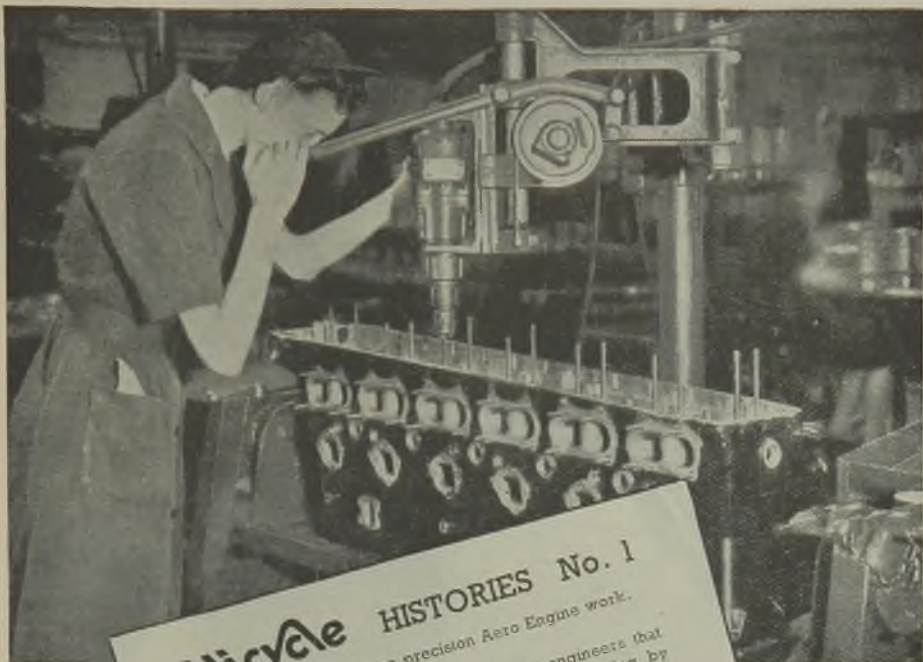
- | | |
|-------------------------------|-----------------------------|
| ★ MINIATURE PANEL INSTRUMENTS | ★ ELECTRICAL RECORDERS |
| ★ SWITCHBOARD INSTRUMENTS | ★ INSTRUMENT TRANSFORMERS |
| ★ PORTABLE INSTRUMENTS | ★ LABORATORY STANDARDS |
| ★ TESTING SETS | ★ STANDARDIZING INSTRUMENTS |

ELLIOTT BROTHERS (LONDON) LTD

CENTURY WORKS, LEWISHAM, LONDON, S-E13

TELEPHONE: TIDEWAY 3232

TELEGRAMS: OHM, LEWIS, LONDON





Higale HISTORIES No. 1

PROBLEM: Studsetting on precision Aero Engine work.

CASE REPORT.
The recommendation by our development engineers that Higale studsetters could replace individual setting by skilled craftsmen was eventually adopted on new assembly lines. Success was immediate. Relatively unskilled female operatives fixed studs at least 8 times the previous speeds and to even closer limits. Higale made possible the production of 30,000 Aero Engines in this one factory alone — and the performance of these engines makes further recommendation unnecessary!

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

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

CONSOLIDATED PNEUMATIC TOOL CO. LTD.

232 DAWES ROAD

LONDON S.W.6

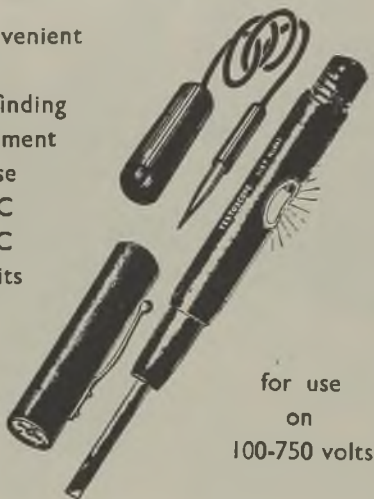
AIR COMPRESSORS · PNEUMATIC TOOLS · ELECTRIC TOOLS · DIESEL ENGINES · VACUUM PUMPS
CONTRACTORS' EQUIPMENT · ROCK DRILLS · DIAMOND DRILLS · OIL WELL TOOLS

C.P.7

THE 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 Green
Midland Representative: Green
W. T. BOWER, 184 Jockey Road, Sutton Coldfield

W

Y

L

E

X

ELECTRICAL
PRODUCTS

for

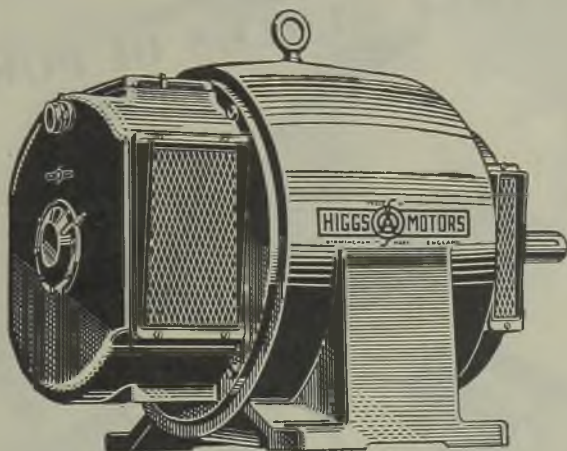
STRENGTH

'Wylex must be good'

GEORGE H. SCHOLES
& CO. LTD.

Wylex Works, Wythenshawe
MANCHESTER





Every Higgs Motor contains the wealth of 35 years' experience in the manufacture of industrial electrical equipment. For Direct Current Motors or Generators you cannot do better than specify HIGGS.

Send for Leaflet 70.

Belfast, Birmingham, Bristol, Dundee, Glasgow, London, Manchester, Nottingham, Peterborough, Sheffield, Wolverhampton.



FOR LARGE BLOCKS OF POWER

OIL-FILLED SUPER TENSION CABLES

33 kV to 330 kV

PIRELLI-GENERAL

MANUFACTURERS OF EVERY KIND OF ELECTRIC CABLE

Advt. of Pirelli-General Cable Works, Ltd., Southampton.

1890

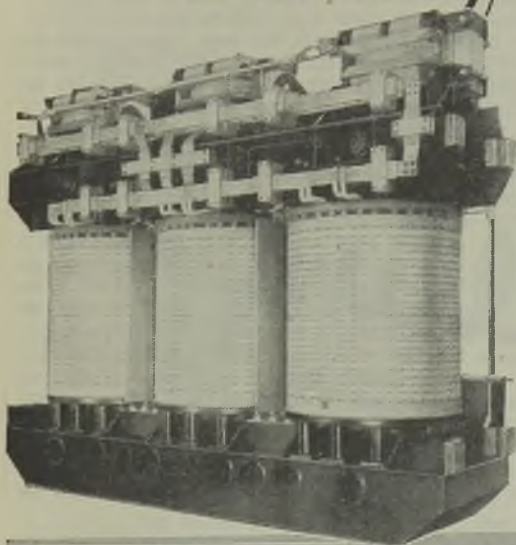
*56 years
experience
in the
manufacture
of*

THE FIRST 10 kV.
TRANSFORMER
(150 h.p.) EVER BUILT
This Ferranti Trans-
former, built 56 years
ago, embodied a ducted
core and ducted wind-
ings—Two fundamental
features of design used
in the large High Voltage
Power Transformer
of to-day.



FERRANTI

Transformers



A 40,000 kVA Ferranti
Power Transformer of
modern design

FERRANTI LTD
HOLLINWOOD, LANCS.

London Office :
KERN HOUSE · KINGSWAY WC2

FT70

1946

You
can't
beat

ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COC
BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC
AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BEI
ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES
COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BEI
ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COC
BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC
AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BEI
ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES
COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC
ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COC
BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC
AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BEI
ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES
COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC
ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COC
BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC
AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BEI

BELLING & COMPANY, LTD., BRIDGE WORKS, ENFIELD, MIDDX. Telephone: Howard 1212

ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COC
BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC
AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BEI
ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES AND COOKERS BELLING ELECTRIC FIRES

What do you look for in Overhead Service Accessories ?



Henley's offer a wide range of overhead service accessories which are of robust construction and simple to install. The designs incorporate all those features, based on long and specialised experience, which the discriminating engineer looks for in such accessories. Here are a few typical items from the wide range available.



INSULATING SHROUD
for nut type service taps.
Insulates neatly and efficiently.



NUT TYPE SERVICE TAP
specially designed to prevent loosening due to vibration.



VICE TYPE SERVICE TAPS
In two sizes, for a wide range of line and service wires.



VICE-TYPE SERVICE CONNECTORS
for jumper connection work at "non-tension" junction points.

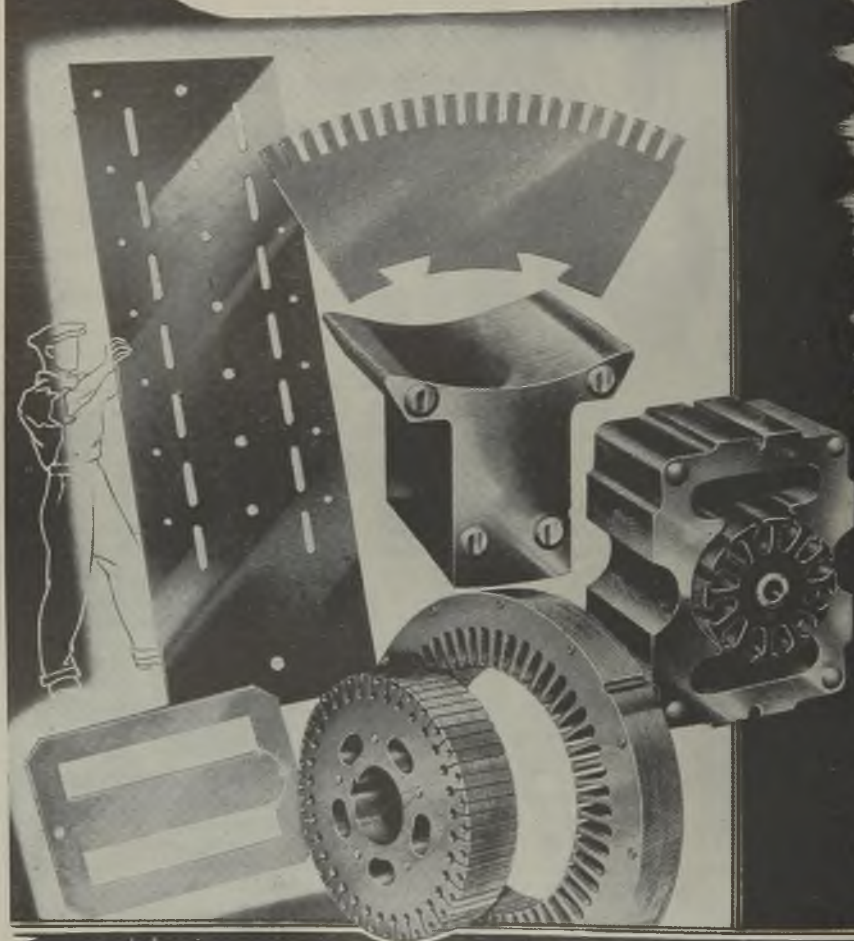
★ Ask for full details of the comprehensive range of
HENLEY Overhead Service Accessories.

HENLEY

ELECTRICAL DISTRIBUTION EQUIPMENT

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

Laminations and Electrical Sheets



JOSEPH SANKEY & SONS LTD.

BILSTON, STAFFS.

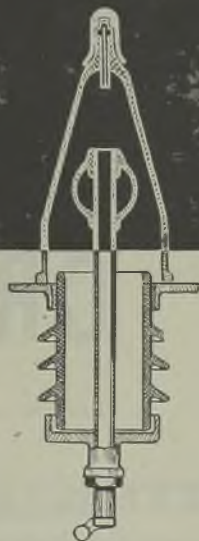
LONDON OFFICE, ULSTER CHAMBERS, 168 REGENT ST. W. 1



Lightning Surges

Terminal Apparatus Protected by Reyrolle High-Speed Arc-Gaps

- HIGH-SPEED OF OPERATION ENSURES CUT-OFF AT RELATIVELY LOW IMPULSE-VOLTAGE
- PERMANENCY OF SETTING BY RAPID TRANSFERENCE OF ARC TO SPECIAL ARCING-ELECTRODES
- CHARACTERISTICS UNAFFECTED BY WEATHER CONDITIONS AS GAP IS TOTALLY ENCLOSED



REYROLLE
HEBBURN-ON-TYNE ENGLAND

Landmarks of Britain



Newcastle on Tyne

THE CASTLE KEEP
NEWCASTLE-ON-TYNE

Built by Henry II in 1177, it was once the most important portion of the Castle, and is now used as a museum

CRYSELCO

MADE IN ENGLAND

Lamps

FIFTY YEARS OF
QUALITY & SERVICE

Branches

BIRMINGHAM
BRIGHTON
BRISTOL

BURY ST EDMUNDS
CARDIFF
GLASGOW

LEEDS
LEICESTER
LIVERPOOL

LONDON
MANCHESTER
NEWCASTLE



CRYSELCO LIMITED, KEMPSTON WORKS, BEDFORD

★ DELARON

L A M I N A T E D P L A S T I C

... Grade C.P.3 is suitable for cold punching up to $3/32$ " thickness, and there are specific grades for high insulation properties, for high tensile strength, or for tropical use, also available.

"DELARON" is made in five paper and three fabric grades, in thicknesses from $1/32$ " upwards and in sheets up to $76" \times 38"$.



We will gladly advise you on the most suitable grades of "DELARON" for your own insulation requirements.

Please send for the "DELARON" Handbook giving full technical data and advice on machining.

★ "DELARON"
is a Registered
Trade Name

DE LA RUE INSULATION LIMITED

IMPERIAL HOUSE · 84 REGENT STREET · LONDON · W.1 TELEPHONE: REGENT 2901

DA. 4 (46)



SWITCHGEAR

OIL-BREAK • AIR-BREAK • AIR-BLAST

AIR-BREAK TRUCK (OIL-LESS)

Class 'AJ 21'

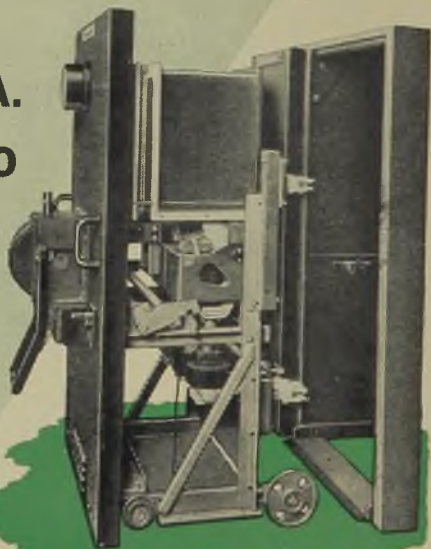
UP TO
50 MVA.
at
**600/660
VOLTS**

FULLY-TESTED FOR
SHORT-CIRCUIT DUTY

Hand, Solenoid, or Spring
operated Breaker.

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

Silvered contacts — Long Life.



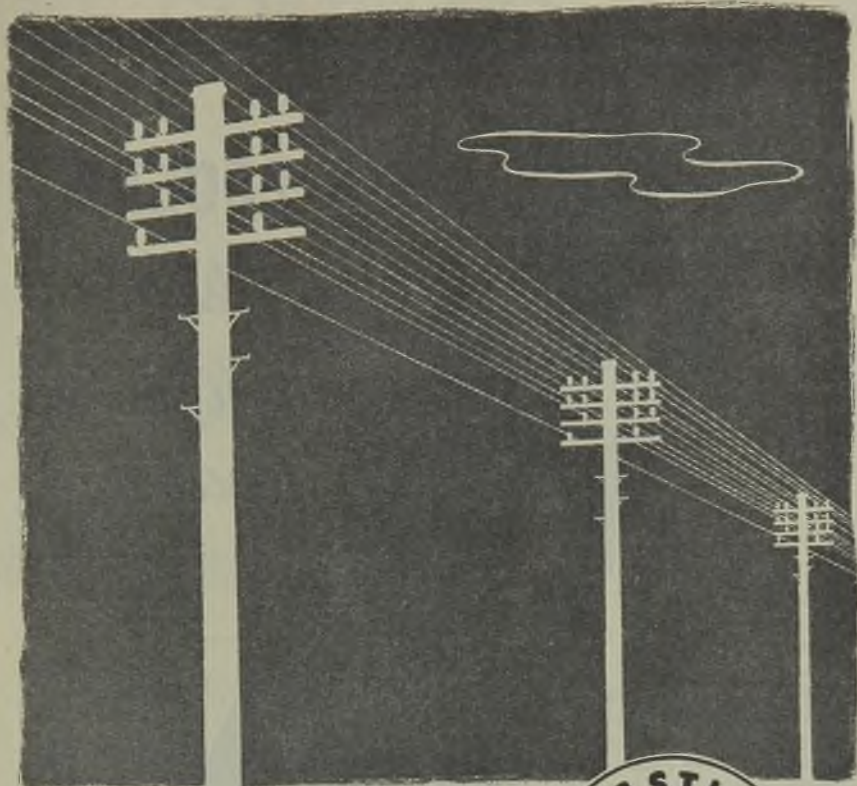
BTH

WILLESDEN

THE BRITISH THOMSON-HOUSTON COMPANY LIMITED, WILLESDEN, ENGLAND.



A3477/2C




FOR EVERYTHING ELECTRICAL—

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



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

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



THIS FOOLED THE NAZIS -

*but it didn't
beat us!*

This little device helped Nazi and Jap airmen to drop their bombs in the wrong places. A tricky piece of work—but it didn't beat Ekco! We turned out these "Gun Flash Simulators" quickly, cheaply, and efficiently. *Your* job may be more straightforward or it may be even trickier, but if it calls for Thermosetting Moulding, Ekco are the best people to do it. Ring Regent 2601 or Southend 49491—and get the 'know-how' on Moulded Plastics.



EKCO
PLASTICS FOR INDUSTRY

Works
Southend-on-Sea

E. K. Cole Ltd., Plastics Division, Dept. ER, 5 Vigo Street, W.1.

THE COMPLETE RANGE

OF

**'ENGLISH ELECTRIC'
TYPE 'T'**

HIGH RUPTURING CAPACITY
CARTRIDGE FUSE LINKS

HAS BEEN

A.S.T.A. CERTIFIED

FOR COMPLIANCE WITH

B.S.S. 88 - 1939

CATEGORY OF DUTY 440 AC4
(25,000 kVA at 440 VOLTS)



A.S.T.A. CERTIFICATE No.	RATING AMPS.	LIST No.	RANGE OF CURRENT RATINGS AVAILABLE
617	30	TIA 30	2 to 30 Amps.
616	60	TIS 60	35 to 60 Amps.
615	100	TC 100	80 to 100 Amps.
251	200	TF 200	125 to 200 Amps.
252	300	TKF 300	250 to 300 Amps.
629	400	TM 400	350 to 400 Amps.
354	500	'TTM 500	450 to 500 Amps.
353	800	TLT 800	550 to 800 Amps.

*Accepted as the Standard of Quality
and Performance the World Over*

THE ENGLISH ELECTRIC COMPANY LIMITED

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

FUSEGEAR WORKS

STAFFORD

High accuracy, simplicity, exceptional versatility and proven reliability have won for "AVO" Instruments a world-wide reputation for supremacy wherever rapid precision test work is demanded. There is an "AVO" Instrument for every essential electrical test.



36-10141 Model 7
Universal AvoMeter

Sole Proprietors and Manufacturers:

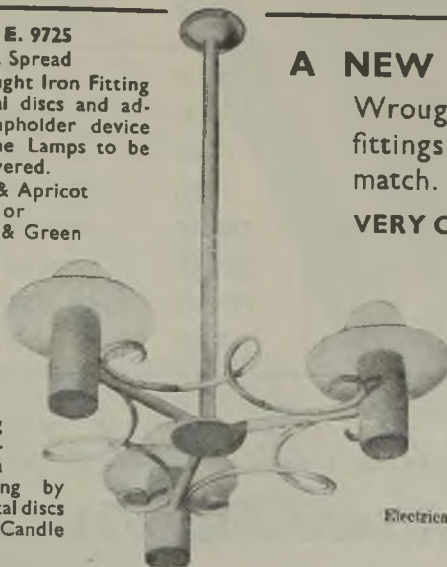
THE AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO. LTD.
Winder House, Douglas Street, London, S.W. 1 Telephone: VICTORIA 3404-8

No. E. 9725
13in. Spread

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

Ivory & Apricot
or
Ivory & Green

This Fitting can be converted to a Candle Fitting by removing metal discs and adding Candle Shades.



A NEW LINE

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

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

Electrical



Accessories

Telephone :
Bishopsgate
4356 (7 lines)

101 DEAN STREET,
OXFORD STREET, W.1

THE WHOLESALE FITTINGS CO., LTD.

50-52 COMMERCIAL STREET, LONDON, E.1

142 KING STREET,
HAMMERSMITH, W.6

MANCHESTER 4: 78-80 HIGH STREET

9 STATION PARADE,
BALHAM, S.W.12

Telegrams :
"Calottes, Edo,
London"

BRISTOL 1:
53 FROGMORE STREET

A Handy Size-

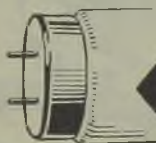
the NEW 4 FOOT METROVICK FLUORESCENT LAMP



The Bi-pin Cap ensures SAFETY FROM SHOCK as all accessible parts are insulated. It also means that—

- (1) Holders are rigidly fixed.
- (2) The insertion of the lamp is a very simple matter as it is only necessary to slip the pins into the slot of the holder and turn the lamp through 90 degrees.

This can be done by one man in one operation.



LOOK



METROPOLITAN-VICKERS ELECTRICAL CO. LTD.
NUMBER ONE KINGSWAY · · · LONDON · W. C. 2.

New & Reconditioned ELECTRICAL EQUIPMENT For Sale

THREE-PHASE 50-CYCLE A.C. MOTORS

H.P.	MAKE	FRAME	TYPE	V.	R.M.P.
450	B.T.-H.	PROT.	S.R.	400	480
300	E.E.C.	PROT.	A-SYN.	440	500
200	E.E.C.	T.E.S.C.	S.R.	440	735
120	Bruce-P.	S. PRO.	S.R.	400	580
100	Bruce-P.	PROT.	S.R.	400	580
85	Clayton	PROT.	S.R.	400	720
45	Brush	PROT.	S.R.	400	725
35	Brush	S. PRO.	S.R.	500	417
30	Fuller	PROT.	S.R.	200	720
20	Brook	PROT.	S.C.	346	1500
15	Crompton	PROT.	S.R.	400	950

D.C. MOTORS

200	Bruce-P.	OPEN	SHUNT I.	440	635
114	M. & C.	PROT.	SHUNT I.	500	750
110	B.T.-H.	D-PROOF	COMPOUND I.	500	740
50	Laur. Scott	PROT.	COMPOUND	220	500
40	Crompton	PROT.	SHUNT I.	220	1100
35	L.D.M.	PROT.	COMPOUND I.	200	750
32	Met-Vick	S. PRO.	SHUNT I.	220	300/ 900
25	G. & B.	EN-VENT	SHUNT I.	220	750
16	McFarlane	S. PRO.	SHUNT I.	240	375/ 950
15	Met-Vick	S. PRO.	SHUNT I.	220	340/ 1020
15	L.D.M.	PROT.	SHUNT I.	440	1020
14	L.D.M.	PROT.	SHUNT	220	2900
13	E.C.C.	PROT.	SHUNT I.	460	320
12½	Crom-Park	EN-VENT	SHUNT I.	440	1720
11	G. & B.	PROT.	SERIES	230	600
11	B.T.-H.	S. PRO.	SHUNT I.	220	400/ 1600
11	Met-Vick	S. PRO.	SHUNT I.	220	650
10	Mc-Whit.	PROT.	SHUNT	440	1100
10	Met-Vick	PROT.	SHUNT I.	220	600
10	Met-Vick	EN-VENT	SHUNT I.	220	370/ 1100

WARDS
might have it!

Whenever you require plant or machinery it is worth bearing in mind that WARDS might have just what you need. Have you a copy of our Machinery Catalogue?

THOS W. WARD LTD

ALBION WORKS - SHEFFIELD

The Symbol of **T.W.W.** Dependability



TILTING TYPE

MERCURY SWITCHES



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

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

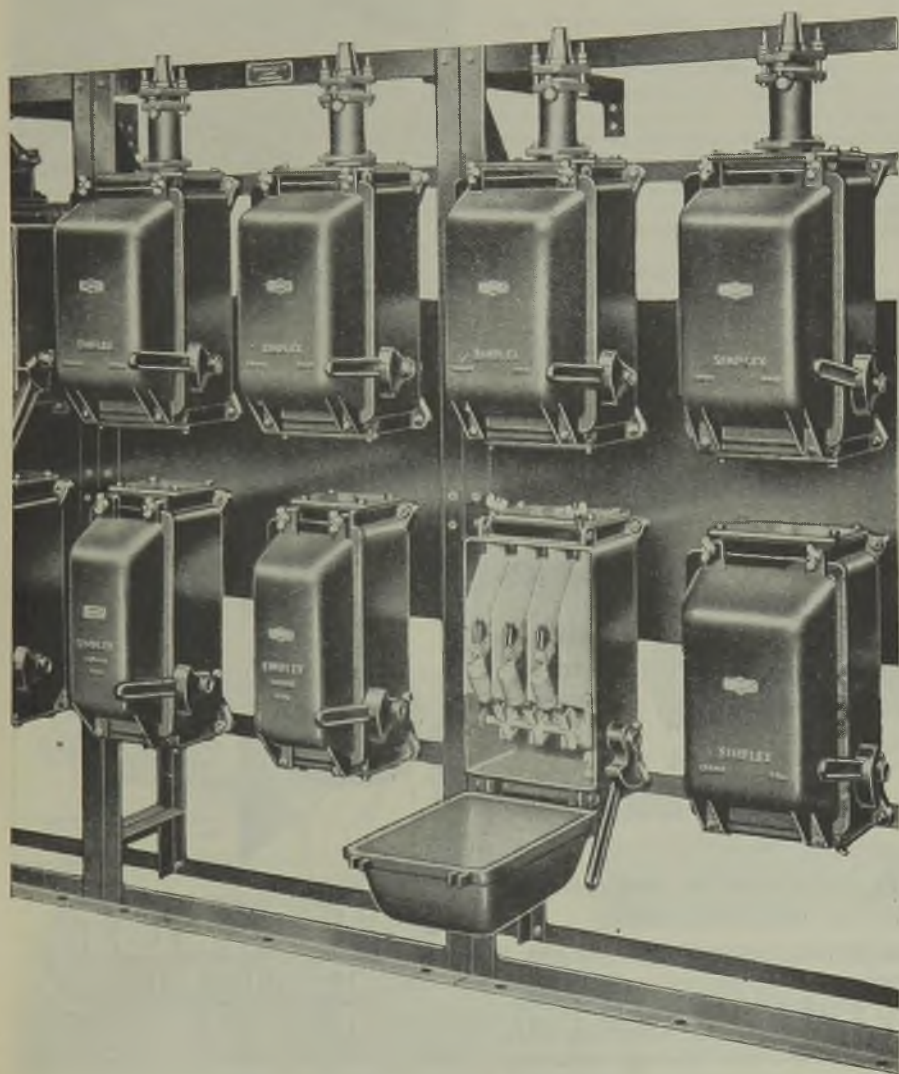
In fine
Mettle

R. H. SYMONDS LTD.
★
47 VICTORIA STREET
WESTMINSTER S.W.1

COPPER & BRASS • WIRE & STRIP • PLAIN & TINNED

WORKS : ENFIELD, MIDDLESEX **W.E.R.38**

SIMPLEX



HOW PHOTOGRAPHY SPEEDS UP PRODUCTION

A Typical Instance is shown here of how modern industry uses photography in a key job to cut costs and speed production. Photography's industrial applications in research laboratory, workshop and office now cover an enormous field. They include: Radiography, X-ray Diffraction, Spectrography, Analysis Recording, High-speed Photography, Document Copying, Electron Micrography, Photo-micrography, Visual Aids.

How and where can photography help you? Expert advice to assist you in deciding is at your service. Write to—

KODAK Ltd.



The photographing of engineering drawings direct on to metal eliminates hand scribing... saves time and labour... reduces the possibility of variation between finished templates or parts intended to be identical. Illustration shows the operation of rolling down the Transfer Sensitizing Paper on to the prepared metal surface.

Dept. 507, Kingsway, London, W.C.2

MOULDED TERMINAL BLOCKS



FROM
2 TO 12
WAYS

Lengths from $1\frac{1}{2}$ " to 6"
Standard Width $\frac{1}{2}$ " Height $\frac{1}{2}$ "
Terminal Bore $\frac{1}{8}$ " Finish Black.

Made In England.

● Special Prices to Wholesalers
and Manufacturers.

FOR DETAILS SEE LIST NO. ME.4/ER.

METWAY ELECTRICAL INDUSTRIES LTD.

King St., Brighton, 1, Sussex. Telephone: Brighton 4456



RE. TAPE

Specify SLIPKNOT BRAND tapes for all your insulation work; and thus ensure uniform quality and efficiency.

Pitch and Bitumen Insulating Tapes.

Bitumenised, Messian and Paper Tapes.

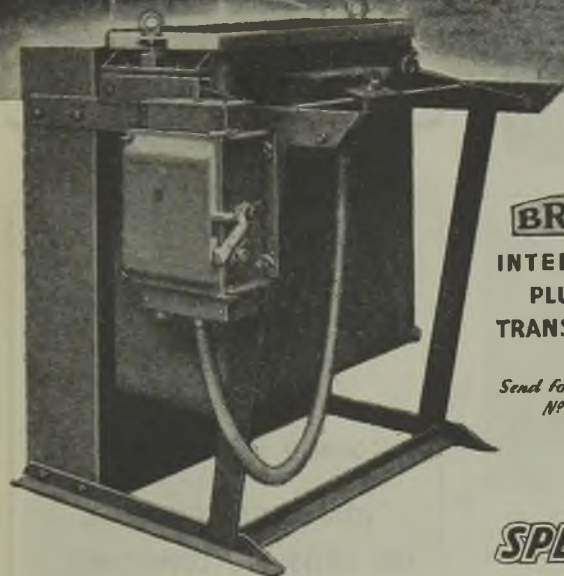
SPlicing COMPOUND TAPE for Electrical Jointing and repair work.

Indispensable to every Electrical Engineer.

SLIPKNOT INSULATING TAPES

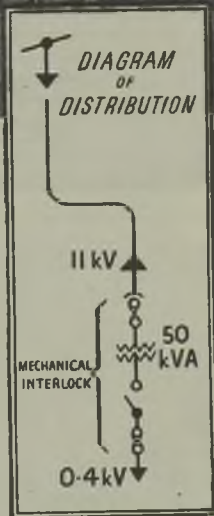
ROTUNDA LIMITED
DENTON • MANCHESTER • ENGLAND

SWITCHGEAR FOR FARM SUPPLIES



BRUSH
INTERLOCKED
PLUG-IN
TRANSFORMER

*Send for Publication
Nº B 283*



b. 88

SPECIFY

BRUSH

The BRUSH INTERLOCKED PLUG-IN TRANSFORMER controls supplies up to 50 kVA. from overhead lines or underground cables. Suitable for voltages 3.3 — 6.6 — or 11 kV.

THE BRUSH ELECTRICAL ENGINEERING CO. LTD. LOUGHBOROUGH, ENGLAND

TURBO-GENERATORS, TRANSFORMERS, E.H.T. and M.T. SWITCHGEAR, A.C. and D.C. MOTORS and GENERATORS, BATTERY ELECTRIC VEHICLES and TRUCKS, TRACTION EQUIPMENT, BUS and COACH BODIES

BRANCHES : London, Birmingham, Cardiff, Bath, Manchester, Leeds, Newcastle, Glasgow, Belfast, Dublin



**PRE-WAR
60/40 ALLOY
NOW
AVAILABLE**

Nominal 1-lb reels
list Prices

14 S.W.G. - 6/-

Cat. ref. no. 18014

18 S.W.G. - 6/9

Cat. ref. no. 1801A

Obtainable from
most factors. In
case of difficulty
write to us.

The cost of the Solder is so little and a sound joint means so much. The greatest economy you can effect in undertaking any soldering of electrical apparatus is to use the finest cored solder in the World—Ersin Multicore. Samples and details sent free.

MULTICORE SOLDERS LTD.
Mellier House, Albemarle St., W.1
Telephone: Regent 1411.



The

'LEADER'

ELECTRIC TRUCK

A Power-driven Truck, built for hard work ; no tugging—no straining.

YOU need this truck.

WINGROVE & ROGERS LTD. (Dept. E)
POLAR WORKS, OLD SWAN, LIVERPOOL 13



Savage

"made to measure"

Specialists in the manufacture of quality instruments up to 5 KVA, built to give you service for many years.

SAVAGE TRANSFORMERS Ltd.
51 NORTHGATE ST., DEVIZES

Phone : Devizes 536

W. H. KEYS L^{TD}

have specialized in the manufacture of Insulating Compounds for the Electrical Industry for over 50 years, and solicit your orders for :—

BITUMINOUS FILLING COMPOUNDS

(To meet the requirements of B.S.S.688)

JOINT BOX COMPOUND

OIL RESISTING COMPOUND

INSULATING VARNISH

ROSIN OIL

CABLE WAX

Head Office :

WEST BROMWICH

Telephone : WES. 0206-7. Telegrams : "OIL."

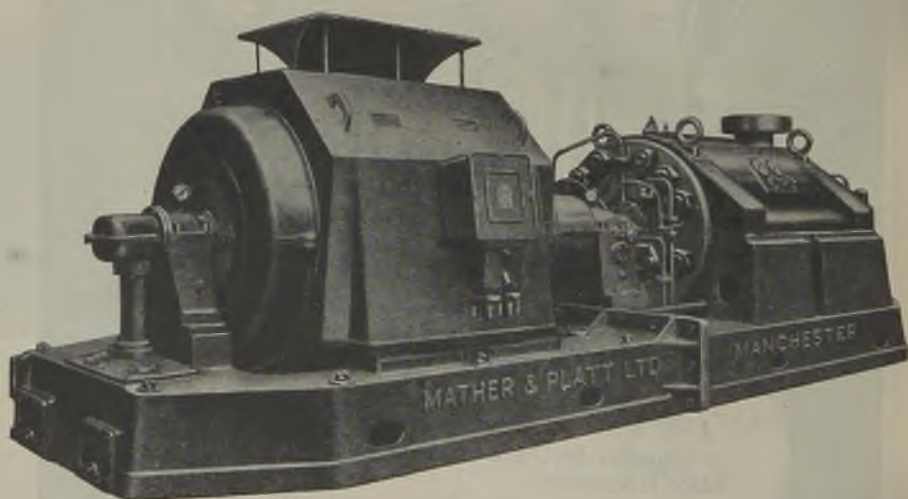
THE essential foundation stone upon which
a quality-first and durable Electrical Instal-
lation is founded.

WALSALL CONDUITS LTD • WEST BROMWICH

3,000

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

TAKING NOT MORE THAN $4\frac{1}{2}$ TIMES full load current
when started by switching direct on to the supply mains,
this Mather & Platt 3,000 H.P. 3,000 Volt, 3,000 r.p.m.
Squirrel Cage Motor drives a Mather & Platt Boiler Feed
Pump operating at a pressure of 3,000 lb. per sq. inch.



MATHER & PLATT LTD
PARK WORKS MANCHESTER 10

ASHTON

*Cables
and Flexibles*



Types for every purpose

Insist on ASHTON Cables, Flexibles and Cords and be sure of the best. Supplied to H.M. Government Departments and all Electrical and Allied Trades.

The wide range of 'ASHTON' Cables, Flexibles and Cords includes types and finishes to meet every requirement.

Manufactured under the strictest laboratory supervision throughout and finished to perfection, they are of the finest quality obtainable.

Supplies are available from numerous distributors throughout the country, but in case of difficulty in obtaining your requirements write direct to the makers.

LCF 3

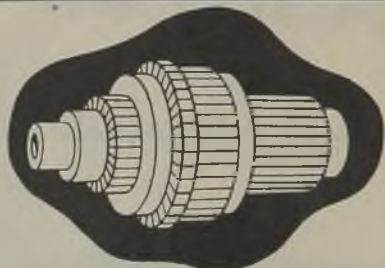
MADE BY

AERIALITE

CASTLE WORKS · STALYBRIDGE · CHESHIRE *Ltd.*

When you think of COMMUTATORS *... think of* NELCO MOULDED COMMUTATORS

During our 20 years experience we have probably met with and overcome most of the difficulties which are likely to arise in connection with commutator problems—and we find that though novel designs of bar and strip formation come and go, the NELCO special design of segment, with maximum face area in contact with the bakelite and with mica or micanite separators between the bars, gives maximum all round efficiency. Although we still have essential contracts to fulfil, limited capacity will soon be available for other work and we shall be able to supply commutators for all purposes, including Dual purpose types carrying both LT and HT currents. Enquiries welcomed now.



NELCO patent super-imposed moulded commutator produced by the thousand for the Services. Slip rings can be incorporated.

NELCO *Moulded* COMMUTATORS

NELCO LTD. SHALFORD, nr. GUILDFORD, SURREY.

NICKEL, CADMIUM AND ZINC BARREL PLATING

FOR THE
TRADE

B. Kimber, Allen & Co
LONDON
S.E. 13.

Phone-LEE GREEN 3491

Efficient Wholesale Service!

WIRING EQUIPMENT,
B.S.S. CONDUIT & FITTINGS,
C.M.A. CABLES & FLEXIBLES,
SWITCH & FUSE GEAR,
SANDERS, M.E.M., CRABTREE,
BRITMAC, M.K., WYLEX, TENBY,
ELMA LAMPS,
APPLIANCES & FITTINGS,
FLUORESCENT LIGHTING,
WASHBOILERS,
VAN DORN AND WOLF TOOLS.

Send enquiries and orders to:

RD JOHNSON, CLAPHAM & MORRIS LTD
7-9, SWAN STREET, MANCHESTER, 4

Phone DEAnsgate 5491

HEAD OFFICE: JACEM HOUSE, TRAFFORD PARK M/c 17.



If Merlin joined our board

No doubt Merlin's magic could produce M.E.M. switchgear out of thin air. But without such assistance, even the most enlightened board of directors must contend with shortages, controls and restrictions in the face of an increasingly heavy post-war demand. All the same, good progress is being made in stepping up production and increasing quantities of M.E.M. gear are being rushed to the wholesalers.



They in turn are doing a splendid job of work in distributing all available supplies fairly and equitably. Depend on it you will get your supplies more quickly through your wholesaler.



MIDLAND ELECTRIC MANUFACTURING CO. LTD., TYSELEY, BIRMINGHAM, 11

SWITCH, FUSE AND MOTOR CONTROL GEAR, ELECTRIC FIRES
AND LOCALISED LIGHTING EQUIPMENT

London Showrooms & Stores: 21-22 Rathbone Place, W.1 : Manchester Showrooms & Stores: 48-50 Chapel St., Salford, 3

CYCLONE FANS



PUT AIR TO WORK

MATTHEWS & YATES LTD

Heating and Ventilating Engineers

SWINTON (Manchester) & LONDON

Tel. SWinton 2273 (4 lines), LONDON, Chandos 7823 (3 lines)

GLASGOW · LEEDS · BIRMINGHAM · CARDIFF

Full Technical Data supplied on quoting ref. ER/10



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

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

"TICONAL" (Registered Trade Mark)

**PERMANENT MAGNETS MADE BY
MULLARD**

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

(8A)

For lasting service and satisfaction

★
Manufacturers
of
CONDUIT FITTINGS
INDUSTRIAL AND
WATERTIGHT WELL GLASS
FITTINGS AND ACCESSORIES.
DOMESTIC LIGHTING AND
DOMESTIC ELECTRICAL
APPLIANCES.
BATTERY CHARGING EQUIPMENT.
HAND LAMPS OF ALL DESCRIPTIONS

ELECTRICAL &
EGAL ENERGY
ACCESSORIES LTD

ELECTRICAL & GENERAL ACCESSORIES
(Leicester) LTD.

NEWHALL STREET, BIRMINGHAM
Telegrams: Elgenic, Birmingham

*The Usual Standard
isn't enough*

We can supply you with
**FIBRE JOINTS
AND WASHERS**
OF GUARANTEED ACCURACY

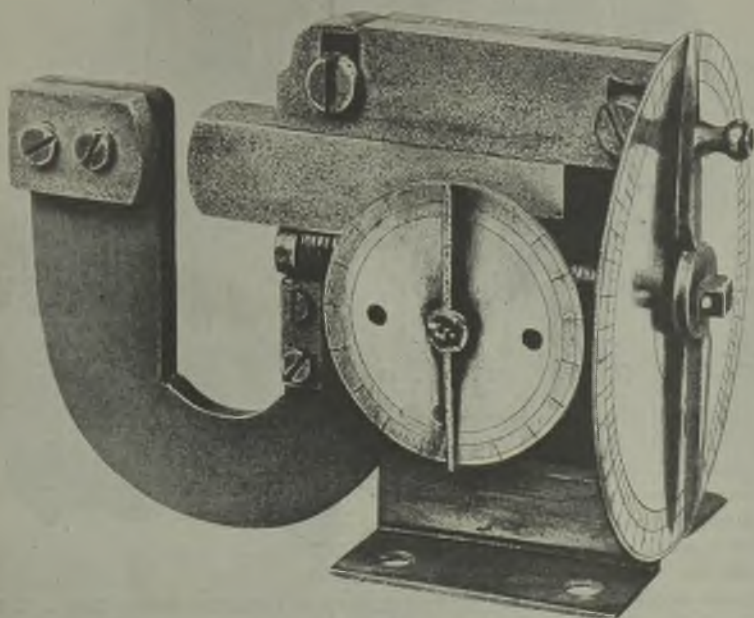
ALSO "Corrujoint" All-Metal Gaskets, Taylor's Corrugated Packing, Copper Joints and Washers, Compressed Asbestos Jointings, Shims and Kinghorn Type Metallic Valves, tabwashers to specifications.

Write for Booklet.

THE
**CORRUGATED PACKING
AND SHEET METAL CO. LTD.**
GATESHEAD-ON-TYNE

PHONE GATESHEAD 71785
GRAMS: CORRUGATED GATESHEAD

CROWN COPYRIGHT. FROM AN EXHIBIT IN THE SCIENCE MUSEUM, SOUTH KENSINGTON.



WATT made a MICROMETER



**C R O M P T O N
M E T E R S . . .**

HAVE MADE A NAME FOR ACCURACY



C R O M P T O N P A R K I N S O N
LIMITED

KMENT. LONDON. W.C.2 and Branches



Taking a risk . . .

He is just one of the crowd clocking in ' at the ordnance factory . . . searched for cigarettes and matches . . . even his money taken and tied up in a small cotton bag. As he passes out on the "clean side" he grins . . . the penalty for "smuggling" matches and cigarettes is high . . . but the penalty of an explosion is higher still! At night . . . back through the danger gate . . . the first long puff at a cigarette is soothing . . . brings home the significance of working on the "clean side." He knows there's a risk all right, but . . . well, he'd as soon take that sort of risk as another. Yes, there are other kinds of risks . . . money . . . position . . . reputation. The financier, for instance . . . the cabinet minister . . . the engineer . . .

No! . . . As an engineer you would hardly agree with that. The engineer does not take risks. He demands facts . . . tests . . . PROOF . . . even in matters of comparative detail. You would, for example, specify precision holding components by Newton. You would know that security, speedy assembly — and often safety — may depend upon Newton accuracy and dependability.

NEWTON

HOLDING COMPONENTS

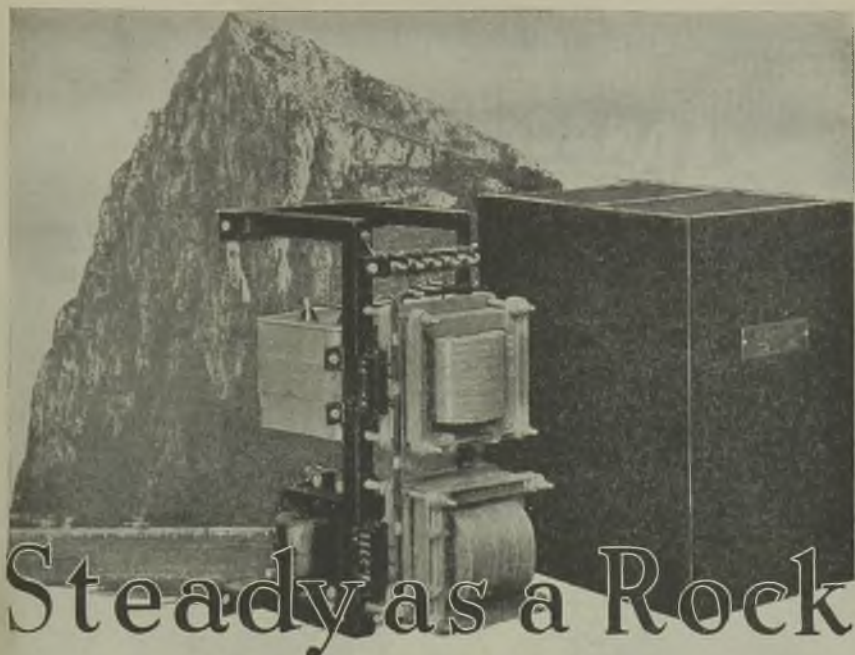
Bolts, Nuts, Screws, Rivets, Precision Components

L. H. NEWTON & CO. LTD., NECHELLS, BIRMINGHAM 7

Telephone: EAST 1551 (16 lines)

LONDON • COVENTRY • MANCHESTER • BRISTOL • DUBLIN • SOUTH AFRICA • NEW ZEALAND
INDIA • CEYLON • DENMARK • NORWAY • PALESTINE

Security under exacting conditions!



A.C. supplies stabilised by this simple and static apparatus

The Westinghouse A.C. voltage stabiliser provides an **undistorted** output voltage wave over a wide range of load, with the output held within fine limits in spite of simultaneous variations in both input voltage and load. It responds very rapidly indeed to sudden

changes in either load or mains, compensation being complete within $\frac{1}{2}$ to $1\frac{1}{2}$ cycles of the supply.

Standard sizes from 80 to 1,200 V.A. for use on 190/260 volts single-phase 50 c.p.s. A.C. supplies, and details are given in publication E.E.2.

“STABILISTOR”

THE



A.C. VOLTAGE STABILISER

WESTINGHOUSE BRAKE & SIGNAL CO. LTD., 82 York Way, King's Cross, London, N.1



ANACOS

OVERHEAD LINES

Telephone, Telegraph and
Trolley Wires, Power Lines
IN
**COPPER, BRONZE &
CADMIUM-COPPER**

TELEPHONE
BLACKFRIARS
8701 (9 lines)

FREDERICK SMITH & COMPANY
(INCORPORATED IN THE LONDON ELECTRIC WIRE COMPANY & SMITHS, LIMITED)
ANACONDA WORKS, SALFORD, 3, LANCs

TELEGRAMS
"ANACONDA"
MANCHESTER



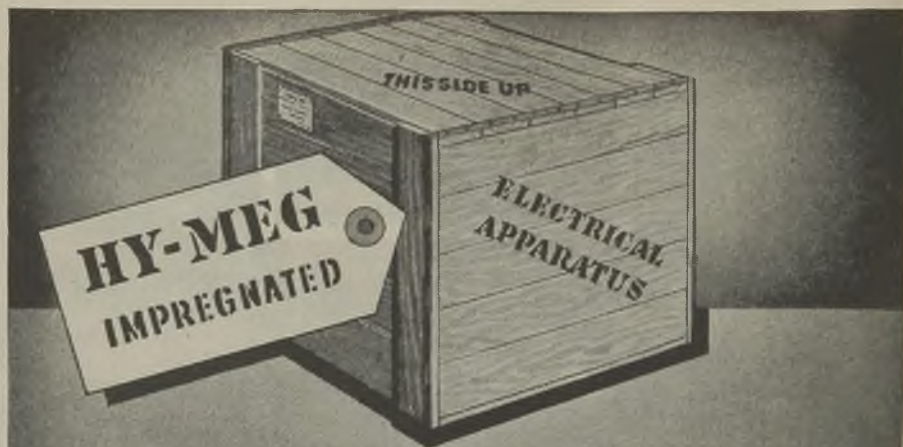
These Ellison Starters, controlling centrifugal hydro extractors in a Silk Works, are working under exacting conditions. Their heavy cast iron cases have to withstand rough treatment and the corrosive action of the acid-laden atmosphere in which they work.

Moreover, since each starter is operated over 200 times a day its mechanism and electrical contacts are subjected to unusual wear and tear.

Notwithstanding the exacting conditions, these starters continue to give satisfactory service and require very little attention.



EXACTING CONDITIONS



Your products, too, can be
assured of a longer life under
all working conditions

USE

HY-MEG

**THE MODERN
TIME SAVING
IMPREGNATING
MEDIUM**

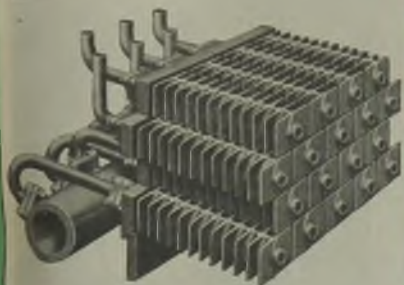


Executives in charge of the production of electrical apparatus calling for impregnation, should send for the HY-MEG Booklet "Stability in Insulation". It describes fully how HY-MEG scientifically overcomes problems arising both in production and in operation. Apply on Business Heading or Card and enclose 2d. to comply with the Control of Paper Orders.

LEWIS BERGER & SONS LTD. (Est. 1760) 35, BERKELEY SQUARE, LONDON, W.1
Telephone : MAYfair 9171

MANUFACTURERS OF INSULATING VARNISHES & ENAMELS

FULL FACILITIES FOR INSPECTION



Every portion of every tube and all joints can be inspected in Green's Premier Diamond Economiser. There are no dead pockets or concealed spaces where slow corrosion can proceed undetected. In this respect alone, this design is the most important advance in recent years in economiser practice.

GREEN'S economisers

E. GREEN & SON
LIMITED

WAKEFIELD

GE10

Personally guaranteed by L. G. Hawkins

Hawkins

Electric Products

APPLIANCES AND LIGHTING EQUIPMENT

Here are examples of what quantity production and new manufacturing methods achieve for the famous Hawkins Supreme Products.

New Aluminium Kettle, 4 pint—1250 watt immersion element. Cat. No. LGH 700.

Hair Dryer, known the world over. Cat. No. LGH 95722.

New Electric Reflector Fire, 1000 watt—adjustable. Cat. No. LGH 113.

New Clip-on Bed Light with switch control—attractive ivory finish with red or green candle. Cat. No. LGH 318.

Mirror Halo Bowl Pendant, 18" diameter. Cat. No. LGH 269285.

New Electric Fan, adjustable for desk, table or wall bracket—guard and blades beautifully finished in cream with the stand in either red or green. Cat. No. LGH 420.

Prices on application

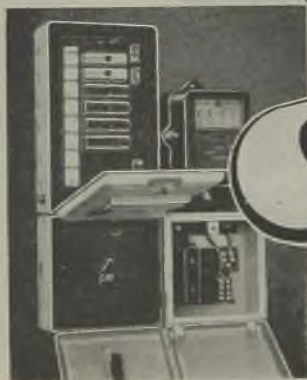
L. G. HAWKINS & CO.
LTD., 30/35 DRURY LANE,
LONDON, W.C.2. Telephone
Temple Bar 5811.



PRODUCED EXACTLY TO THE E.D.A SPECIFICATION



PATENT No. 525624
and others pending




Write for full particulars
and prices.

**CONSUMER'S
SERVICE UNIT**

This flexible, compact, domestic unit with many patented features fits into almost any space . . . widest variety of arrangements possible . . . saves time and cost of installation, extension and maintenance . . . "plug-in" or permanent connections to most types of meters . . . shock risk eliminated by shielding of all internal metal parts . . . cartridge type fuses instantly replaceable without tools . . . single switch control . . . for 250 Volts A.C., 60 Amperes.

REVO ELECTRIC CO. LTD..TIPTON..STAFFS



delivrance

Out of the darkness of days better forgotten comes the clear bright dawn of a new era, shedding its welcome beams that must forever glow to the glory of all mankind.

Illumination . . . REALUMINATION is the order of the day and

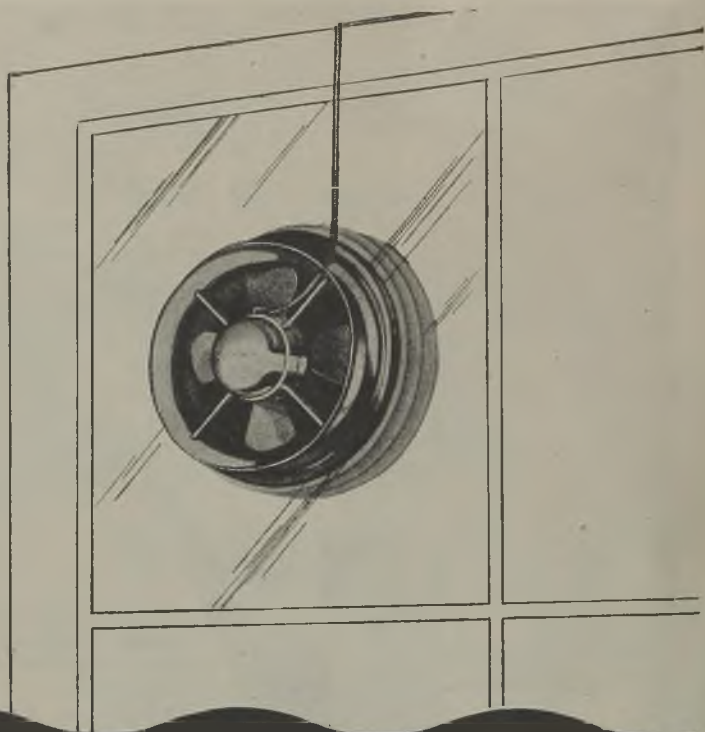
R·E·A·L

Industrial Lighting Equipment is designed to meet every modern requirement. Our team of experts will advise on every illumination problem.

"La delivrance"—symbol of Victory is reproduced by kind permission of the Museum and Art Gallery Committee of the Corporation of Birmingham.

ROWLANDS ELECTRICAL ACCESSORIES LTD.

R.E.A.L. WORKS BIRMINGHAM '18



XPELAIR

WINDOW FAN

- Easily installed.
- Silent in operation.
- Consumption only 25 watts.
- Air displacement 14,000 cu. ft. per hour (N.P.L. certificate).

A

G.E.C.

PRODUCT



Send a
Postcard

for **LIST 138**

FOR COMPLETE INFORMATION,
ILLUSTRATIONS AND SPECIFICATIONS OF
SANDERS SWITCHGEAR, SWITCHFUSEGEAR
AND OTHER ELECTRICAL PRODUCTS
WRITE TO-DAY FOR CATALOGUE No. 138

SANDERS
WEDNESBURY

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

—AGRO ELECTRICAL Co. Ltd.—

Electric Bells

Bell Transformers

Bell Pushes

Bakelite Lampholders

Ceiling Roses

Junction Boxes, etc.

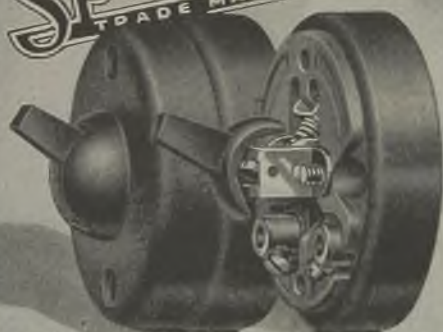
Marketed by **T.M.C.-HARWELL (SALES) LTD.**

BRITANNIA HOUSE, 233 SHAFTESBURY AVENUE, LONDON, W.C.2

Telephone: TEMple Bar 0055 (3 lines)

Telegrams: "Arwelidite, Westcent, London"

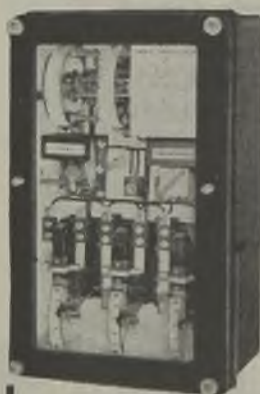
Sperryn
TRADE MARK



**ELECTRICAL
ACCESSORIES
OF
QUALITY**

SPERRYN & CO
MOORSOM STREET WORKS
BIRMINGHAM 6

LONDON OFFICE
21, GREAT SUFFOLK ST., S.E.1



TYPE M3

P & B—GOLDS THERMAL OVERLOAD RELAYS

FOR THREE-PHASE MOTORS

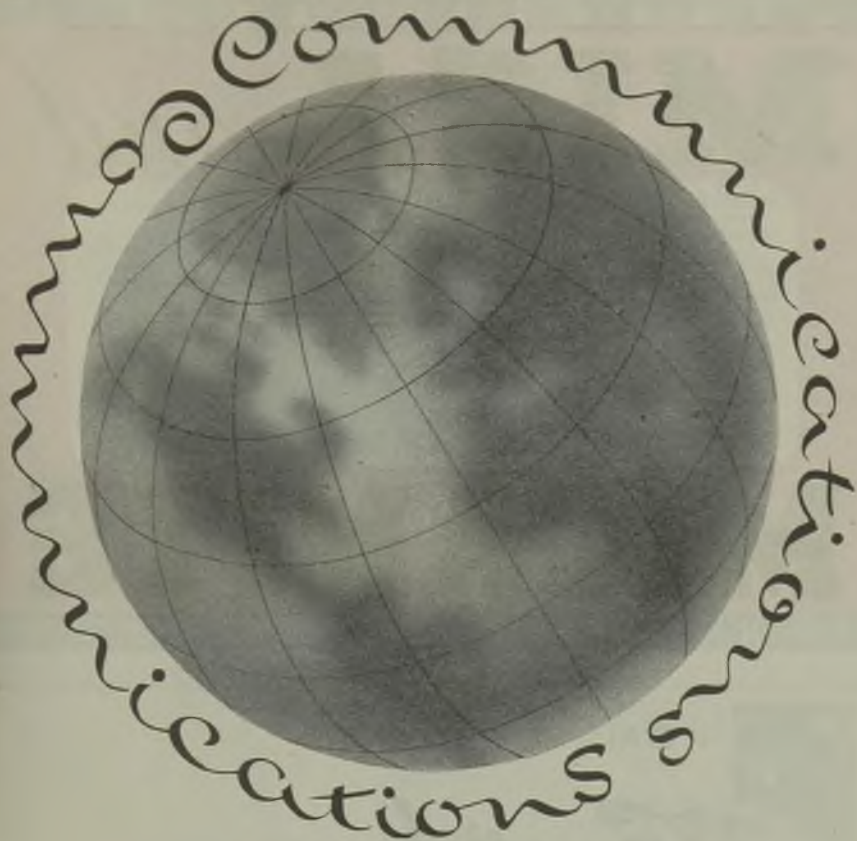
GIVE

Complete and Positive Protection

DESCRIPTIVE PAMPHLET AVAILABLE ON REQUEST

The **P & B** ENGINEERING Co. Ltd

TAMWORTH LANE WORKS, MITCHAM, SURREY



TO JOIN THE ENDS OF THE EARTH

THE new industrial era which lies before us will make heavier and heavier demands upon world communications presenting a host of new problems. It is in the solution of such problems that the unique facilities of Standard Telephones and Cables Limited find their greatest expression. For many years at the forefront in this field of human endeavour, their vast resources and wide experience enable them to undertake any Telecommunication problem—whatever it may be and in whatever part of the world it may be found.

Standard Telephones and Cables Limited

TELECOMMUNICATION ENGINEERS

Connaught House · Aldwych · London, W.C.2

Telephone : Holborn 8765

Telegrams : "Relay, Telex, London"

C L A R K E ' S " A T L A S "

MICA *and*

TUBES: Round, Square or Rectangular, in Mica or Bakelite.

MICANITE: In Moulding, Flexible and Commutator qualities.

HEATER MICANITE for Domestic and other Electrical Appliances.

MICA: Uncut or cut to size and calibrated.

Contractors to Admiralty Air Ministry War Office and other Government Department lists

MICA for all Electrical Gear and Domestic Appliances.

MICAFOLIUM • MICA PAPERS • MICA CLOTH • STEEL TUBES AND BARS INSULATED WITH MICA OR BAKELITE • LEATHEROID • FIBRE BAKELITE SHEET, ETC.

H. CLARKE & CO.

(MANCHESTER) LTD.

Telephone: ECCLES 2001-2-3-4-5



ATLAS WORKS
PATRICROFT
MANCHESTER

Grams: Pirtoid, Phone, M'chester

MICANITE

I N S U L A T I O N

WE AIM TO BRING



THROUGHOUT
THE WORLD

WHEREVER YOU SEE THIS
TRADE-MARK YOU ARE
ASSURED OF THE FINEST
CRAFTSMANSHIP IN THE
WIRE & CABLE INDUSTRY



EVERSHED CONTROLS for AIRCRAFT



Over 40 years' experience now
available to the Aircraft
Industry.

Electrical Throttle Controls
Electrical Trim Tab Controls
Synchronised Flap Controls
Fuel Gauges, etc.

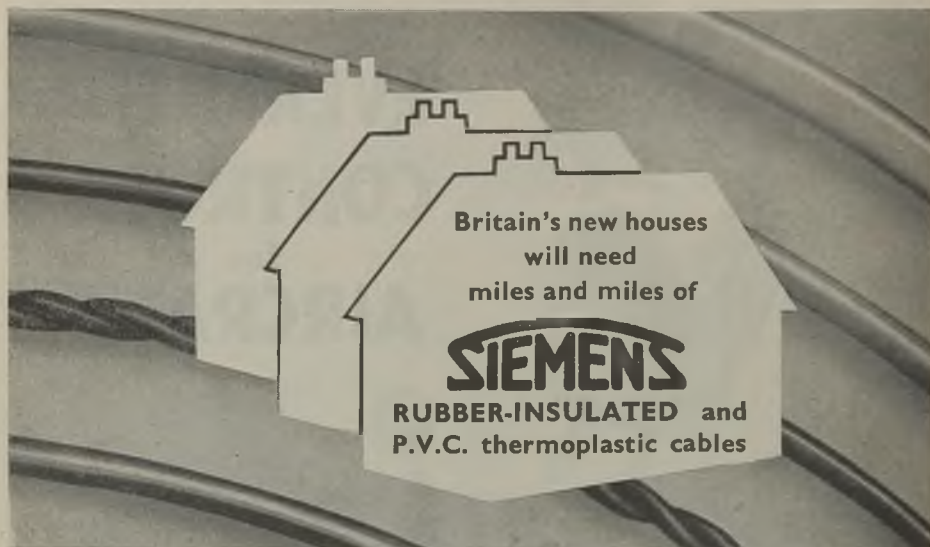
We invite your enquiries. When
writing please mention **D 5/66.**

EVERSHED & VIGNOLES LTD.

CHISWICK LONDON, W.4

Telephone : Chiswick 1370

Telegrams : Megger. Chisk, London



Britain's new houses
will need
miles and miles of
SIEMENS
RUBBER-INSULATED and
P.V.C. thermoplastic cables

There's over three quarters of a century's experience and research behind every inch of the miles of Siemens wires and cables which pour from the great factory at Woolwich—cables and wires that helped to make Victory complete and are now helping on Britain's work of reconstruction.

SIEMENS ELECTRIC LAMPS & SUPPLIES LTD., 38/39 UPPER THAMES STREET, LONDON, E.C.4

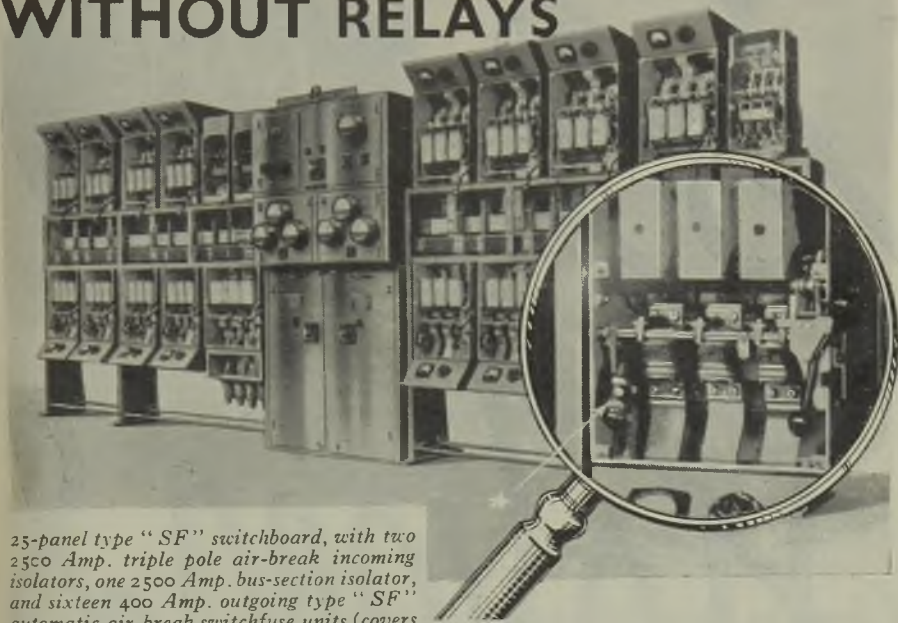


LIFTS *by*
PICKERINGS
STOCKTON • ON • TEES AND LONDON
116 Victoria St., S.W.1
Telephone: Victoria 9860



Earth-Fault Protection

WITHOUT RELAYS



25-panel type "SF" switchboard, with two 2500 Amp. triple pole air-break incoming isolators, one 2500 Amp. bus-section isolator, and sixteen 400 Amp. outgoing type "SF" automatic air-break switchfuse units (covers removed).

for Medium Voltage, Automatic Air-Break Switchgear

The unit illustrated is used for works distribution on the L.N.E.R. system at Cowlairs. Complete earth-fault protection (J. & P. Patent No. 563,060) is given by fitting into the outgoing switch-fuse units core balance current transformers operating low voltage striker fuses (starred in the illustration above). The striker fuses *trip all three phases*. By dispensing with relays both size and cost of the board are reduced. Publication S.G.26 gives full details of earth-fault protection.

Another reason for installing J. & P. Equipment



JOHNSON & PHILLIPS LTD.
CHARLTON LONDON S.E.7

The mark that means that "little more" in quality



**A BIG
NAME
in
CABLE**



ST HELENS
CABLE & RUBBER
CO. LTD.
SLOUGH, BUCKS

Phone : Slough 20333

ELECTRICAL REVIEW

August 23, 1946

Contents :—

Managing Editor :

Hugh S. Pocock, M.I.E.E.

Technical Editor :

C. O. Brettelle, M.I.E.E.

Commercial Editor :

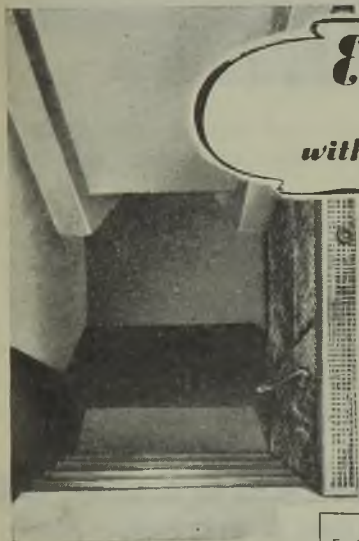
J. H. Cosens

	Page
Editorial.—Improved Pole Lines .	283
Distilling Oil .	285
Nationalization Plans .	290
Views on the News .	291
The Domestic Load. By H. A. P. Caddell, B.A., A.M.I.E.E. .	292
Correspondence .	294
New Books .	296
Standard Overhead Lines .	297
Transportable Steam Boiler .	298
Personal and Social .	299
Town and Country Planning. By Leslie F. Stemp, B.A., LL.B., Barrister-at-Law .	301

	Page
Submarine Cable Fault. By M. Datta, M.Sc.Tech., A.M.I.E.E. .	303
United States Exports .	305
Commerce and Industry .	307
Airfield Lighting Control .	311
Public Lighting Conference .	312
Electricity Supply .	313
Making Electric Clocks .	315
Financial Section .	317
New Patents .	320
Contract Information .	321
Classified Advertisements .	59
Index to Advertisers .	78

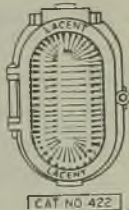
EDITORIAL, ADVERTISING & PUBLISHING OFFICES : Dorset House, Stamford St., London, S.E.1
 Telegraphic Address : "Elecrev, Sedist, London." Code : ABC. Telephone No. : Waterloo 3333 (50 lines).
 Registered at G.P.O. as a Newspaper and Canadian Magazine rate of postage. Entered as Second Class Matter at the New York, U.S.A., Post Office.

Annual Subscription, post free : Great Britain and elsewhere (except Canada), £2 7s. 8d. ; Canada, £2 3s. 4d.
 Cheques and Postal Orders (on Chief Office, London) to be made payable to **ELECTRICAL REVIEW LTD.,** and crossed "Lloyds Bank."



Eliminate those dark
DANGER SPOTS
with a **LACENT OR PRISMATIC**
FITTING

No property owner can afford the risks which are entailed in a badly lit staircase or corridor. If it's dark it's dangerous! Heyes LACENT fittings are available in a wide variety of types and finishes, and are tamperproof. Write for fully illustrated leaflet



by

HEYES

of Wigan

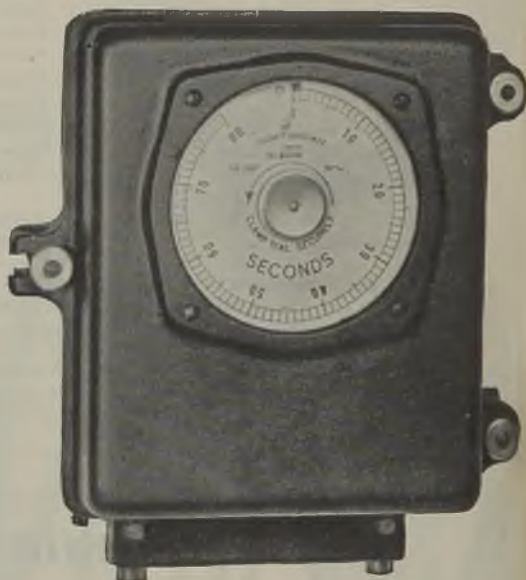
AGENT :
 F. G. KETELBEY, M.I.E.E.
 GAZETTE BUILDINGS
 CORPORATION STREET
 BIRMINGHAM

HEYES & COMPANY LTD., WATER HEYES ELECTRICAL WORKS, WIGAN

d.m. H.C.3

SYNCLOCK PROCESS TIMERS AND CONTACTORS

**for
accurate
timing
of
industrial
and
scientific
processes.**



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

Write for Catalogue Sheet 611

EVERETT EDGCUMBE

COLINDALE WORKS

LONDON, N.W.9

Telephone : COLINDALE 6045

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

ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXIX. No. 3587.

AUGUST 23, 1946

9d. WEEKLY

Improved Pole Lines

Reconciling Low Cost with Reliability

IN order to connect to the public mains the remaining 25 per cent or so of the total of reachable premises in rural areas, it can be said that at least as great a length of mains as already exist will be needed, while a lower average revenue to the route mile is to be expected. The utmost economy in construction is consequently called for. At the same time the standard of reliability should be as nearly as possible equal to that enjoyed in more thickly populated centres.

E.R.A. Investigations

These not easily reconcilable requirements—lowered first cost of overhead lines and lessened liability to interruption in supply—are, it is claimed, met in the new design of wood-pole line which, based upon initial investigations by the E.R.A., is now specified by the British Standards Institution, as described in this issue. From information given us by supply engineers who have operated trial installations, comprising in the aggregate upwards of 850 miles of such lines, during the past half-dozen years and confirmed by the opinion of Post Office engineers from their own angle, the claim appears to be well substantiated.

Although voltages above 11 kV are not covered, a reasonable deduction from the I.E.E. Transmission Section paper by Messrs. H. Willott Taylor and K.L. May two and a half years ago is that the design could be widely adopted with advantage for still higher voltages. Further scope can be envisaged in the reconstruction of existing systems as these become necessary.

Available experience indicates that a line which utilizes, as this does, the additional insulation resistance of its supports is more free from lightning damage (burned poles now being an almost negligible hazard) than one of the ordinary kind with the metal work earthed. It is also probably safer in view of the sense of false security likely to be felt in the latter case, since low-resistance earths may be difficult to obtain everywhere. So far no instance of vibration trouble has been reported with this type of construction, while the horizontal formation of conductors makes them less liable to transient earth faults, the commonest cause of interruptions to supply, and also enables the pole height to be reduced, resulting in a less conspicuous line. In addition, this formation facilitates interchangeability in regard to section and angle poles.

Inclusion of Design Details

The new Specification represents a departure from normal B.S.I. procedure in that it goes beyond establishing criteria of quality, performance and tests and prescribes details of design. This invites the question as to whether any obstacle to progress is a likely consequence. There is, however, the safeguard contained in the provisions made for the use of alternative materials and methods, which give reasonable flexibility. Moreover, compliance with the Specification is not obligatory, although its adoption will eliminate much of the work necessary when obtaining the Electricity Commissioners' approval to a new line.



Progress in the economic electrification of the countryside in the near future will depend largely upon the ability to import timber of the requisite quality, and priority should be given to the needs of the electrical industry in this respect. In any case the magnitude of the extensions necessary and their immediacy indicate the need for a considerable degree of standardization. The ability to purchase "off-the-shelf" components for a simple design that represents the pooled experience of engineers of a diversity of undertakings is a factor of the greatest value in time as well as in money.

I.M.E.A. Supports Nationalization

UNLIKE the companies' organizations the municipal electricity supply authorities, as represented by the I.M.E.A., have decided to concur in the nationalization of the industry. It was easier for them thus to bow to the inevitable, for in their case nationalization means only a change in the form of public ownership. It may also be claimed that it was the existence of so many separate municipal undertakings which led to the original demand for "integration"—a course which the company groups have been pursuing for many years. The question is whether any proposed form of grouping will be better than the structure which the companies have built up and in the building of which they have been accused of "monopolization"—quite unjustly for the most part. The I.M.E.A. hopes that the generating stations and main transmission lines will be handed over to the Central Electricity Board and that any measures for co-ordinating distribution will take account of the need for retaining the "local touch."

Fuel Economy

POWER station engineers have been accused in the past of making a fetish of thermal efficiency. That one-time peculiarity has now come to be regarded, rightly, as a virtue. Yet the very fact that there is no slack to take up leaves them with a feeling of impotence in their inability to give appreciable assistance to the national fuel economy campaign. Nevertheless the autumn conference, under the chairmanship of Dr. E. S. Grumell, arranged in this connection by the Ministry of Fuel and Power with the co-operation

of the Institute of Fuel should be of interest to them, particularly the discussion on sizing and grading of coal to be held on October 10th, and no doubt also the Melchett Lecture during the evening of October 8th. There will be a better factual basis than hitherto for the proposed discussion of district heating on the third day, in view of the probable publication before then of an authoritative report on the subject.

Rising Output

A FURTHER increase in the rate at which electricity production is increasing is recorded in the July figures issued by the Electricity Commissioners. In the first six months of the year authorized undertakings generated 20,481 million kWh, exceeding production in the corresponding period of last year by 6.4 per cent. In July 2,764 million kWh was generated, representing a rise of 8.8 per cent and raising the rate of expansion for the seven months to 6.7 per cent (total 23,244 million kWh). The output for the month was 2,597 million kWh and for the seven months 21,925 million kWh.

Power Station Emissions

REGARDING the recommendation of the L.C.C. Housing and Public Health Committee that the Ministry of Fuel should institute an inquiry into the extent of the discharge of sulphur from power station chimneys and methods of preventing it, the requisite data should not be difficult to obtain. Although this aspect was not included in the terms of reference of the Taite Committee set up by the Electricity Commissioners in 1930, the general conclusions then reached should be enough in general to cover emissions of all kinds. Subsequent experience in special cases has been gained at Battersea and Fulham. The present issue has been raised in connection with the proposed Poplar power station.

Save Paper

EARLIER appeals for waste paper, coupled with a suggestion that any money received for it should be sent to the Electrical Industries Benevolent Association, resulted in contributions to the Association's funds totalling nearly £900. The need for paper persists and donations are always welcomed by the E.I.B.A. We suggest that readers should renew their salvage activities and pass on the proceeds.



Production of Crude Oil from Shale

IN the *Electrical Review* of July 19th we published an article on "Oil-Shale Winning" as the first result of a recent visit, by the courtesy of Scottish Oils, Ltd., to see the extensive use which is made of electricity in the shale-oil industry in Mid and West Lothian. It is now our purpose to describe the electrical applications to the retorting processes carried out in the crude-oil works which are supplied with shale from the various mines in the area.

It has been pointed out that in some cases the "green" shale is first crushed at the pit-head and in others at the crude-oil works. In principle the production is the same at all the crude-oil works, so it will facilitate both writing and reading if we deal almost entirely with the most modern of the works, namely, the one at Westwood.

Shale is received from a distant pit in railway wagons and from an adjoining pit in tubs which run by gravity down to the works receiving point. Both the wagons and the tubs are received

by tipplers and unloaded into the same hopper. The smaller tipplers for the tubs are operated by a $7\frac{1}{2}$ -H.P. motor. The wagon tippler will handle 10-ton trucks and has a capacity of 230 tons per hour, and its 25-H.P. motor transmits through a "Radicon" reducing gear to the single-rope drum by which the lever equipment for tilting the wagon carriage is raised.

From the hopper, the shale is fed into a spiked-drum crusher or breaker which is served by a 60-H.P. motor with transmission first through a worm gear and then through heavy pinion gear to the crusher drum shaft, with an actual overall reduction of from 740 to $4\frac{1}{2}$ r.p.m. The shale from the crusher equipment falls on to a short 5-H.P. motor-driven 42-in. wide belt conveyor which has a capacity



The green shale wagon tippler has a capacity of 230 tons per hour

of 225 tons per hour and a speed of 60 ft per minute, and feeds the shale on to a long inclined 30-in. wide belt conveyor by which the shale reaches the top of the retorts, about



95 ft above ground level. Actually there are two crushers, each with its own cross conveyor, and interlocking provides that only one conveyor will operate with its appropriate breaker. The 30-in. main conveyor also has a capacity of 225 tons per hour, but its speed is greater—330 ft per minute. The drive is by a 55-H.P. motor, and the belt is 448 ft long between the end pulleys. At the top, the main conveyor feeds on to a shuttle conveyor which runs centrally over a line of bunkers, with a capacity of 1,860 tons, which serve the retorts beneath.

The endless reversible shuttle conveyor is mounted on a travelling carriage with a range from end to end of the bunkers. The conveyor's 10-H.P. motor is mounted on the carriage and is supplied by a trailing cable from a central plug point. There is a special take-up drum for the slack cable. The shuttle-main-and-cross-conveyor and the shale breaker motors are sequence interlocked in the order given, so that the shuttle conveyor must be run up first and the breaker last. All the motors for these equipments and for the wagon and tub tipplers are contactor operated and

remotely controlled, including reversing of the breaker and shuttle conveyor motors, by push-button stations near the equipments.

There are 104 retorts arranged in two benches. Each retort has a cast-iron portion at the top, 14 ft high, and a firebrick portion at the bottom, 20 ft high. The whole assembly opens out from 2 ft 9½ in. by 1 ft 2½ in. at

the top to 4 ft 8 in. by 1 ft 10 in. at the bottom. Under the firebrick part is a spent shale hopper. As the shale passes gradually down through the retort, at the rate of about 12 tons in 24 hours, oil and ammonia vapours and permanent gas are released from the shale by the heat from the permanent gas with which the retorts are fired in chambers surrounding the distilling chambers. Exhaust steam from a nearby steam container is injected into the base of the retorts during the process, to provide



Endless reversible shuttle conveyor mounted on a travelling carriage

the hydrogen necessary for combination with the nitrogen of the shale to form ammonia. Air is also introduced to assist the combustion of the carbon of the shale.

The mixture of vapours, steam and gases is drawn from the retorts by turbine-driven exhausters and passed to a bank of water-

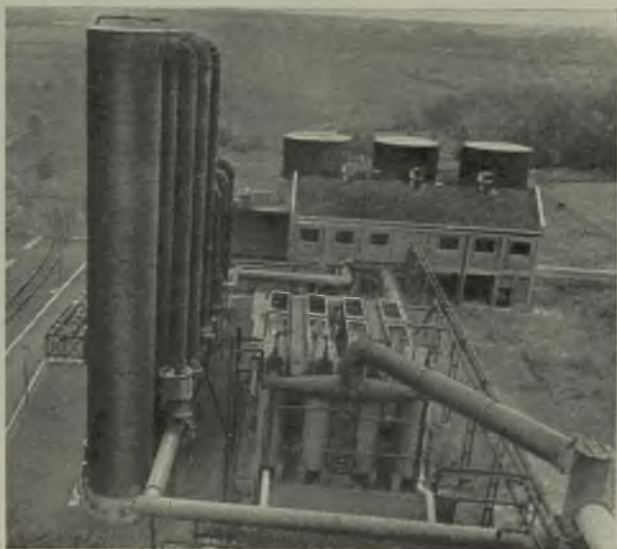


The Westwood Crude-Oil Works presents an impressive lay-out. Right to left: Pit from which the works receives part of its shale; cooling tower dealing with water from retort vapour condensers; ammonium sulphate plant; green shale conveyor to retorts; crude-oil storage tanks; oil and water scrubbers; products pump house; naphtha plant and storage; ammonia water storage; spent shale bings

cooled condensers in which the oil and water vapours condense, leaving a mixture of oil and ammonia liquor, and gas containing light spirit and some ammonia. The liquor mixture is passed on to separating tanks from which the crude oil goes to railway tanks for conveyance to the central refinery at Pumphurst, and the ammonia water is passed on to another part of the works as the raw material for the production of sulphate of ammonia. The gas mixture from the condensers is passed through scrubbers in which it is first subjected to a spray of water which absorbs the ammonia, and then to a spray of oil which extracts the spirit. The remaining or permanent gas is the retort-firing gas already referred to. Producer gas plant is available to augment the retort firing, if necessary, but so far this has not been required. The waste gases from the heating chambers of the retorts are passed through two 6,000-lb per hour 120-lb/sq in. waste-heat boilers. About 1,100 lb of steam and 5,000 cu ft of air per

ton of shale are fed into the retorts, and about 20 gallons of crude oil and 30 lb of sulphate of ammonia are obtained from a ton of shale.

The main steam source for the retorts is four Clarke Chapman 30,000-lb per hour boilers with steaming conditions of 200 lb per sq in. and 500 deg F. These supply directly two Belliss & Morcom back-pressure 6,000/1,000-r.p.m. 2,250-kVA 3,300-V

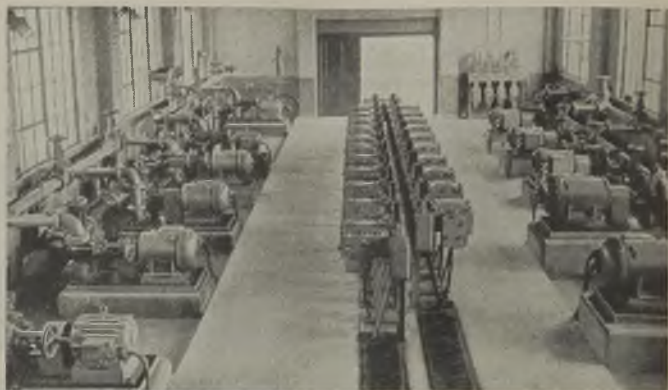


The mixture of vapours from the retorts is passed to a bank of water-cooled condensers (right); the gas mixture from the condensers is passed to the scrubbers (left)

turbo-alternator sets in the works generating station, and the exhaust steam from these is passed to the retorts at 7 inches w.g. At 15 lb per sq in., 15,000 lb per hr of pass-out steam is also available for the sulphate of ammonia plant. The exhauster turbines are supplied from the waste-heat boilers, and the exhaust from these at 7 inches w.g. is also fed to the retorts.

Very considerable pumping operations are required for

centrally down the aisle, constitutes one of the most imposing and efficient lay-outs we have seen. The starters are arranged near



The products pump house presents an imposing and efficient lay-out

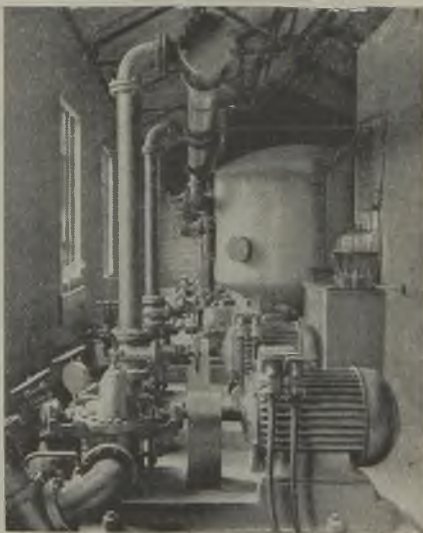


About 30,000 gallons of water per hour is required at the works and is obtained mainly from the River Almond pumping station

conveying partly and completely processed products, such as crude oil and ammonia water, in and about the works, and all the pumps required for this purpose are centralized in a products pump house. About a score of pumps are involved. They are all of the centrifugal type and the individual duties vary considerably up to, say, 14,000 gallons per hour. The motors, up to 22 H.P. each, are mainly of the totally enclosed externally fan-cooled flameproof type, and they are disposed in two rows along each side of the pump house. This arrangement, together with the two back-to-back lines of starters

their corresponding motors. The directly-coupled motors are squirrel-cage 440-V equipments, and the starters are direct-on or star-delta oil-filled flameproof type units. The starters are all Metrovick products.

Something like 30,000 gallons of water per hour is required throughout the works. This demand is met mainly by two turbine pumps in a pumping station at Breich Pit. They each have a capacity of 1,200 gal per min against a 130-ft head, and draw water from



The general works water is treated and pumped through large cylindrical filters

the River Almond. The 87-H.P., 3,200-V, 1,485-r.p.m. directly-coupled motors are Bruce Peebles totally enclosed fan-cooled

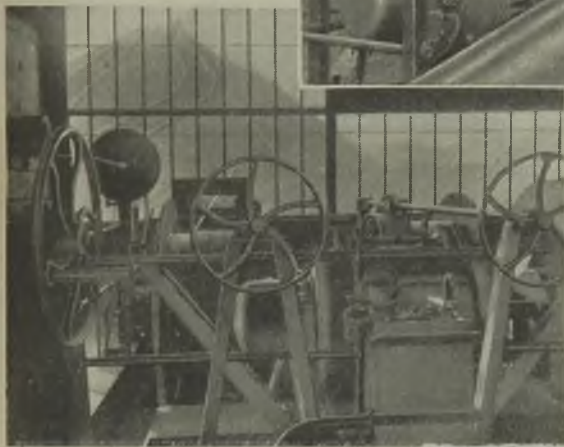
units. A supplementary supply of water is obtained from the Breich Water by a 60-H.P., 1,470-r.p.m. motor-driven pump which has a capacity of 1,000 gal per min against a head of 140 ft.

The water for general works purposes is treated in a large tank with lime and aluminium sulphate and passed through four large cylindrical filters by means of 9-H.P., 1,460-

they feed on to main conveyors. Each cross conveyor is driven by a 5-H.P., 1,460-r.p.m.

Right: Each main spent shale conveyor handles 180 tons per hour; drive at top end

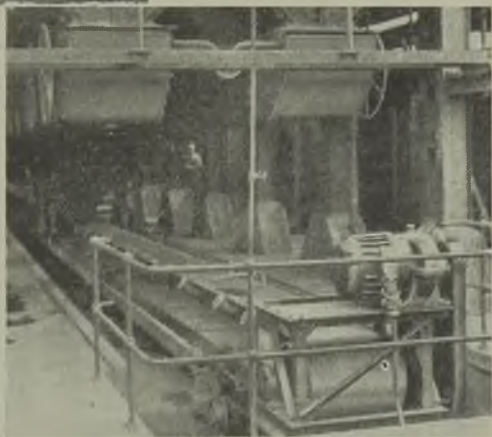
Below: The double drum 160-H.P. spent shale winder hauls two 6-ton bogies up an incline of 1 in 3.5



Metrovick s.c. geared motor unit with an overall ratio of 36 to 1, which results in a conveyor speed of 200 ft per min, at which speed the handling capacity is 180 tons per hour. Each main conveyor has a similar capacity and it transports the shale at an angle of about 16 deg from the horizontal to an elevated bunker of 100 tons capacity. The belt speed is 250 ft per min and the 20-H.P.,

r.p.m. directly motor-driven centrifugal pumps, each of which will handle 30,000 gallons of water per hour against the filter resistance. Here again the motors are Bruce Peebles totally enclosed externally fan-cooled units. Water from the primary condensers is passed into a boiler feed-water tank for treatment with soda, lime and sodium aluminate. It is then pumped through a set of three filters and on to the boiler feed tank. These 5-H.P. motor-driven pumps are similar to the others and each has a capacity of 14,000 gallons per hour.

The spent shale from the retorts falls on to aligned cross conveyors. There are two of these, and they convey the shale inwards to a central point where



Spent shale from the retorts falls on to aligned cross conveyors; drive at outer end of one conveyor

730-r.p.m., s.r. motor transmits to the top end drum of the conveyor with a speed reduction ratio of about 15 to 1.

The bunkers discharge into 6-ton bogies which are conveyed to the top of a huge adjacent bing (disposal heap) to be discharged. Three double-drum winders are employed for this work, there being two 8-ft gauge rail tracks up the bing for each winder, with a gradient of 1 in 3.5, i.e., when one bogie is going up the bing the other is coming down. As each bogie approaches the top of the bing it runs on to a cantilever with a raised set of rails of narrower gauge. These narrower rails engage with secondary flanges on the bogie wheels. A trigger on the cantilever releases the tipping gear as the bogie enters the cantilever. The winders are each driven by a 160-H.P., 735-r.p.m., s.r. motor with pinion gear transmission to the drum shaft, with a ratio of 20 to 1. The rope speed is six miles per hour.

The winder motor is operated by contactor gear which is governed by a master controller. The master controller operates main contactors for forward and reverse, and for the first step of the rotor resistance. The remain-

ing five steps of the rotor resistance are operated by the master controller through magnetic time relays which ensure that the motor is not accelerated too quickly, no matter how fast the master controller handle is moved. All the contactors are actuated by D.C. which is supplied from a metal rectifier on site. A static condenser connected across the stator circuit provides for power-factor correction.

The cross conveyors and the main conveyors are sequence interlocked, so that neither of the cross conveyors can be started until one of the main conveyors is under way. All these conveyors are operated by contactor gear which is remotely controlled. There are push-button stations at convenient points along the conveyor routes which provide for local stopping and starting of the conveyors.

We are indebted to Mr. Robert Crichton, managing director, Scottish Oils, Ltd., for permission to visit the works and to publish this article, and to Mr. G. A. McLennan, chief electrical engineer, and Mr. W. Sterling, assistant electrical engineer, for their help in preparing the article and taking the photographs.

Nationalization Plans

I.M.E.A. Decision

THE Incorporated Municipal Electrical Association at a well-attended extraordinary general meeting held at Caxton Hall, Westminster, on Thursday last week, passed the following resolutions practically unanimously after a very full discussion:—

(a) The Minister of Fuel and Power having intimated the Government's intentions with regard to the electricity supply industry, this Association declares its willingness to co-operate with the Government in arriving at the best form of re-organization and administration of the industry.

(b) It being part of the declared policy of the Government to transfer the ownership and control of the generating stations and main transmission lines to a central body, this Association approves the principle, subject to suitable safeguards, and recommends that such body be the Central Electricity Board.

(c) This Association approves the principle of public ownership of the whole of the electricity supply industry, and considers that in the best interests of the consumers and of the nation the maximum amount of local authority administration and control be ensured on the distribution side of this vital public service.

(d) That the Council through its appropriate Committee be empowered to meet the Minister to submit and discuss the foregoing resolutions.

Following upon these resolutions it is expected that further consultations with the Minister will take place in the near future. The Association represents 348 local authority electricity undertakings, comprising 95 per cent of all local authorities owning electricity undertakings.

Building Industries Inquiry

THE Committee appointed by the Minister of Works to inquire into the distribution of building materials and components has held its first meeting. The Committee has already invited the submission of written evidence from representative bodies of the builders' merchants, building materials producers and users of building materials and components, and from a number of separate authorities, firms and individuals. The Committee would also be glad to receive written statements from any other organization or individual concerned with the production, distribution or use of building materials and components, or from any other interested person who feels that he has something of value to offer which would assist the Committee in its inquiry. Communications should be addressed to the Secretary of the Committee, Mr. W. P. D. Skillington, Ministry of Works, Lambeth Bridge House, London, S.E.1.

Views on the News

Reflections on Current Topics

A POPULAR tendency is illustrated in the correspondence columns of the *Architect and Building News*, where reference is made to the "absurdity" of erecting two sets of poles for carrying power and communication lines. A layman not unnaturally fails to understand how, when the two circuits run in parallel, earth-fault currents in the power mains can adversely affect the telephone system, if not directly then through electromagnetic induction. The writer would have more legitimate cause for complaint if he received either electric or acoustic shocks when using his telephone or if the service were dislocated possibly through damage by fire to the Post Office plant. Again harmonic currents in the power line may induce audio-frequency currents in the other that would disturb conversation. Post Office engineers, while very properly safeguarding the interests of telephone subscribers, have shown every disposition to assist power-transmission engineers to cheapen construction.

* * *

It is a matter of some surprise that at the present time, when undertakings are faced with steeply rising costs, a number of them are making even larger allocations than hitherto to assist in reducing local rates. I have just seen a report in a Sunderland paper of an electricity "windfall" of £12,500 for the rates. At Nottingham £35,000—the entire surplus apart from a few pounds—goes to the rates. Clearly, this is a short-sighted policy, but the reason may possibly be found in the recent statement by a Finchley councillor that it is not known whether, under nationalization, the acquiring authority will be empowered to take over liquid resources "and there is no reason to build up the reserve fund to an unnecessarily high level."

* * *

During the next month or two manufacturers will be showing their latest developments at a number of exhibitions in various parts of the country. The first post-war Public Lighting Apparatus and Equipment Exhibition, which brings together public lighting engineers from all over the country, will be staged at the Central Hall, Westminster, from September 10th to 12th. Welsh industries will be given the opportunity of displaying their products at the Welsh Industries Fair at the Drill Hall, Cardiff, from September 23rd to 28th. The "Britain Can Make It" Exhibition, which commences at the Victoria and Albert Museum, South Kensington, on September 24th will show

the latest designs in all the main ranges of consumers' goods, and will, of course, include an extensive electrical display. In November there is to be a Scientific and Technical Exhibition at Kelvin Hall, Glasgow (from November 15th to 17th), and I see from a preliminary list of exhibitors I have received, that electrical and allied interests will be well represented. There is also, of course, the British Industries Fair, and although this is not being held until May next year, those who intend to take part are no doubt already preparing their plans for the most important and comprehensive of British exhibitions.

* * *

It has been said that anything which can be imagined by man is possible of achievement in course of time. It is certainly true that many of the developments and devices imagined by H. G. Wells have been realized in a comparatively short span—a shorter span than he himself sometimes considered possible. Take for example "When the Sleeper Awakes" which appeared in 1899. Among other things this story visualized broadcasting and the public address system, television, "daylight" illumination and air conditioning on a grandiose scale, and many other advances which have become or are becoming commonplace. In other words the all-electric age. But there may be some among us who would rather have a backward-operating time machine.

* * *

The shortage of labour is one of the many problems with which electrical manufacturers are faced, and the lack of housing accommodation within a reasonable distance of the works contributes to this problem. At the recent extraordinary meeting of the English Electric Co., Ltd., Sir George Nelson (chairman), mentioned that the company was forming a housing association which he hoped would materially assist in solving this problem. I now learn that the Kingsway Housing Association, Ltd., has been formed with a capital of £100,000 of which Sir George and other members of the English Electric organization are directors.

* * *

I have received a circular telling me that "it is the hope of the Post Office that within a period of five years it will be possible for any of its subscribers to telephone to anywhere in Europe on a 'no delay' basis." My own hope is more modest—it is that within this period I shall be able to obtain a local call on this basis.—REFLECTOR.

The Domestic Load

Forecasting Lines of Development

STATISTICIANS, in studying a phenomenon that is not subject to laboratory control, are accustomed to find that it is related not to a single cause but to a tangled skein of causation, the causes being variable and acting in varying degrees on the phenomenon. Load-analysis problems, to which statistical methods are being increasingly applied, are no exception to this. Often, on the other hand, in practice such phenomena are freely presented over a wide range of conditions and a relation between cause and effect may be broadly traced by the study of samples in these different conditions. This has suggested the possibility of applying this method to the prediction of the probable lines of development of the domestic load.

The information presented refers only to a limited area and does not claim more than local significance. Moreover the degree of accuracy obtainable is not high, ± 10 per cent being expected. The conduct of such investigations to the necessary degree of accuracy and over a broad field lies properly within the province of the Electrical Research Association, by whom, it is understood, load-analysis problems are being energetically pursued. It is hoped nevertheless that the information given may be interesting and suggestive to supply engineers.

The load of an individual group of domestic consumers will principally depend on: Time of day and day of week; weather conditions, primarily illumination and temperature; appliances installed and their loading.

From the cost aspect, it is necessary to know, first, the load of a group of consumers at the time of system peak, this, with their annual consumption determining their load factor in relation to generating and transmission plant; and secondly, their load at the time of peak on the local distribution plant, this conditioning their load factor on this local plant. For some distribution plant, such as high-voltage feeders, both the first and second items will have a bearing on the load factor, but this has been omitted for simplicity.

Study of load curves showed that the most probable time of system peak was from 8 to 8.30 a.m. on a weekday and of peak on

the local distribution plant Sunday midday, both under the worst conditions of temperature and illumination. As the loads at these times need only be dealt with, the possibility was opened up of ascertaining them by means of a methodical series of spot tests over a number of consumer groups in which the installed load, indicating the state of development, varied over a wide range, provided the effect of the weather factors indicated above could be reduced to the common denominator of worst conditions. While in a number of cases readings were obtained at, or very close to, the system peak or on Sundays under the worst conditions as indicated in general by the system load, this was obviously not possible in every case. A system of weighting was therefore calculated, based on the fact that for a number of consumer

groups readings at or near the system maximum and at the lower system loads were available. The weighting adjustments were small

and exceeded 10 per cent in only a few cases. Incidentally, in the calculation of these weightings definite indications were found that the domestic heating load reaches its maximum at Sunday midday. While this is surprising, it is probably due simply to diversity at that time being small and may well be a common effect.

The actual load will in addition be influenced by the number of consumers in the group and by the laws of chance, as demonstrated by Schiller (*Electrical Review*, December 29th, 1944), and possibly also by rateable value. As the bulk of the consumer groups dealt with show no wide difference in numbers of consumers and average rateable value and as reliance is not placed on individual spot tests, the errors introduced by these factors are negligible in relation to the accuracy expected.

The load figures were obtained by taking current readings at the distribution transformer low-voltage terminals every five minutes during the half hours stated and averaging these over the half hour, this process having been tested against and being similar to integrating the readings of a recording ammeter. Cold snap conditions

By H. A. P. Caddell,

B.A., A.M.I.E.E.

are not covered. The results are shown in Fig. 1 (a), (b) and (c), each entry indicating a particular group of consumers, the average number of consumers per group being 101. While there are some indications at the higher end of the scale of departure from a straight line relationship, it is not considered that there is sufficient information to justify

which communities and premises are separated. For an existing distribution system supplying a given configuration of premises, distribution costs per consumer will remain broadly constant so long as its capacity remains adequate for the load to be carried. As far as capacity is concerned, what appears to be significant is capacity in

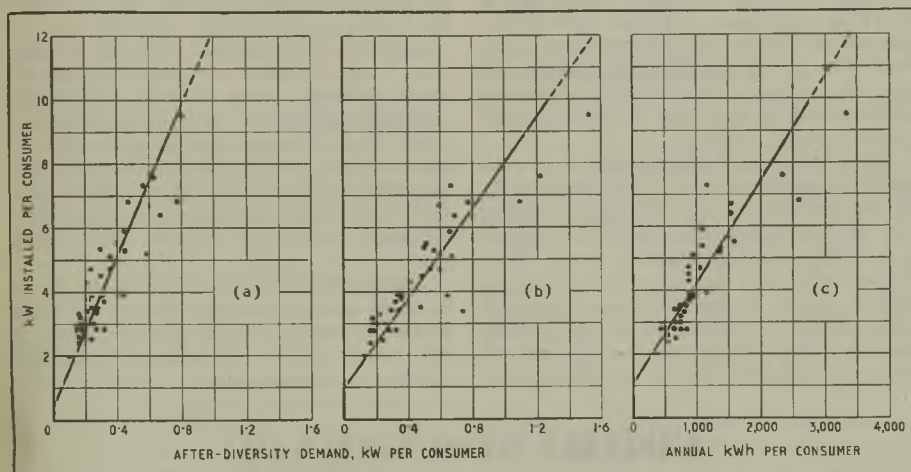


Fig. 1.—Relationships between average installed load per consumer and : (a) average after-diversity demand per consumer at system peak, 8 to 8.30 a.m. on winter weekdays, (b) average after-diversity demand per consumer at distribution peak, midday on winter Sundays, (c) average annual kWh per consumer

this and consequently the most probable straight lines have been plotted on the method of least squares. Generally the purposes of load analysis are best served by relating after-diversity demand to a defined class of appliance, and connected load is used here only in order to indicate the broad picture.

What is the practical import of these graphs to the undertaking concerned?

The relation between Fig. 1 (a) and (c) indicates that the load factor of the domestic load in relation to the generating plant increases from about 32 per cent at the lowest stage of development, represented by 2.5 kW installed load per consumer, to about 39 per cent at the highest stage of 10 kW per consumer, implying the importance of a progressive development policy.

Fig. 1 (b) and its relation to Fig. 1 (c) bear on the question of distribution costs, which has received much less investigation than that of generating costs.

The predominating influence in distribution capital and costs is the distances by

kW per consumer. While the author has seen no figures quoted on these lines for existing distribution systems, perhaps something of the order of 1 kW per consumer might represent a figure typical of small property. Fig. 1 (b) shows that the a.d.d. at time of distribution peak approaches 1 kW when the installed load is 8 kW and the consumption 2,000 kWh per year. The calculation of capacity on these lines for existing distribution systems on the limiting basis of voltage drop and, making allowance for practical conditions of balance and load distribution, would present no technical difficulty, nor indeed, going a stage further, would the calculation of the increased capital and costs for a given additional capacity in these systems. In this manner a guide to the future development of distribution costs might be obtainable.

The most useful measure of distribution efficiency is "kWh sold per £ of distribution capital" (Kennedy and Nokes, *I.E.E. Journal*, 1933). Generally speaking, greater distribution efficiency can be obtained only by increased sales of kWh by the use of the

same capital. This increased sale may be expected either by improved load factor, or by loading existing plant to its full capacity, load factor remaining constant. The relation between Fig. 1 (b) and (c) indicates that the load factor on the distribution plant falls slightly from about 27 per cent at the lowest stage of development, 2.5 kW of installed load per consumer, to about 25 per cent at 10 kW per consumer. It follows that the first expectation is likely to be disappointed, apart from the use of load-limiting devices, and that the primary criterion of distribution efficiency will be how close to capacity distribution systems are run.

These points imply the necessity for ensuring that distribution systems are designed by the co-operation of the distribution engineer and the commercial engineer with knowledge of probable development and loads. They further imply the necessity for building up load as rapidly as possible, bearing in mind that a number of existing distribution systems may be lightly loaded and that the cost of supplying additional capacity in a distribution

system of, say, 1 kW per consumer, as an extension to an existing distribution is probably less than that of providing the same capacity in a new system.

A figure of 20 kW of installed load per consumer seems to represent about the final limit of development, and it is tempting to prolong the straight lines to this figure. A connected load of 10 kW per consumer is, however, clearly the furthest limit of significance of the straight lines. In addition 10 kW per consumer of connected load for small property, such as that dealt with, represents about the limit of development, apart from the sole use of electricity for space-heating, such as will be found in the genuinely "all-electric" house. This heating load may have characteristics appreciably different from the mixed loads dealt with.

Acknowledgments are due to Mr. D. H. Kendon, general manager of the S.W. & S. Electric Power Co., for permission to publish this information, and to colleagues who have assisted in its preparation.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication.

Responsibility cannot be accepted for correspondents' opinions.

"A Universal Plug—Now"

MR. CONNELL states in his letter in your issue of August 9th "... we have now an agreed standard." I am left wondering what justification there is for the word "agreed" in the statement, for I have not heard of any consultations or any questionnaire to the industry generally. All that I know, as a member of the industry, is that a small body purporting to represent the views of the industry has decided on a certain line of action. That information came from the technical press, and was the direct cause of the article with the above title.

If, in fact, this small body does not really represent the views of a majority of the industry, then the net result will be that in due course—probably two or three years from now—another type of plug will be added to the "57 or more varieties" that are mentioned by Mr. Connell—for a standard can only become effective by general agreement.

He asks me to wait a few more months. I make bold to state that it will more likely be a few more years before the now proposed

B.S.I. standard will be produced in quantity. So far as I am aware, even the draft of the B.S.I. Specification is not yet issued. When it is, if my experience of such matters is any guide, it will travel to and fro between the B.S.I. and other parties for months before it is finally agreed. When it is finally agreed and published, the various factories will have to be tooled up to produce in quantities of millions per year. It seems quite certain that the public would have to wait for some years before their demands could be supplied, and in the meantime the biggest housing programme in history is proceeding—necessitating the installation of many hundreds of thousands—if not millions—of what will become non-standard plugs. The only reason which would justify this delay is that there is no satisfactory plug available now. I am of the opinion that there is one available—*now*. Hence the article.

I am extremely doubtful whether any real improvement could be effected, and when allied to that doubt is the certainty that a very considerable delay will inevitably result if the

present B.S.I. proposals are proceeded with, it seemed to me that the proposals should be challenged and stopped.

I still have a lively recollection of the "lobbying" I was subjected to by manufacturing interests when the I.M.E.A. considered the plug question in the 1930's and I cannot help feeling that the representatives of the electricity supply industry dealing with this matter have been subjected to similar "lobbying."

This is a matter in which the needs of the electricity consumer should dominate and manufacturing interests be subordinate. The present proposals reverse that order. Why delay when it is very doubtful indeed if any good purpose is served by delay?

- "PLAIN ENGINEER."

Unsafe Installations

WITH regard to the inspection of installations, the supply authority is certainly not the best for this work, the responsibility for which usually devolves on the meter fixer, and it is not infrequent to find that his technical knowledge is not of a sufficiently high order.

The writer recalls a case where the meter fixer of one of the largest undertakings in a suburban area, presumably unaccustomed to a reasonably good class of workmanship, was very loth to connect an installation of some twenty-three 3-kW general-purpose plugs which showed an "infinity" test at the main switch. He explained somewhat acidly that something "must be wrong" either with continuity or final earthing. The installation being of the "part ring main" variety, the writer had to show him how to test for continuity.

Would not the fire or life insurance companies be a good medium for this work? Apart from the consumer, they are probably the most interested bodies.

London, W.1. P.L. PULVER, A.M.I.E.E.

I AGREE with Mr. Milne that the sooner arguments on the above stop, the better, in order to safeguard the public and the better type of contractor against those who know no law but expediency, but they will continue so long as electrical contractors refuse to put their own house in order and are content to allow others to do what is in fact illegal.

Naturally registration in itself would no more protect the public against "quackery" than can the B.M.A. but it would go a long way.

Ct

My argument is that as the law stands now, power suppliers have no right or duty to carry out an inspection and it will perhaps put the matter in its proper perspective when I suggest that the present position has arisen because the public would rather trust the supplier than the contractor, and because the contractor prefers letting someone else protect him gratis, to forming his own protective organization which would of course involve some expenditure.

I would like to point out that this correspondence was opened on this occasion by a contractor who thought that power companies were wrong in preferring to carry out their real function rather than one which is solely (and "logically"—vide Mr. Milne) the concern of the contractors themselves! It is with this attitude and not with the necessity of safeguarding the public that I join issue, and I am certain that any steps to increase security would have whole-hearted support from supply people.

Sheffield, 6.

D. H. BRAID.

MANY views have been expressed relative to unsafe installations but in my opinion none has hit the right point. I have been in the trade for thirty-seven years and my position as chargehand, foreman, etc., has convinced me of two things: (a) That some employers do not worry over the way an installation is carried out if it comes out right on the financial side and (b) that some tradesmen to-day are satisfied if an installation just passes the tests of the corporations and consulting engineers. Their craftsmanship is nil; their desire to work for the £ s. d. side is first and foremost.

The (a) employers find their men in (b) category; the good craftsman is considered to take too long on his job and is therefore considered totally unsuitable for the get-rich-quick contractor.

It is just as easy to do right as it is to do wrong. Mr. Alex. Milne, to my mind, has hit the nail on the head when he says that compliance with I.E.E. Rules would suffice to keep things in order, but who will enforce these?

Bacup.

J. ROSE.

James Watt Steam Engine

A three-ton cast-iron cylinder made by Carron Company to James Watt's orders, and the sole remaining relic of his first steam engine, is incorporated in a memorial to Watt which was unveiled at Kinneil Palace, Bo'ness, on August 3rd.

NEW BOOKS

Radio Questions and Answers. Domestic Equipment Design.

Radio Communications. By W. T. Perkins and R. W. Barton. Pp. 312; Figs. 184. George Newnes, Ltd., Tower House, Southampton Street, W.C.2. Price 12s. 6d.

This is primarily a manual of the "question and answer" type, intended for students preparing for the City and Guilds of London Institute examinations in radio communications, Grades I, II and III. It should therefore be regarded as supplementary to the usual type of textbook and/or classwork. The book opens, appropriately enough, with a syllabus for the above examinations, followed by seventeen pages of useful formulae.

Each question, printed in bold type, is followed by a model answer, and questions have been grouped under eleven chapter headings. Following these chapters is one detailing twenty-two experiments, mainly devoted to the practical determination of valve characteristics. The book is completed by a number of useful tables, nomograms, valve base diagrams, etc.

For the student who is not skilled in examination question answering (however good his theoretical knowledge may be) a book of this nature is a useful adjunct to his ordinary studies. It indicates how his knowledge must be applied to the answering of particular questions in a concise, clear and adequate manner.

A perusal of the book in question, however, shows a number of slips, and gives the impression of hurried preparation. Most of these are of a minor nature, and will no doubt be corrected in any future edition. The student is apt to be confused by the abbreviations R/F and H/F apparently used indiscriminately to signify "radio frequency"; Kc/s is used in place of the standard kc/s; μ F and μ f are both used on the same page; and a transposition of blocks for figs. 50 and 51 has occurred. Fig. 138 shows an electrostatic deflection cathode-ray tube with the deflecting plates between the two anodes, and although this arrangement has been used, the more standard practice is, of course, for the order to be: first anode, second anode, deflector plates. Fig. 53 shows a heptode ("pentagrid") valve in which the first grid is marked "triode screen grid," instead of "triode control grid." Small points like these would not confuse the experienced reader, but the student may very conceivably be misled.—W.E.M.

Housing Digest. Pp. 106. Illustrated. Art & Educational Publishers, Ltd., 54, Bloomsbury Street, London, W.C.1. Price 15s.

None of the post-war problems has created so much general interest as the question of housing, particularly with regard to the design, layout and equipment. Reports on every aspect of the subject which have been prepared by various organizations have become so

voluminous that the need for a compilation of the views of these organizations, which would be useful as a book of reference to authorities dealing with housing, has become a necessity.

With this object in view the Electrical Association for Women has followed up its interim report on post-war reconstruction, published in 1943, by sponsoring "Housing Digest," an analysis of Housing Reports from 1941 to 1945. As Miss C. Haslett, Director of the E.A.W. says in a foreword to the book, although the Association stands for the use of electricity for all domestic purposes, and in no way abates its own views on this subject, the compilation of quotations from reports could only be of the greatest value to the public if reference was included to equipment for all fuels.

At the request of the E.A.W. therefore, the book has been prepared by the Association for Planning and Regional Reconstruction, as an unbiased authority, and it contains a wealth of information regarding the construction of houses from the point of view of education, health, amenities and communal life. The contents include sections dealing with standards of housing, construction, equipment, design and smoke abatement; training for home management; types of houses; siting; public services; internal planning; and the kitchen and service rooms. The book will prove an invaluable work of reference to recommended practice in this country.—H.B.

Journal of the Electrodepositors' Technical Society. Vol. XX. Pp. 217, with index; 27, Islington High Street, London, N.1. Price 21s.

This cloth bound collection of fifteen technical papers presented during the 1943-44 session in London and at the Midlands Centre includes communications from the Armament Research Department (formerly Woolwich Arsenal) and nine discussions. Among the subjects dealt with is the use of electrography for the examination of deposits and a simple magnetic tester is described for determining the thickness of coatings.—W.O.F.

T.V.A. Points the Way (16 pp.) Welsh Party Offices, Caernarvon. Price 6d.

This pamphlet, by the authors of "Plan Electricity for Wales" and "T.V.A. for Wales," is a further attempt to show that the electrical side of the Tennessee Valley Authority is conducted on economic lines and that similar methods could be adopted in the development of Welsh resources.—J.H.C.

Book Received

A Handbook of Telecommunication. By B. S. Cohen. Pp. 437; figs 281; index. Sir Isaac Pitman & Sons, Ltd. Price 30s.

Standard Overhead Lines

Main Particulars of B.S. 1320 : 1946

WITH a view to securing an improved performance of wood-pole lines accompanied by lower capital and maintenance costs, the British Standards Institution has this week issued at 10s. 6d., post free, a Specification of 47 pages, B.S. 1320. This covers three-phase and single-phase high-voltage lines up to and including 11 kV with copper conductors not exceeding 0.05 sq in.—one of the two recommended sizes, the other being 0.025 sq in.; the use of other conductors is not, however, precluded. Leading features of the design are that the metal-work supporting the insulators is unearthed and that the conductors are spaced horizontally.

The factor of safety required for conductors is 2.5 with a wind loading of 16 lb per sq ft (equivalent to a continuous wind of 70 m.p.h.). For imported red-fir poles the figure is 2.5 and for larch or home-grown red fir it is 3.5. The minimum diameter of pole is $6\frac{1}{2}$ in. at 5 ft from the butt; the loading point is 6 in. above pole top and the modulus of rupture 7,800 lb per sq in. Other factors of safety are 3.0 for wooden cross-arms, cross-arm struts and stay insulators and 2.5 for steel components, excluding insulator pins.

Minimum Heights

Conductors will be at a minimum height from the ground of 17 ft at 122 deg F, except at road crossings, where 20 ft is required without further precautions, at railway and canal crossings, where the Overhead Line Regulations will apply, and when crossing or in the vicinity of Post Office lines, where special requirements, given in an appendix, must be met. In the last case, the guard should be unearthed but with a modified number and disposition of the cross-lacing wires.

The Specification gives not only precise dimensions of components, but also nine tables, occupying seven pages, of conductor sags and tensions (calculated on the assumption that wooden poles are flexible supports) and other data to assist design and also 47 dimensioned drawings occupying 28 pages. Two of the latter, relating to binding-in stirrup, illustrate salient features of the design.

Anti-climbing devices are not required on single poles, unless these carry transformers or remote-mechanically operated fuses or switchgear. A similar exception applies to the earthing of steelwork, the requirements for which, including an earth mat where metal (such as a switch-operating handle) has normally to be handled when the line is alive, are stated in an appendix.

Revisions of Regulations

A third appendix sets out the Electricity Commissioners' revisions (dated August 16th) of the Overhead Line Regulations and the Electricity Supply Regulations. The purport of the first is to make the Specification a statutory, but not compulsory alternative to the adoption of other designs. This is embodied in a new Regulation 20, as follows:—

"Overhead lines may be erected in accordance with Specification No. 1320, dated August, 1946, issued by the British Standards Institution or any modification thereof for the time being current and in so far as the requirements of the said Specification are inconsistent with or repugnant to any of the foregoing Regulations or the Electricity Supply Regulations, 1937, the requirements of the Specification shall prevail: provided that save as aforesaid and in all other respects overhead lines so erected shall comply with the provision of the said Regulations so far as applicable."

The second makes it clear that the obligation for the standard of construction to be not lower than that prescribed in the appropriate B.S. does not apply to any type of overhead line. This is done by the insertion after the words "electric lines" in Regulation 12, as amended on July 8th, 1940, the words "(other than overhead lines)." Although these revisions will obviate the necessity of sending detailed technical particulars and drawings to the Electricity Commissioners for approval in each case for lines that are constructed to the new Specification, they do not alter the existing statutory procedure for obtaining the consent of the Minister of Fuel and Power to erect a line along a specified route.

In effect the new Specification consolidates

the relaxations of the Overhead Line Regulations named in the Electricity Commissioners' circular letters of September 24th, 1937, and September 16th, 1942, but extended to include line conductors up to 0.05 sq in. It also embodies the results of the work of

the Electrical Research Association, which early in 1939 drafted a preliminary specification, in accordance with which the Shropshire, Worcestershire & Staffordshire Electric Power Co. erected a number of lines for trial purposes.

Transportable Steam Boiler

Development of a Wartime Conception

THE needs of devastated areas in Russia and elsewhere inspired the wartime conception of transportable power stations to provide emergency supplies of electric power, but such plant has possibilities beyond its wartime uses. International Combustion, Ltd. has taken a leading part in the design, development and construction of a steam generating unit to meet requirements on developing sites and in localities (at home and abroad) where power supply is not immediately available.

The plant consists of a two-drum water-tube boiler with all the usual equipment and water-conditioning apparatus for an evaporative capacity of approximately 35,000 lb of steam per hour, arranged for oil, coal, or dual firing in a combustion chamber which is built over the stoker. The latter is of the louvre type and the oil burners are mounted on the front casing. An economizer is included and a superheater of the horizontal grid-iron type gives a final steam temperature of 680 deg F, while saturated steam is available for the evaporators and other auxiliary plant.

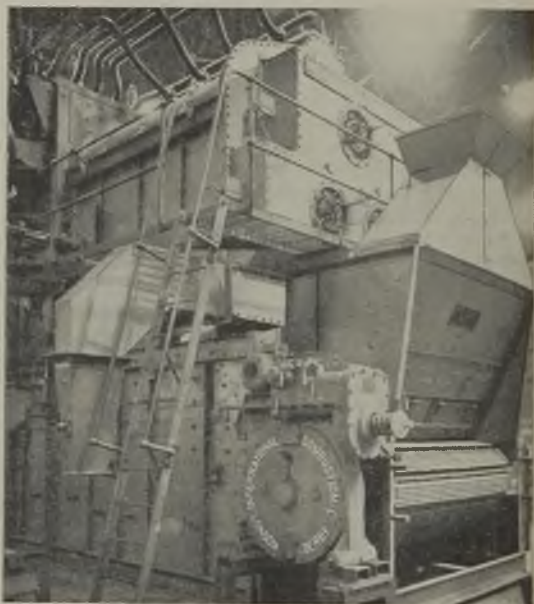
The boiler is transported to the site on rail or road vehicles, in five sections with supporting steelwork. The sections are of a size conforming to the Berne international loading gauge: none exceeds 25 tons. The five sections are stoker, lower portion of supporting structure, combustion chamber, pressure parts and economizer. Each section is designed for handling into place by an erection structure which is provided.

A portable conveyor is included for feeding coal into the stoker hopper and the oil fuel equipment comprises a complete set of pumping and heating units with storage and settling tanks, so that fuel can be taken directly from tank wagons brought alongside.

The 2,500-kW directly coupled turbo-alternator, complete with condenser and air ejectors, is mounted on a common girder structure. It weighs about sixty tons, but can pass the international loading gauge on a low-loading wagon. Alternatively, road wheels can be fitted to the girder structure.

The complete plant is designed to operate,

if required, without weather protection in the early stages of construction of new factories or trading estates and, moreover, can be quickly



Self-contained transportable steam boiler plant

transferred from one site to another according to the power needs of an extended erection programme. International Combustion, Ltd. is prepared to supply boiler plants of the transportable type suitable for turbo-alternator outputs of up to 5,000 kW, which at present seems to represent the limit of the transportable plant.

I.E.E. Western Centre

THE programme for the first half of the next session commences on October 7th with an address by the chairman, Mr. R. W. Biles, at the University Physics Laboratory, Bristol. Further meetings are to be held at Gloucester, October 28th; South Wales Institute of Engineers, Cardiff, November 11th; and Bristol, December 9th. All meetings are to be held Monday evenings, commencing at 5 p.m.

PERSONAL and SOCIAL

News of Men and Women of the Industry

OVER 600 people attended the first annual sports day of the new factory of Hoover, Ltd., at Cambuslang, Glasgow, held in the local Somervell Park on August 10th. Among those who attended were Mr. W. C. Puckey, director and general works manager of the company, and several senior executives from the main factory at Perivale, Middlesex. Prizes were presented by Mrs. J. T. Simmons, and the day was rounded off with a gala dance until midnight in the factory canteen.

Mr. J. Huntington has retired from his position as joint managing director of the Simplex Electric Co., Ltd. He will, however, retain his seat on the board. Mr. Huntington has been associated with the Simplex concern for forty-six years, and has played a considerable part in its development from the original Simplex Conduit Co. to the present extensive electrical appliances manufacturing organization of the Tube Investments group.

The Simplex Electric Co., Ltd., has announced the following appointments which took effect from August 1st:—**Mr. J. M. Surrall**, general commercial manager, responsible for all trading departments within the company; **Mr. F. G. Arnott**, general sales manager (Installation Division), who will for the time being work from the company's London office at Tottenham Court Road; and **Mr. E. G. Plucknett**, general sales manager (Creda Division). Mr. Plucknett returns to the electrical industry after an absence of five years in the Middle East, where he saw active service with the Corps of Royal Engineers, and for two and a half years held the appointment of Chief Administrative Executive M.E. to the U.K.C.C. on loan from the Army.

Mr. J. H. Dunbar, a director of the Lancashire Dynamo & Crypto, Ltd., has been appointed assistant managing director. Mr. Dunbar has recently returned from a business visit to Canada. **Mr. H. W. Bosworth**, managing director of the company, has been appointed a director of the Nevelin Electric Co., Ltd.

Mr. G. E. Walker has been appointed secretary of Associated Electrical Industries, Ltd., in succession to **Mr. R. H. Haviland** who has retired but will be available in an advisory capacity until the end of the year. As secretary of the Metropolitan-Vickers Electrical Co., Ltd., Mr. Haviland is succeeded by **Mr. J. G. Lowe**, who in addition retains the position of comptroller.

Lt. Col. E. G. Bowers, M.C., M.I.E.E., went on leave preparatory to retirement from service with the Madras Port Trust at the end of last month. After active service in the 1914-1918 war he joined the Bombay Port Trust with whom he served from 1921 till he joined the Madras

Port Trust in 1928. He occupied the post of mechanical and electrical engineer in Madras from 1928 till 1941 when he proceeded on service in India, subsequently being specially recalled in 1944 to return to the Trust as executive engineer during the period of preparation for the assault on Burma and the Far East.

Mr. G. S. Boyd, chief engineer of the Sydney County Council electricity undertaking, N.S.W., has been appointed general manager for six months following the death of Mr. D. J. Nolan. Mr. Boyd, who is sixty-one, has been in the service of the undertaking for forty-two years.

Mr. J. E. Parton has resigned his appointment as senior scientific officer with the British Iron & Steel Research Association, to become lecturer in electrical engineering at Glasgow University.

Mr. W. A. Burke, M.P., Assistant Postmaster-General, and **Mr. A. J. Gill**, Post Office Deputy Engineer-in-Chief, have gone to the United States and Canada for a month to study the telephone and telegraph services.

Mr. I. M. E. Aitken, B.Sc., M.I.E.E., A.Inst.W.E., has been appointed chief mechanical and electrical engineer to Brian Colquhoun & Partners, consulting engineers. Mr. Aitken was previously chief engineer to the Tinsplate Co., of India, Ltd., Bihar, India. He was this year's recipient of the Herbert Lapworth Medal and an Institution Premium from the Institution of Water Engineers.

Mr. T. C. Bond, general manager of Furze Wholesale, Ltd., has been appointed a director of the company.

Councillor W. J. Tudor, of Birkenhead, has been elected by ballot general secretary of the National Union of Enginemen, Firemen and Electrical Workers. The retiring general secretary is **Mr. I. J. Hayward**. Mr. Tudor takes up his new appointment in October.

To celebrate forty-seven years' service of **Mr. C. R. Norton** with H. Snuggs & Co., Ltd., wholesale ironmongers and electrical factors, the directors and staff visited the London Palladium and afterwards attended a dinner on August 14th. A silver cigarette case was presented to Mr. Norton by his colleagues.

The Sheffield City Council has now confirmed the appointment of **Mr. A. Haddock**, B.Sc., M.I.E.E., distribution engineer as distribution engineer and sales manager, at a salary of £1,050 per annum plus cost-of-living bonus of £60 rising by two increments to a total of £1,310, and of **Mr. W. E. B. Nettleton**, A.M.I.E.E., chief distribution assistant as deputy distribution engineer at a salary in accordance with Class M, Grade 5 of the N.J.B. Schedule, at present £794 per annum

rising to £829 per annum. Mr. Haddock was educated at Leeds University, where he took first class honours in electrical engineering, and was with the Yorkshire Electric Power Co. for nine years before going to Sheffield in 1936. He is chairman of the Sheffield Sub-Centre of

token of affection and regard. Other tributes came from Mr. S. M. Rix, secretary and assistant manager, Mr. O. Howarth, sales manager and technical adviser, Mr. R. Watson Smyth, generation engineer, and Miss E. Hammond, representing the lady members of the staff.

Mr. R. C. Leslie, mains superintendent, who had the longest term of service (nearly forty years) under Mr. Taite, made the presentation.

In the course of his reply, Mr. Taite said that in the uphill days, and later, he had been fortunate in having with him men of marked ability who had given of their best to the company and enabled it to do its job. A public utility company was an undertaking which in



The presentation to Mr. C. D. Taite upon his retirement from the L.E.P. Co.

the I.E.E. Mr. Nettleton was educated at Manchester College of Technology. He was with Salford Corporation Electricity Department for thirteen years previous to which he was with the Metropolitan-Vickers Electrical Co., Ltd. He went to Sheffield in 1938.

Councillor L. F. A. Driscoll, M.I.E.E., of Newport, has been appointed Divisional Electrical Engineer to the Great Western Railway in the Swansea Division. He is at present Assistant Divisional Engineer to the G.W.R., responsible for the company's docks at Newport, Cardiff, Penarth and Barry.

Mr. J. Baggs has been appointed to the sales organization of the G.E.C. in Manchester as industrial electronic instrument engineer for the north-west area. For the past eight years Mr. Baggs has been responsible for test and inspection to Government requirements of electronic equipment at the company's instrument works, Salford, in addition to being publicity manager of these works.

Mr. E. A. Logan is shortly retiring from the position of chief electrical engineer and manager at Erith to take up the appointment of chief engineer and manager in the Electricity Supply Division of the Government of Burma. The Erith Corporation is advertising in this issue for a successor at a salary of £1,324 plus cost-of-living bonus and car allowance.

On August 9th before a gathering of staff representing all departments of the Lancashire Electric Power Co., presided over by Mr. M. H. Adams, chief engineer and manager, a presentation was made to Mr. C. D. Taite, whose retirement at the conclusion of nearly forty years' leadership of the company we have already announced. Mr. Adams spoke of Mr. Taite's achievement in building up the company and asked him to accept a framed picture as a

the main should be working for the public, and by the public he meant the councils and industrialists as well as the individual small consumer. He thanked everyone for their kindness during his long period with the company, and expressed appreciation on behalf of Mrs. Taite and himself for the picture.

Obituary

Mr. E. S. Saunders.—We learn with regret of the death, on August 13th, of Mr. Edgar Stopford Saunders, O.B.E., M.I.E.E., who until his retirement in 1941 was district officer at Surbiton and area engineer to the London and Home Counties J.E.A. Mr. Saunders was born in India in 1876 and was educated at Dulwich College and the Central Technical College, South Kensington. After serving an apprenticeship with Crompton & Co., Chelmsford (1896-99) he became electrical superintendent at Bradford in 1899 and two years later joined the staff of the London office of the British Westinghouse Co. From 1904 to 1907 he was with Guest, Keen & Nettlefolds, Ltd., at their Dowlais works. He went to Siemens Bros. & Co. at Sheffield in 1907 and from 1910 to 1915 was general manager for that company in India, Burma and Ceylon. During the 1914-18 war he served in the R.A.F. and was awarded the O.B.E. In the recent war he held a post in the Ministry of Aircraft Production.

Mr. S. V. Williams.—We reported last week the death of Mr. Stanley Vaughan Williams, chief metallurgist at the G.E.C. Research Laboratories, Wembley. Mr. Williams had been with the company since 1924; he took over the leadership of the metallurgical group in 1938. He was a member of the Institute of Metals and was recently elected a fellow of the Institution of Metallurgy. He had also recently

been appointed chairman of the London Local Group of the Institute of Metals. His other activities included membership of the Development Committee of the British Cast Iron Research Association and of various sub-committees of the British Non-Ferrous Metals Association.

Mr. W. Thomson-Edgar.—We regret to learn of the death of Mr. William Thomson-Edgar, chairman of the Horstmann Gear Co., Ltd., which occurred at Bath on August 11th at the age of seventy-six. The younger son of the late John Edgar of Dumfries. Mr. Thomson-Edgar married Miss Pauline Horstmann of Bath. He was chairman of the company and had been

a director since its inception in 1904. During the war he acted as Controller of Emergency Food Stores for the north-eastern rural districts of Bath.

Mr. A. van Rood, hospitality officer to Marconi's Wireless Telegraph Co., Ltd., for the past twenty-three years, died on August 13th at the age of fifty-five.

Will. Mr. Albert George Bruty, M.I.E.E., of Craan, Greystones, Co. Wicklow, managing director of A. G. Bruty, Ltd., and past-president of the Electrical Contractors' Association, who died on May 9th, left estate in England and Eire valued at £14,565.

Town and Country Planning

Utilities and Compulsory Purchase of Land

By **Leslie F. Stemp, B.A., LL.B., Barrister-at-Law**

DURING the next few years planning authorities will be faced with the almost stupendous task of clearing areas of "extensive war damage" and making provision for the resettlement of the population. Obviously this will make it necessary for them to exercise the powers of compulsory purchase conferred upon them by the Town and Country Planning Act, 1944. The effect of such powers upon public utility undertakings may be serious. In the first place land held by them for the purpose of carrying on their undertakings may be situated in an area to be purchased, and secondly, the redevelopment of an area may render part of an undertaking's distribution system redundant.

It follows that public utilities should maintain close contact with their appropriate planning authorities, the most satisfactory course being for the planning authority to call representatives of the utilities supplying the area into preliminary consultation in order to ensure from the start that proposals put forward are such as to commend themselves to all parties. Where this is done it may be unnecessary for the utilities to invoke the cumbersome and, no doubt, costly procedure laid down in the Act, and good and friendly relations between all parties will not be jeopardized. So great are the advantages of preliminary consultation that where steps are not taken to that end by the planning authority on its own initiative, public utilities might well consider whether they should not request the authority so to do. Such a request would be stronger, and the ensuing consultations more satisfactory, if

all the utilities in the area acted together in the matter.

The first step to be taken by a planning authority under the Act is to obtain from the Minister of Town and Country Planning an Order designating the area specified in the Order as land subject to compulsory purchase. Such an Order does not itself authorize compulsory purchase, but is in the nature of a declaration that at a subsequent date a Compulsory Purchase Order will be made in respect of the area. The planning authority must advertise by *Gazette* and local advertisement that an application will be made to the Minister for the Order and the advertisement must specify the time (not being less than twenty-eight days from the first local advertisement) within which objections may be made.

If the area designated includes land held by statutory undertakers for the purpose of carrying on their undertakings, they should as soon as possible after the appearance of the advertisement make representations to their appropriate Minister (in the case of electricity, the Minister of Fuel and Power) under Section 13 (5a) of the Act. The form of such representation is laid down in Form 4 of the Town and Country Planning Act, 1944 (Particulars and Forms of Orders and Notices) Regulations, 1945 No. 1036.

Where such a representation is received from an electricity undertaking, the Minister of Town and Country Planning and the Minister of Fuel and Power may take one of the two following courses:—

(1) They may make an Order declaring

that it is expedient that the land should be subject to compulsory purchase. Such an Order will be subject to special Parliamentary procedure under the Statutory Orders (Special Procedure) Act, 1945, and the undertakings will, therefore, have the right to object to the Order in Parliament. If the Order is confirmed by Parliament, the effect will not be to transfer the ownership of the land to the planning authority. The authority may, however, include the land in a subsequent Compulsory Purchase Order under Section 2 and the undertaking will not be able to claim the exclusion of the land from the Order under the provisions of Section 13 (3) of the Act. Whether on the acquisition of the land the special provisions of Schedule 4 of the Act regarding the assessment of compensation to statutory undertakings will be available in such cases is a point of some doubt. While from Section 13 (6) this would appear to be the case, the Schedule itself is said to apply only in the case of a purchase under Section 10 (4).

(2) The two Ministers may refuse to make an Order declaring the land to be subject to compulsory purchase. The effect of this will not be to exclude the land from the Declaratory Order: it will, however, be possible when the planning authority applies for a Compulsory Purchase Order under the section for the affected undertaking to take advantage of the provisions of Section 13 (3) of the Act.

Representations to Minister

Immediately an application is made for a Compulsory Purchase Order, the undertaking should make representations to the Minister of Fuel and Power in accordance with Form 11 of the Particulars and Forms of Orders and Notices Regulations that its land should be excluded from the Order. On proving that the land is used for the purposes of carrying on the undertaking, and that it is not land which is "in respect of its nature and situation comparable rather with the generality of land" to which the Order applies rather than with the operational land of a public utility, the land must be excluded from the Compulsory Purchase Order.

If the planning authority still desires to purchase the land, it must apply in accordance with Form 12 to the Minister of Town and Country Planning and to the Minister of Fuel and Power for an Order under Section 10 (4). If such an Order is made it is subject to special Parliamentary procedure, which again will give the undertakings an oppor-

tunity to have their case stated in Parliament. If compulsory powers are obtained by the planning authority, the compensation in such a case will clearly be assessable in accordance with Schedule 4.

The provisions of the Act as outlined above are admittedly cumbersome. It was impossible in the interests of town and country planning to obtain absolute exclusion of operational land from the provisions of the Act. The matter was the subject of careful consideration by the Inter-Departmental Committee over which Sir David Maxwell-Fyfe presided, so the conclusions of the Committee, which have largely been embodied in the Act, may be regarded as a fair compromise of a difficult question.

Electric Sorting

DETAILS of a number of electric sorting devices now being used in the United States in all kinds of industries are given in the "McGraw Hill Digest." For sorting out the bad from the good in such foodstuffs as beans, peanuts, coffee, seed corn and potatoes light from a lamp is reflected by the article being inspected through the lens to a partial mirror, which reflects half of the light through a red filter to a red-sensitive photo-electric cell and transmits half to a second mirror, which reflects it through a green filter to a green-sensitive cell. The outputs of the photo-electric cells are amplified and fed to the deflection plates of a cathode-ray tube to control the horizontal and vertical sweeps of the electron beam. A bad article throws the beam outside a partial mask on the tube to actuate a rejector.

Photo-electric cells are also being used to detect minute particles of foreign matter, even when transparent, in mineral waters at a production-line speed of 140 bottles a minute. A ray of light passing through the filled bottles actuates a photo-electric cell which in turn operates a rejector. Yet a further application is to be found in the Ford factories for testing hot-metal samples. Here two pieces of each sample are placed end-to-end in a holder to pass a 35-kV spark for 45 seconds. The heated sample radiates light, which is colour separated by a prism. Percentages of an element in the sample are determined automatically by a photo-electric cell which magnifies radiation 200,000 times and then records the intensity, rather than the colour, on a meter.

A Wheatstone bridge type of circuit is employed for another type of sorter used for grading ball and roller bearings in five sizes, plus "under" and "over" rejects, with a selectivity of 40 millionths of an inch at a rate of two a second. A feeler touches the bearings as they roll under it, solenoids opening stops to direct the balls into the appropriate bins.

Submarine-Cable Fault

Method of Localization

UNDER service conditions difficulties are sometimes experienced in localizing an open-circuit fault with very low resistance to earth. The usual capacitance test cannot be used in such circumstances, and the inductance-bridge method using audio-frequency current might still be considered a refinement more suited for laboratory work.

The author received a request from a supply company in India for assistance in locating a fault of this nature on a 6.6-kV submarine cable which linked-up the power station on one side of a wide river with a substation on the other side. The cable was a three-core 0.0225 sq. in. conductor insulated with impregnated paper, lead-sheathed, jute-served and double-wire armoured. Except for a short distance on each end, the cable was submerged in saline water at a depth of about 120 to 150 ft. The route length was 800 yd, and the resistance of each core was 0.111 ohm per 100 yd.

Conductor resistance measurements carried out from each end of the cable, using a bridge "Megger," are shown in the accompanying table. Red, blue and yellow are the core

By **M. Datta,**
M.Sc. Tech., A.M.I.E.E.

complete break; the resistances between each of the cores and the sheath showed that the dielectric of the yellow core had deteriorated, resulting in a low-resistance fault to the sheath. A low-resistance earth fault was also present on one of the cores, but the insulation resistance between the cores was comparatively high and each had high-resistance breaks, probably due to the burn-out at the time the fault developed (Fig. 1).

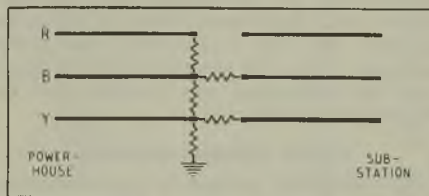


Fig. 1

In view of the limited time and equipment available, a rapid method of localization giving a reasonably accurate result was considered preferable to an elaborate procedure involving various refinements which might give greater accuracy but which would delay the operation. A modified fall-of-potential test was devised and applied to the faulty core by running a pilot wire of 3/20 v.i.r. cable across the river to connect the far end of the cable with the substation earth lead (Fig. 2).

A 6-V battery was used to pass a steady current through the fault to earth via the return loop set up. If V be voltmeter reading to earth at the near end of the faulty cable

with a current I flowing, then:
$$\frac{V}{I} = X + f,$$

where X = resistance of the conductor from the power-house end to the fault and f = fault resistance to earth from power-house end, the two being in series.

Knowing the value of f , the value of X can be found from the reading of the voltmeter and the ammeter. The actual fault position at a distance F from the power-house end is a proportion of the total length (800 yd) in the ratio of $X : R$ (R being the resistance of the conductor). Therefore,

Core Colours	Measured Resistances — Ohms.			
	With loop at the remote (substation) end	From power-house end with substation end open-circuited	From the substation end with power-house end open-circuited	
Red-sheath ..		1,540	17,000	
Blue-sheath ..		2,640	15,000	
Yellow-sheath ..		1.4	18,000	
Red-Blue ..	4,000	5,000	12,000	20,000
Blue-Yellow ..	4,500	4,400	2,000	2,000
Red-Yellow ..	2,660	3,500	12,000	25,000

colours, and the second set of figures in the last column are repeat tests taken after a short time interval.

Resistances of the blue-yellow and red-blue loops were higher than the red-yellow, approximating to open-circuit conditions, and all were greatly in excess of the calculated value, viz.: $2R = 1.76$ ohms. When resistances were measured from the substation and with the power-house end open-circuited, red-blue and red-yellow appeared to be considerably greater and were variable.

Evidently the red conductor had an almost

$F = \frac{X}{R} \times 800$ yd. The calculated resistance, R , for an 800-yd length of the cable conductor was 0.88 ohm. Ammeter and voltmeter readings for the Fig. 2 circuit were 99 mA and 338 mV; 85.3 mA and 302 mV; 89.5 mA and 316 mV. The average resistance calculated from these readings is approximately 3.4 ohms.

The measured earth resistance of the yellow core at the fault was 2.2 ohms, and that of the substation earth at the far end was 0.6 ohm, so that f is 2.8 ohms, and X is 0.6 ohm. As the normal conductor resistance was about 0.111 ohm per 100 yd, the fault was suspected to be about 600 yd from the power-house end, or 200 yd from the substation end. Subsequent lifting of the cable showed that the localization was fairly accurate. The cable was twisted at this place and the armouring was severed, due to unauthorized anchorage.

Factors Affecting Accuracy

The foregoing method is not necessarily the most accurate one, as proportionality calculations of this type, which are based on conductor resistance and cable length, depend upon the accuracy to which these

ing some form of "search" method*, and the following notes deal with search methods applied under somewhat similar circumstances.

Use of Search Coil

Exploration of the magnetic field in the vicinity of a faulty cable carrying a tracer current (introduced by interrupted d.c. or a.c.) by means of a search coil is fairly well known for cables installed in the ground or in ducts. A description has been published† of the application of this principle to localization of a fault in a submarine power cable. The search coil was wound on a long laminated steel core enclosed in a waterproof casing giving a bar formation, and was connected to a two-valve amplifier. It was suspended in a vertical position from a launch which travelled over the cable route, and difference in volume of sound gave the approximate fault position. After marking the location with a buoy, the cable was grappled and raised, final exact localization being carried out with a small sector-shaped coil and headphones.

A modification of this method is known to have been used on another faulty cable at a river crossing. Current from a buzzer on

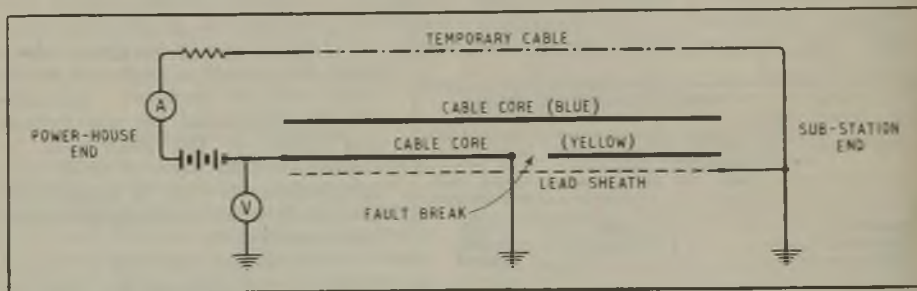


Fig. 2

properties are known, also on the magnitude and stability of the fault resistance. On an installation of this kind, appreciable temperature differences may exist between parts of the cable laid underground or in water so that the resistance per unit length of the cable is not constant, thus introducing errors. However, bearing in mind the limited apparatus available, the result can be regarded as satisfactory.

Subsequent inquiries, and a study of literature on the subject of fault localization, suggest that equally good or possibly better results might have been obtained by employ-

ing the shore was passed through the faulty core, returning through the water, and was detected by means of electrodes lowered over the two ends of a rowing boat, connected to a three-valve amplifier and headphones in the boat. In this case exact localization was unnecessary as a severe damage was visible as soon as the cable was lifted.

* J. H. Savage. "Localization of Faults in L.V. Cables." *I.E.E. Journal*, Part 2, December 1945.

† D. F. Tulloch. "Interruption Locates Submarine Cable Faults." *Electrical World*, August 5th, 1944.

United States Exports

Preliminary Figures for 1945

THE U.S. Department of Commerce has issued in preliminary form detailed statistics, by countries, of the export trade of the United States for 1945. The principal electrical items are shown in the following table with a note of increase or decrease in value on 1939. The only noteworthy lines in which very large increases were not recorded were

certain domestic appliances and other equipment not needed in the war effort. The outstanding customer countries were Canada, the U.S.S.R., Mexico, and some other Latin American states. Argentine trade fell off. Comparison between 1939 and 1945 is affected in some cases by changes in classification and generally of course by the rise in costs.

Class of Goods	1945 \$ (000)	Inc. or dec. on 1939	Class of Goods	1945 \$ (000)	Inc. or dec. on 1939
<i>Generators, a.c.</i>	2,616	+ 2,237	<i>Other batteries, including flash-</i>		
To Canada	631	+ 560	light	6,622	+ 3,006
" Britain	505	+ 501	To Britain	1,019	+ 28
" Brazil	52	+ 15	" India	1,242	+ 572
" India	188	+ 187	" U.S.S.R.	985	+ 985
" U.S.S.R.	1,032	+ 1,032	<i>Power transformers over 500 kVA</i>	2,705	+ 1,911
<i>Generators, a.c.</i>	993	+ 247	To Mexico	259	+ 253
To India	61	- 197	" Brazil	285	+ 32
" Britain	182	+ 178	" Chile	225	+ 209
" Mexico	181	+ 140	" U.S.S.R.	1,360	+ 1,360
" Canada	153	+ 120	<i>Distribution transformers 500 kVA</i>		
" Brazil	154	+ 91	and less	1,889	+ 1,306
" U.S.S.R.	11	- 81	To U.S.S.R.	430	+ 430
<i>Steam turbo-generator sets, under</i>			" Mexico	505	+ 466
500 kW	951	+ 690	" Colombia	123	+ 38
To Canada	122	+ 114	<i>Instrument transformers</i>	181	+ 66
" Mexico	211	+ 202	To Canada	10	+ 6
" India	118	+ 116	" Brazil	29	+ 12
" Venezuela	58	+ 52	" Mexico	29	+ 13
" U.S.S.R.	334	+ 334	<i>Other transformers</i>	1,056	+ 548
<i>Diito, 500 kW and larger</i>	16,039	+ 13,809	To Canada	115	+ 38
To Canada	471	+ 471	" U.S.S.R.	272	+ 200
" Mexico	297	+ 289	<i>Mercury power rectifiers</i>	359	+ 326
" Brazil	127	- 1,694	To U.S.S.R.	309	+ 309
" U.S.S.R.	13,086	+ 13,086	<i>Convertors</i>	4,304	+ 3,673
" Venezuela	118	- 41	To Canada	141	+ 53
" China	424	+ 424	" U.S.S.R.	2,421	+ 2,361
" Australia	403	+ 393	<i>Battery chargers, non-rotating</i>	767	+ 512
<i>Accessories & parts for generators</i>	6,183	+ 5,332	To Canada	184	+ *
To Canada	447	+ 385	" Australia	113	+ *
" Mexico	267	+ 207	<i>Switchboard panels, except tele-</i>		
" Brazil	264	+ 19	phone	3,456	+ 2,644
" Uruguay	418	+ 417	To Canada	113	+ 72
" Britain	503	+ 478	" Brazil	511	+ 231
" U.S.S.R.	2,326	+ 2,326	" Mexico	376	+ 285
" India	276	+ 265	" U.S.S.R.	1,125	+ 1,125
" China	831	+ 822	<i>Circuit breakers and switches</i>		
<i>Welding sets</i>	6,267	+ 5,228	over 10A	3,905	+ 2,326
To Canada	647	+ 471	To Canada	1,174	+ 940
" U.S.S.R.	3,096	+ 3,073	" Brazil	211	- 85
" Brazil	500	+ 345	" U.S.S.R.	1,059	+ 1,058
" Mexico	460	+ 409	<i>Testing, measuring, recording</i>		
" Venezuela	292	+ 214	and indicating instruments	11,500	+ 8,544
<i>Self-contained lighting sets</i>	5,088	+ 3,562	To Canada	1,157	+ 475
To Canada	894	+ 825	" Australia	706	+ 591
" Britain	921	+ 876	" India	626	+ 602
" Mexico	1,079	+ 1,032	" Britain	5,591	+ 5,311
" U.S.S.R.	559	+ 555	" U.S.S.R.	1,594	+ 1,362
<i>Diesel electric sets</i>	30,532	+ 30,532	<i>Lightning arrestors, choke coils,</i>		
To U.S.S.R.	19,925	+ *	reactors and parts	654	+ 201
" Britain	4,484	+ *	To Canada	88	+ 29
<i>Wind-driven generators</i>	236	+ 36	" Brazil	70	+ 19
To Canada	68	+ 121	" U.S.S.R.	133	+ 124
" Uruguay	79	+ 48	" Australia	96	+ 56
" Brazil	109	+ 85	<i>Electric locos, railway and mining</i>	936	+ 211
" S. Africa	100	+ 41	To Canada	102	- 51
<i>Storage batteries</i>	9,459	+ 7,053	" Belgian Congo	78	+ 78
To Canada	148	+ 52	" U.S.S.R.	571	+ 571
" Mexico	165	+ 76	<i>Industrial trucks and tractors</i>	1,567	+ 1,100
" Venezuela	143	+ 33	To U.S.S.R.	1,290	+ 996
" U.S.S.R.	197	+ 195	" Brazil	95	+ 71
" India	1,970	+ 1,798			
" Britain	2,975	+ 2,888			

* Comparative figures not available

United States Exports (Continued)

Class of Goods	1945 \$ (000)	Inc. or dec. on 1939	Class of Goods	1945 \$ (000)	Inc. or dec. on 1939
<i>Motors, under 1 H.P.</i>	1,559	+ 365	<i>Domestic motor-driven devices, including washing machines, vacuum cleaners and parts</i> ..	455	- 3,099
To Canada	754	+ 300	To Canada	321	- 929
" New Zealand	45	+ 19	" Brazil	51	+ 10
" Brazil	183	+ 116	" Mexico	23	- 781
<i>Stationary motors, 1-200 H.P.</i> ..	9,061	+ 7,581	<i>Electric flat-irons</i>	215	- 265
To Canada	868	+ 686	To Canada	37	- 20
" Mexico	1,112	+ 1,002	" Mexico	42	+ 7
" Brazil	617	+ 494	" S. Africa	29	- 5
" U.S.S.R.	4,863	+ 4,710	<i>Heating or cooking devices, etc.</i> ..	963	- 126
<i>Ditto, over 200 H.P.</i>	1,968	+ 1,496	To Canada	500	+ 157
To Mexico	351	+ 292	" Mexico	74	+ 7
" Brazil	192	+ 167	" Colombia	66	- 49
" U.S.S.R.	1,142	+ 974	" S. Africa	57	- 103
<i>Starting and controlling equip- ment for industrial motors, and parts</i>	4,838	+ 3,318	<i>Furnaces and other industrial heating devices and parts</i> ..	5,624	+ 3,934
To Canada	1,475	+ 1,027	To Canada	691	+ 406
" U.S.S.R.	1,601	+ 1,351	" Mexico	311	+ 293
" Mexico	490	+ 436	" U.S.S.R.	3,123	+ 2,226
<i>Accessories and parts for motors</i> ..	2,576	+ 1,086	<i>X-ray and therapeutic apparatus and parts</i>	8,301	+ 6,099
To Canada	896	+ 491	To Canada	1,063	+ 437
" Iran	129	+ 126	" Britain	1,047	+ 802
" India	135	+ 89	" Mexico	640	+ 504
" Mexico	224	+ 185	" Brazil	939	+ 829
<i>Portable tools, power driven</i> ..	1,984	*	<i>Radio transmitters and parts</i> ..	46,310	+ 43,614
<i>Portable electric tools, other</i> ..	1,234	*	Receiving sets	4,273	- 6,179
To Canada	667	*	Radio receiving valves	4,160	+ 1,159
" Britain	162	*	Loudspeakers	500	- 75
" Brazil	51	*	<i>Other components and accessories</i> ..	8,895	*
" U.S.S.R.	28	*	<i>Other telegraph and telephone apparatus and parts</i>	19,250	+ 15,591
<i>Refrigerators, household</i>	530	- 9,010	To Canada	2,132	+ 855
To Canada	48	- 657	" U.S.S.R.	9,161	+ 8,693
" Mexico	101	- 318	" Australia	2,321	+ 2,311
" Brazil	81	- 808	" India	752	*
" Australia	58	- 320	<i>Bells, buzzers and alarms</i>	963	+ 695
" New Zealand	45	- 134	To Canada	315	+ 381
<i>Ditto, Commercial up to 1 ton</i> ..	1,379	- 412	" U.S.S.R.	440	+ 440
To Canada	390	+ 190	<i>Starting, lighting and ignition equipment</i>	5,262	+ 4,100
" Venezuela	105	+ 15	To Canada	2,228	+ 1,811
" Mexico	439	+ 381	" Brazil	285	+ 213
<i>Parts for electric refrigerators</i> ..	2,767	- 3,286	" Mexico	603	+ 582
To Canada	1,279	- 702	" Australia	67	+ 8
" Mexico	152	+ 89	" New Zealand	106	+ 81
" Australia	154	- 56	" Britain	110	+ 65
" S. Africa	108	- 12	" Venezuela	285	+ 267
" Brazil	175	+ 66	<i>Insulating material</i>	1,345	+ 938
" New Zealand	117	+ 59	To Canada	655	+ 511
<i>Electric fans</i>	197	- 405	" Brazil	137	+ 122
To Canada	69	- 7	" S. Africa	57	+ 42
" Mexico	25	-	<i>Electric light fixtures, fluorescent</i> ..	1,610	*
" India	23	- 4	To Canada	354	*
<i>Filament lamps, small</i>	1,984	*	" Mexico	283	*
To Canada	218	*	" Venezuela	123	*
" Mexico	105	*	" S. Africa	78	*
" Brazil	118	*	<i>Wiring supplies and line material</i> ..	2,033	+ 953
" Britain	304	*	To Canada	447	*
" India	484	*	" Mexico	145	*
" Australia	166	*	" U.S.S.R.	442	*
<i>Filament lamps, large</i>	4,639	*	" Venezuela	149	*
To India	1,226	*	<i>Electric razors</i>	16	- 902
" S. Africa	227	*	To Canada	15	- 79
" Chile	358	*	<i>Other electrical apparatus</i>	13,704	+ 3,990
" Colombia	378	*	To Britain	1,450	- 1,767
<i>Flashlights</i>	987	*	" Canada	4,937	+ 2,663
To Britain	60	*	" Australia	802	+ 466
" S. Africa	51	*	" S. Africa	248	- 50
" Canada	326	*	" India	1,025	+ 852
" Mexico	143	*	" Argentina	86	- 326
<i>Fluorescent lamps</i>	1,275	*	" Brazil	664	+ 321
To Canada	113	*	" Mexico	626	+ 384
" Chile	174	*	" India	1,025	+ 852
" Brazil	184	*	" Venezuela	176	+ 22
" Uruguay	184	*	" U.S.S.R.	1,538	+ 1,454
<i>Searchlight and airport beacons</i> ..	1,461	+ 1,213	* Comparative figures not available		
To Britain	327	+ 327			
" U.S.S.R.	888	+ 888			
<i>Electric light fixtures</i>	1,877	+ 271			
To Canada	421	- 164			
" Mexico	447	+ 316			

COMMERCE and INDUSTRY

Next Year's B.I.F. Tungsten and Molybdenum Imports.

British Industries Fair

It had already been announced that the first post-war British Industries Fair was to be held in May next year. Now it is stated that the actual period of the Fair will be from May 5th to 16th. It will be held at Earl's Court and Olympia, London, and Castle Bromwich, Birmingham, the division of exhibits being much the same as in pre-war Fairs. The Export Promotion Department of the Board of Trade, 35, Old Queen Street, S.W.1, will be responsible for the London sections and the Birmingham Chamber of Commerce, 95, New Street, Birmingham, for the Castle Bromwich display.

Civilian Industries for Kidbrooke

The Board of Trade announces that six London firms have been allocated factory space for civilian production in part of the No. 1 Maintenance Unit at Kidbrooke, Kent, which is being vacated by the R.A.F. They are Foxborough Yoxall, Ltd. (makers of scientific instruments), Scientific & Projections, Ltd. (instrument and cinema equipment), Paterex, Ltd. (instruments), Brentford Transformers, Ltd., F. C. Burnard & Co., Ltd. (engineers' chucks), and J. S. Manufacturing Co., Ltd. (woodworking). Several of the firms were "blitzed" and are at present without accommodation. It is expected that employment for about 1,200 workers will be provided. These allocations, including one still to be made, represent about 150,000 sq ft of the total covered floor space of 700,000 sq ft.

Iron and Steel Price Increases

The Minister of Supply has made the Control of Iron and Steel (No. 52) Order, 1946, and the Control of Bolts, Nuts, etc. (No. 12) Order, 1946, which came into operation on August 14th. These Orders provide for higher maximum prices necessitated by increases in railway rates, coke prices, wages and other costs. The maximum prices of the main qualities of pig-iron are increased by from 4s. 6d. to 6s. 6d. per ton, and of heavy steel by 5s. per ton. Prices of more finished products have been increased where necessary by amounts which reflect the effect of the increases in pig-iron and semi-finished steel as well as the increase in direct processing and delivery costs. The Orders also free wrought iron in any form and cemented carbide hard metal tool tips from control.

Tungsten and Molybdenum Ores

Government purchase of tungsten and molybdenum ores and concentrates with the exception of small outstanding commitments has ceased and it has been decided to return to private trading in these materials. The arrangements for dealing with residual Government stocks are under consideration, but purchase and import on private account may now be resumed subject to import licence. Applications for import licences should be made on the usual form which should be forwarded to the

Iron & Steel Control, Ministry of Supply, Artillery Mansions, 75, Victoria Street, London, S.W.1, for transmission to the Import Licensing Department of the Board of Trade. For the present, the Ministry will be prepared to sell material for current requirements from stocks as necessary.

Grain Handling

Investigations carried out by the British Electrical and Allied Industries Research Association to ascertain the extent to which pneumatic methods are employed in this country for conveying and elevating grain on a small scale form the subject of a Report W/T12 by A. E. Canham, 4s. 6d. A conclusion reached is that the design of these plants has generally not been based on definite scientific knowledge or on extensive preliminary research, although the scope for such equipment should be large. The direction of further research is indicated, mainly on the lines of the small units developed by the National Institute of Agricultural Engineering.

Bedford Aeronautical Station

Work has begun on clearing the site of the new Government aeronautical research station near Bedford, the cost of which will be in the region of £20,000,000. Some of the equipment is expected to be ready by 1948 and a considerable part by 1952.

Motors taken from a concealed German aeronautical establishment near Brunswick will be used for the first of the supersonic air tunnels. To provide the power to equip other tunnels, motors aggregating about 500,000 H.P. will be installed with a peak load of 200,000 H.P. The electricity supply will be taken from the Bedford Corporation undertaking.

Boiler House Instruments

Fuel Efficiency Bulletin No. 45 of the Ministry of Fuel and Power deals comprehensively in 24 pages with "The Installation and Maintenance of Boiler-House Instruments." It includes nine diagrams, which reinforce the simple and practical explanations given in the text of the functions of the instruments, their construction and possible causes of unsatisfactory operation with notes on methods of checking performance.

First Post-war Radiolympia

The Radio Industry Council announces that it is planning to hold the first post-war Radiolympia in late September or early October, 1947. Negotiations are now in train for a tenancy of Olympia for this purpose.

Electrical Exhibition at Selfridges

In continuance of their policy of holding post-war exhibitions illustrating how British industries have converted from war to peace manufacture, Selfridges are holding an electrical exhibition at their Oxford Street store from October 7th for three or four weeks. The

exhibition will show what the post-war efforts of the electrical industry are producing, and there will be sections representing room heating, water heating, commercial refrigeration, lighting, etc. Already it is anticipated that over 100 exhibitors, mostly B.E.A.M.A. members, will be taking part, but the exhibition is open to anyone in the electrical industry whose merchandise Selfridges approve as being good.

Radio Navigation of Ships

It is reported that the Ministry of Transport has arranged with the Decca Navigator Co. for experimental operational trials of the Decca system of radio navigation on board merchant ships. The Ministry of Transport has taken advantage of the existence of the chain of transmitting stations, established by the company on the Thames Estuary and North Sea for the experimental use of the Royal Navy, to test the usefulness of the system to the Mercantile Marine. The trials are expected to last some months.

Fuel-Oil Firing at Bunnerong

Following tests on fuel-oil firing to supplement coal burning at Bunnerong power station, the general manager of the Sydney County Council electricity undertaking (Mr G. S. Boyd) has recommended the installation of auxiliary fuel-oil burning equipment in station "A" at a cost of £1,300. According to the *Electrical Engineer and Merchandiser*, the results indicate that the output of this section, which has a capacity of 175,000 kW, could be increased by approximately 10 per cent by the use of fuel oil.

Municipal Trading at Eastbourne

Eastbourne Corporation Electricity Committee has decided to permit direct sales in the showrooms and discontinue the practice of allowing contractors discount on showroom sales except in cases where a prospective purchaser is introduced by a contractor, when the appropriate trade discount will be allowed.

Sale of Utensils

The Torquay Chamber of Trade has protested to the Electricity Committee against the suggested extension of municipal trading at the electricity showrooms by the sale of non-electric cooking utensils. The Committee is to receive a deputation to discuss the matter.

Minister's Visit to Scotland

The Minister of Fuel and Power, Mr. Emanuel Shinwell, has made a tour of a number of Scottish centres during the past week. The programme arranged included a visit of inspection, with the Secretary of State for Scotland, to Loch Sloy hydro-electric scheme, a visit with the Secretary of State to Tummel-Garry hydro-electric scheme, and a visit to the Dumfries County Council's electricity undertaking.

V.I.R. Wire in New Zealand

There has been some discussion among electrical associations in New Zealand regarding the use of p.v.c. insulated wire in place of v.i.r. When the subject came before the Executive Committee of the Electric Supply Authority

Engineers' Association a resolution was passed expressing the opinion that those who dealt with house wiring supplies should not be prevented by any restriction on imports from continuing to handle v.i.r. wire or from recommending its use to their customers.

Water Heating at Yarmouth

As a companion to the brochure on electric water heaters recently published for circulation in the rural area, the Great Yarmouth Electricity Department has now issued a booklet for the town area. In the main the contents are the same, describing the different types of equipment available with examples of installations and suggestions for keeping heat losses to the minimum, but the costs are adjusted in view of the slightly more favourable town tariff.

Costs in Industry

We have received from McGowan, Perry & Partners, consulting industrialists, 34, Birkdale Road, London, W.5, a booklet entitled "Reducing Your Costs." It is contended that in this country, unlike the United States, cost reduction has not received the detailed attention that it deserves. The importance of the subject in relation to exports is emphasized.

Reports on German Industry

Further reports on German industry now available include the following: C.I.O.S. XXIII-14, "Turbine Engine Activity at Ernst Heinkel Aktiengesellschaft" (6s.); B.I.O.S. 563, "The German Radio Component Industry" (6s. 6d.); F.I.A.T. 229, "Copper, Lead, Zinc, Tin and Antimony Smelting and Refining in North-Western Germany" (4s. 6d.); and F.I.A.T. 413, "Tungsten and Molybdenum Wire Manufacture, for use in Lamps and Radio Tubes" (1s. 6d.).

Power Station Company Formed

The Carmarthen Bay Power Station Co., Ltd., was registered on August 6th as a public company with a capital of £100, its objects being to construct and equip an electricity generating station, etc. The directors are M. A. Edwards, W. McNeill (a director of the Llanelly & District Electric Supply Co., Ltd.) and A. S. Valentine, M.I.E.E. The registered office is at 66, Queen Street, London, E.C.4.

Technical Mission to the Caribbean

A technical mission will leave this country shortly to make a three months' tour of the oilfields and refineries in Trinidad, Venezuela and Columbia. While all the personnel of the mission are members of the Council of British Manufacturers of Petroleum Equipment, the mission is purely a private one organized and financed by the members themselves. Equipment to the value of many millions of pounds is purchased annually by the oil companies—before the war this was almost entirely an American monopoly—and the importance of the visit, therefore, cannot be stressed too greatly since its successful conclusion must have far reaching results on our export trade. Every support is being accorded the mission by the Ministry of Fuel and Power and the Export Promotion Department of the Board of

Trade, and on arrival in Trinidad a public reception will be held by the Governor General. The President of Venezuela has also expressed a wish to receive the members. The mission is under the leadership of Mr. G. R. Bolsover, director and chief metallurgist of Samuel Fox & Co., Ltd. (branch of the United Steel Co., Ltd.), and comprises the following:—Messrs. E. E. Allen (Industrial & Engineering Development Association), D. H. Carter (Head Wrightson Processes, Ltd.), A. G. Ellison (Yorkshire Copper Works), E. T. Forestier (Newman, Hender & Co., Ltd.), E. F. E. Howard (Hayward, Tyler & Co., Ltd., also representing other firms), F. Kenyon (Wm. Kenyon & Sons, Ltd.), H. Martin (Murex Welding Processes, Ltd.), E. Pritchard (British Oilfields Equipment Co.) and G. H. Thorne (Dawnays, Ltd.).

Export of Surplus Machine Tools

Removal of the two months' period during which, in the past, surplus machine tools have been on offer to British industry before being made available for export, is announced by the Ministry of Supply. The new arrangement, which comes into force immediately, has been made possible because of the increasing quantities of Government surplus machine tools becoming available. Although a limited range of the scarcer tools will not be available for export for the present, the revised procedure will free several thousand tools which can be purchased at attractive prices for resale abroad.

Machine Tool Sales

An additional selling centre for Government owned surplus machine tools will be opened at the Ministry of Supply Store, Patterson Street, Blaydon, Haughs, Blaydon-on-Tyne, on September 11th.

Sale of Radio Sets at Showrooms

Dartford Corporation Electricity Committee has asked the borough electrical engineer to report on the sale of radio and television sets at the electricity showrooms.

Fatal Accidents in Australia

According to the Commonwealth Bureau of Census and Statistics, 38 people were killed by electric shock in Australia in 1944, all but one being males. In the previous year there were 36 male and 7 female victims.

Parsons Memorial Lecture

The Parsons Memorial Lecture for 1946 will be delivered by Sir Hugh Chance at the Institution of Civil Engineers on September 26th at 5.30 p.m. and members of the I.E.E. are invited. Sir Hugh's subject will be "Recent Developments in Optical Glass Manufacture."

A.S.E.E. West London Branch

Subjects of talks to be given to the West London Branch of the Association of Super-vising Electrical Engineers during the 1946-47 session include "Fractional H.P. Motors" by A. N. D. Kerr (September 3rd), "Electricity in Horticulture" by F. E. Rowlands (October 1st), "Post-War Utilization" by W. Gilchrist

(November 5th), "Some Notes on the Safe Installation of Electrical Equipment" by H. F. Buxton (December 3rd), "Some Applications of Electricity and Gas" by a representative of the gas industry (January 7th), and "Mineral Insulated Sheathed Cables" by F. E. Redman (February 4th).

Contract Price Adjustment Formula

The latest figures for the B.E.A.M.A. contract price adjustment formulae are as follows:—Rate of pay for adult male labour at August 10th, 103s. (no change). Cost of material: the index figure published by the Board of Trade on August 10th is 196.0 and is the figure for the month of July (compared with 192.2 for June).

Trade Announcements

Pye, Ltd., has removed its Glasgow office to 21, Waterloo Street, Glasgow (telephone: Glasgow Central 8301).

The address of the Manchester office of British Insulated Callender's Cables, Ltd., is now Faraday House, Todd Street, Manchester, 3 (telephone: Blackfriars 7044/5).

Aerialite, Ltd., has opened a sales office and showroom at 91/93, Baker Street, London, W.1 (telephone: Welbeck 7986).

Changes of Name

Hope's Heating & Lighting, Ltd., has changed its name to Henry Hope (Engineers), Ltd.

The title of the Midland Electric Co. (Leicester), Ltd., has been changed to Atlas Electric Co. (Leicester), Ltd.

Trade Publications

G.W.B. Electric Furnaces, Ltd., Dibdale Works, Dudley, Worcs.—Illustrated brochure (B.C.F.46) describing in general terms versatile belt conveyor furnaces for continuous heat treatment processing.

Runbaken Electrical Products, Ltd., 71, Oxford Road, Manchester, 1.—Illustrated and priced leaflet with manual of operating instructions relative to an auto-electrical test set for automobile and ignition servicing.

Precision Components Co., Aller, Langport, Somerset.—Illustrated and priced leaflet on "Kahi" multi-way moulded terminal blocks.

Ferranti, Ltd., Hollinwood, Lancs.—Illustrated and priced leaflet on Model 546 transportable AC/DC radio receiver in moulded white cabinet of miniature size.

Genristo, Ltd., Osmaston Street, Nottingham.—Illustrated and priced brochure on heating elements of many varieties for domestic and industrial appliances; also temperature control panels, furnace heaters and motor starter resistors.

J. H. Sankey & Son, Ltd., Refractories Works, Ilford, Essex.—Illustrated leaflet, with directions for use, on quick setting acid resisting cement which withstands high temperature.

British Aluminium Co., Ltd., Salisbury House, London Wall, E.C.2.—Brochure (No. 403) illustrated with sketch drawings, outlining the merits of steel cored aluminium conductors for

overhead power lines, including data sheets on conductors, clamping, jointing, anchoring, damping and tapping.

Gent & Co., Ltd., Faraday Works, Leicester.—Illustrated brochure describing "Tangent" fire detection, indication and alarm equipment with accessories.

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

Municipal Reports

Stoke-on-Trent

COMPARATIVE load curves included in the annual report of the general manager at Stoke-on-Trent (Mr. T. Lockett) show that, with the abolition of double summer time, the peak load on the undertaking reverted to the pre-war time of 5 p.m. The maximum demand last winter (48,350 kW) occurred on January 2nd and was the highest in the history of the undertaking.

Any loss of load through the closing of war factories was more than offset by increases in other industrial requirements, and power consumption as a whole rose from 104.6 million to 106.5 million kWh. Domestic supplies were about 10 per cent higher on the year, amounting to 63.4 million kWh. Excluding bulk supplies to other authorities, total sales aggregated 170.7 million kWh, an increase of 8.1 million kWh.

Income, at £794,939, was up by £77,283 and expenditure rose by £52,419 to £769,875, leaving a surplus of £25,064. It is pointed out that the reduction in loan charges from £145,795 to £131,752 resulted from the fact that little capital expenditure was permitted during the war. Plans authorized, however, provide for an expenditure of £128,000 on extensions chargeable to capital account and the provision of a main distribution station at Locketts Lane, Longton, will cost £250,000. On the other hand the cost of changing to 230 V originally envisaged is now avoided by the Commissioners' decision to make 240 V the standard.

Nottingham

Increases in all classes of supply except by contract are recorded in the 1945-46 report of the Nottingham Electricity Department (city electrical engineer and general manager, Mr. G. H. Lake). Sales by contract, at 67.2 million kWh were down by 12.7 million kWh (15.9 per cent), while there were gains of 17.9 and 15.2 per cent respectively under the lighting rate and domestic tariff. Altogether 220.3 million kWh was sold, an improvement of 3 million (1.4 per cent) on the previous year. The output from the generating station was 332.2 million kWh, an increase of 3.3 per cent.

An analysis of consumers and connected load shows that domestic premises supplied (excluding farms) numbered 108,059 out of a total of 119,187 consumers, their connected load being 301,221 kW (out of 455,347 kW) and aggregate consumption 98 million kWh.

The Department's total income last year was £1,141,336 (against £1,065,292) and working expenses were £915,353 (£818,111). Loan charges amounted to £190,822 (£205,211) with other net revenue charges of £92 (£30,634), leaving a net profit of £35,069 (£11,336) nearly all of which (£35,000) goes to the relief of the city rates.

Eastbourne

With the town quickly recovering from the effects of the war, the number of electricity consumers at Eastbourne increased from 18,473 to 20,470 during the year ended March 31st last; this compares with 21,030 at the outbreak of war. Sales rose from 27.5 million kWh in 1944-45 to 35.5 million last year, falling short of the 1938-39 figure by 2.8 million kWh. As an indication of the increased pressure on the undertaking the borough electrical engineer and manager (Mr. N. Boydell) mentions that the number of callers at the showrooms last year was 28,798 against 19,597 in the previous year. There is little doubt, he says, that the public is rapidly becoming electrically minded, and the process has been stimulated by wartime experiences. The accounts show a total revenue of £289,535 (against £214,032 in 1944-45) and a net profit of £6,379 (£2,621).

Cannock

Against the general trend, Cannock Electricity Department (chief engineer and general manager, Mr. P. Wardle) records a reduction in the average revenue per kWh sold (from 1.032d. to 1.017d.). From January 1st, 1945, charges to e.h.v. and l.v. bulk consumers were lowered, while ordinary tariffs remained at the pre-war level. Sales aggregated 26.8 million kWh (an increase of 6.8 per cent over 1944-45). With the connecting up of Littleton Colliery all the collieries in the area are now taking a public supply. Revenue amounted to £123,292 (£118,735) and there was a net profit of £417 (£159).

Non-Ferrous Metals Consumption

DETAILED figures of consumption of non-ferrous metals in the United Kingdom during the second quarter of 1946, covering zinc, lead, tin, nickel, cadmium, antimony, cobalt and manganese, have now been issued by the Directorate of Non-Ferrous Metals. Total figures of the consumption of virgin metal only, including for comparison the first quarter of 1946, are as follows:—

Metal	Long Tons	
	First Quarter 1946	Second Quarter 1946
Zinc	50,653	51,548
Lead	55,426	48,013
Tin	5,421	6,449
Nickel	2,098	3,094
Cadmium	127	138
Antimony	1,490	1,274
Cobalt	149	244
Manganese Metal	136	149

Airfield Lighting Control

Selective Pulse Switching on Telephone Relay Principles

WHAT is termed the "unit control" system of selectively switching from a distance the airfield lighting which assists aircraft to land and take off and also marks taxi-ing routes on the ground has been developed and the equipment manufactured by Standard Telephones & Cables, Ltd., to Air Ministry contract. The apparatus was finally inspected and its operation demonstrated at the makers' New Southgate works last week in the presence of officials of the Air Ministry and the Ministry of Civil Aviation prior to its installation at the London airport.

In the first stage of construction of that airfield three runways have been provided; each can be used in two directions, so that the initial selective switching requirement was for six approach and flare paths, which are illuminated by lamp fittings variously situated within a radius of 2.5 miles.

Two systems of lighting are catered for, namely, the "Drem" method utilizing filament lamps and sodium funnels as well as contact fittings as employed on Royal Air Force aerodromes during the war, while the later method uses approach fittings of high and low intensity with high intensity contact lights. In addition, angle of glide indicators, taxi, traffic and obstruction

lights and beacons are common to both systems. Thus the present three runways need over 2,100 separate electrical fittings of an aggregate of 250 kW and connected in a total of nearly 300 separate circuits, each remotely operated from a desk in the airport control tower.

Those circuits which make up the approach and contact lights are interlocked and co-ordinated in the switching system by "runway selection," which ensures that only those flare path services required for a given approach path can be illuminated at any one time. Such other non-flare path services as taxi-way and traffic lights and beacons can be individually operated independently of whichever runway may be selected for utilization.

Quick change-over and speedy response are important considerations. Any service can be switched in from one to two seconds; alternatively, the controller can set up a series of lamp-lighting sequences in any order he chooses and then put them into effect by depressing the main operating key once only, watching the result by means of "back indication" lamps beneath a coloured miniature diagram of the airfield inset in the control desk. In the event of a change of direction of wind, the controller is able (by manipulating one master runway



Lighting control desk with mimic airfield plan, showing lift-out panels for ease of maintenance and relay racks in background

selection switch and depressing one key) to change the whole lighting scheme in operation from any one flare path to any other in 24 seconds.

Taxi-ing tracks, at present switched in sections, will ultimately be arranged for group switching, with "back indication" in each case.

A master check key enables the controller automatically to verify all control functions. A fault developing anywhere on the system is instantly indicated by a special lamp and operation of the "check" facility immediately displays the position of the faulty service on the mimic plan.

The control desk is built up in units on the expanding bookcase principle so that new

sections can be added to control duplicate and triplicate runways as they become serviceable without disturbing existing facilities. Present requirements are catered for by 50 switches on the control desk, of the rotary and depression types; their knobs are illuminated internally whenever manipulated. There is not sufficient space for appropriately disposing all the "back indication" lamps beneath the miniature diagram, so the light from some of them is "piped" longitudinally through bent glass rods to the required points.

The desk switches initiate pulse rhythm selection through telephone type relays specially designed for the purpose. They are rack mounted in dust-proof plastic moulded cases with a transparent front cover and plug-in base for quick replacement and easy addition, being energized with d.c. at 50 V derived through selenium rectifiers, two to each rack, from the a.c. power main.

The relay combinations control the actuation of the power contactors for selectively switching the lighting circuits as well as for transformer

tap-changing to reduce voltage for dimming lights, also furnishing true "back indication" in every case, over twelve wires only and no more than those six pairs will be needed, however control requirements may be increased in future. They are provided in a 38-pair cable laid as a ring main, which includes telephone circuits and some spares not connected with the lighting control system.

The present 555 relay units are distributed among the control centre and twelve substations, arranged to permit the addition of forty further services to be controlled from each substation, making a total of 480 additional services as the aerodrome grows. The lighting circuits are contactor energized from the substations, into which an a.c. 11,000-V power cable is looped to form a ring main so that future spurs may be added for extension with minimum cable lengths.

The provision of a fourth runway will increase the number of control services by a third, while nine runways will need 3,000 circuits spread over an area of 16 sq miles.

Public Lighting Conference

THE Conference and Exhibition of the Association of Public Lighting Engineers will commence on September 10th at the Central Hall, Westminster, when Mr. A. Barnes, M.P., Minister of Transport, will give an address, after which he will declare open the exhibition of street lighting equipment. In the afternoon there will be an extraordinary general meeting, followed by the annual general meeting and the induction of the president, Mr. W. N. C. Clinch, who will deliver his presidential address. In the evening he will hold a reception at the Connaught Rooms, Great Queen Street, W.C.2.

On September 11th Mr. E. C. Lennox (Newcastle-on-Tyne), will read a paper on "Public Lighting—Administration"; he will be followed by Mr. R. Parker (Aberdeen), whose subject will be "The Public Lighting Engineer, His Organization, Staff and Training, with Postscript to Councillors." After an adjournment for lunch, the session will be continued when Mr. E. Fryer (secretary of the Automobile Association) will read a paper on "Street Lighting from the Motorists' Point of View." This will be followed by an inspection by delegates of the exhibition. In the evening a tour will be made to inspect lighting installations. During the afternoon a motor coach trip to Windsor has been arranged for the ladies.

On September 12th the proceedings will commence with a paper by Mr. C. Sugg, B.Sc., M.Inst. Gas E. At the annual luncheon, which will be held at the Connaught Rooms, the principal guest will be Mr. W. S. Morrison, M.C., K.C., M.P. The concluding session will be held in the afternoon when Mr. Davies will

give a lecture and demonstration, after which visits have been arranged to Watson House, Fulham, and the Illumination Laboratory of the G.E.C. at Wembley.

The list of firms taking part in the exhibition contains 39 names including those of most of the leading makers of electric street-lighting equipment.

Supplies for Arc Welding

ALTHOUGH problems connected with the supply of electricity for arc welding plant are less acute than they are for resistance welding, they have peculiarities of their own that call for careful consideration in view of the increasing scope for arc welding in structural engineering, machine and pressure-vessel construction and shipbuilding. The subject is dealt with in a new Technical Report, K/T117, of the E.R.A. (5s. 6d.), which has been prepared by R. Neumann. Many aspects such as power factor and voltage drop are similar to those found with resistance welding, which formed the subject of a previous report, K/T110. In contrast with the latter, D.C. is largely used for arc welding and the relative merits of A.C. and D.C. are considered, leading to the conclusion that each case should be studied individually. The Report also discusses rating of plant, load characteristics and effect on supply systems and tariffs. Appendices deal with means of improving the effect of the load, with particular reference to the use of capacitors, wiring methods and different types of generators and transformers. A bibliography of 46 references is included.

ELECTRICITY SUPPLY

Belfast Plant Contract. Switch Shortage Problem.

Belfast.—TURBO-ALTERNATOR CONTRACT.—The Electricity Committee has recommended the acceptance of the tender of £264,869, submitted by Metropolitan-Vickers, for the supply and erection of a turbo-alternator, with auxiliaries, at the Harbour power station.

Birkenhead.—POWER STATION EXTENSIONS.—The Electricity Committee has obtained sanction to borrow £1,650,000 for the power station extension scheme.

Doncaster.—HOUSING DEVELOPMENTS.—Mains extensions costing £45,000 to meet housing developments on the various new estates are to be carried out by the Town Council.

Helensburgh (Dumbartonshire).—DEFERMENT OF ELECTRICITY SCHEME.—Replying to the Council's proposal to install electricity in housing schemes the Department of Health states that having regard to the present shortage of labour and materials and the need to conserve skilled labour, the Secretary of State does not feel justified in consenting to the expenditure involved at the present time and requests that the proposal be deferred for six to nine months. The Council is to make further representations to the Department.

Heywood.—IMMERSION HEATERS.—The Housing Committee has decided to install immersion heaters in the 50 houses proposed to be built on Gooden Housing site.

Huddersfield.—INCREASED LOAD.—The borough electrical engineer has reported that in order to deal with additional loads it will be necessary to provide nine new substations and modify or extend 26 existing stations. Subject to the approval of the Finance Committee, application is to be made to the Electricity Commissioners for sanction to borrow £57,356.

Liverpool.—JUBILEE CELEBRATIONS.—Arrangements for celebrating the jubilee of the Liverpool Electric Supply Department include facilities for the public to inspect sections of the undertaking. Substations at Highfield Street, Paradise Street, Bolton Street and Monument Place will be open for public inspection from September 10th to 13th inclusive, Clarence Dock generating station on September 10th and 12th, and Lister Drive generating station on September 11th and 13th. The culminating event of the celebration will be on September 13th when a number of distinguished guests will participate in a day's outing, including the inspection of the Mersey Tunnel and the new penicillin factory at Speke. In the evening the Electric Power and Lighting Committee will entertain the members of the Corporation and other guests to dinner at Reeces, Parker Street. A brochure has been prepared which, although dealing mainly with the electricity supply undertaking, also shows in graphic form the progress of Liverpool and how the city is facing its post-war problems.

Luton.—DEVELOPMENT PLANS.—The Corporation has approved a £200,000 development programme for South Bedfordshire, including the erection of a primary substation about six miles from Woburn.

Mansfield.—SUPPLY TO COLLIERY.—The Electricity Committee has now arranged terms with the Bolsover Colliery Co. for a supply to the Mansfield Colliery, the costs being estimated at £17,750 for 11,000-V cables and £2,650 for switchgear and metering equipment.

LOANS APPROVED.—Sanction has been obtained by the Electricity Committee to borrow £2,374 for a substation in Chesterfield Road and £10,067 for the extension of the 11,000-V system to Mansfield Woodhouse.

Middlesex.—SCHOOL INSTALLATIONS.—Plans approved by the Education Committee provide for the installation of electricity at Greenhill School, Harrow, Whitefriars School, Wealdstone, and Alperton School, Wembley. It is also proposed to improve electric lighting at four other schools at a cost of £3,281.

Nelson.—LOAN FOR RURAL SUPPLIES.—The Town Council is making application to the Electricity Commissioners for sanction to borrow £1,800 in connection with the supply of electricity to rural areas.

Shipley.—ELECTRICITY FOR CINEMA.—The Council has decided to take no action regarding the recommendation that it should lease a site adjacent to the Glenroyal Cinema to the Shipley Picture House Co. This was required in connection with a proposal by the company to generate its own electricity. The Electricity Committee of the U.D.C. submitted that it would not be in the best interests of the Council to lease the site for such a purpose.

Spennorth.—STREET LIGHTING.—The electrical engineer has been directed to submit a comprehensive report dealing with the development of street lighting, including automatic control.

Sunderland.—SHORTAGE OF SWITCHES.—Further reference to the shortage of electrical equipment for houses is made in a report by the borough engineer of Sunderland to the Town Council. The report stated that considerable difficulties had arisen through the non-delivery of electric switches. The bottleneck appeared to be the manufacture of the porcelain parts of the switches which were entirely inadequate for needs. There did not appear to be any signs of an improvement and work was being carried out "from hand to mouth." The borough electrical engineer had suggested that certain switches in houses should be dispensed with for the time being and this would relieve the situation to a certain extent. The report added that it took 60 weeks to obtain delivery of electric cable. At present there were five houses completed and ready to be handed over except for the electric services.

Overseas

Australia.—PETITIONS AGAINST ADELAIDE BILL.—The possibility that the Electricity Trust Bill, authorizing the taking over of the assets of the Adelaide Electricity Supply Co., which was passed by a special session of the South Australian Parliament early in the year,

may be referred back to Parliament is now being discussed in Adelaide. It is understood that four petitions have been presented to the King asking that his assent should not be given to the Bill. The petition presented by the company covers 19 clauses, one of which contains eight sub-sections giving reasons why the Bill should not be agreed to by His Majesty.

BUNNERONG EXTENSIONS.—The new 30,000-kW turbo-alternator at the Bunnerong power station, Sydney, has now been placed in position and tested.

SOUTH-WEST POWER SCHEME.—The Western Australian Minister for Electricity (Mr. Hawke) reports that the State Electricity Commission has given close consideration to the proposed South-West Power Scheme, and a staff has been appointed to undertake the work incidental to the completion of the project. The engineer in charge of the scheme is Mr. J. B. Jukes who has been to the United States to secure first-hand information on rural electrification. Permanent surveys of the areas which will be supplied with power through the new scheme are shortly to be undertaken, and the Collie Power Co. has been notified of the Commission's intention to take over the company's undertaking as from October 1st.

Belgium.—EFFECT OF WAR ON OUTPUT.—In the Sofina report for 1939-45, recently issued, it is stated that the German occupation of Belgium during the war had a marked effect on the country's electric power production, the output declining from 5,798 million kWh in 1939 to 3,948 million kWh in 1944. Last year's output, although better than that of 1944, was still 22 per cent below the pre-war total due to the supply restrictions caused by the shortage of coal.

Brazil.—INCREASED OUTPUT.—While the river flows in the Rio region were still below the average last year the position was better than in 1944, and it was found possible to discontinue the rationing of supplies of power to consumers. The result was a marked advance in the year's sales of power of the Brazilian Traction, Light & Power Co., Ltd., which through its affiliated concerns controls the electricity supply in the cities of Rio de Janeiro, São Paulo and Santos. In the three areas the total was 2,606 million kWh as compared with 2,395 million kWh in 1944, the number of consumers having increased from 662,734 to 694,957. The generating capacity of the combined generating plants advanced from 612,570 to 662,570 kW and the connected load from 1,564,806 to 1,725,853 kW.

At the Serra do Cubatao plant (São Paulo system) the power house extension for the Nos. 4, 6 and 8 units, each of which will have a capacity of 91,000 H.P., was started during the year. Unit No. 4 is scheduled to come into operation by the end of the present year. At the Ribeirão des Lages installation (Rio system) work continued at a reduced rate on the reconstruction and raising of the main dam, but it will not be possible to accumulate additional water in the reservoir until the Serra-Lages transmission line comes into service in the early part of 1947. The 57,000-H.P. "C" unit at the Lages plant is expected to be in operation by the end of this year.

Another important project now in hand, and known as the Paraiba-Pirai, will permit about 675,000 H.P. of additional firm power at 60

per cent load factor to be obtained by consecutive steps in the Lages plant and, when built, 135,000 H.P. in the Lages auxiliary plant, by diverting and pumping up to 160 metric tons of water per second from the Paraiba river above Barra do Pirai via a 3½-mile tunnel, the Pirai valley and the Vigario pool canal and tunnels, into the Lages plant, which is to be extended as required. Thus, by elevating this water about 135 ft in the Santa Cecilia and Vigario pumping plants, whenever power is available, the water can be utilized under a total head of 1,125 ft at any time when the system needs the power. The same Lages units can also use water from the Lages reservoir now being enlarged to a capacity of 1,100 million metric tons.

Eire.—RESTRICTIONS REVOKED.—The Electricity Supply Board has notified consumers that the restrictions imposed as from June 3rd are revoked and replaced by regulations ensuring improved supplies of electricity. The relaxation allowed by the latter, as from August 15th, is as follows:—Until further order the total consumption for all purposes of any consumer (excluding industrial power consumers and supplies for industrial process heating, traction and public lighting) shall not exceed 100 per cent of the ration quoted on the consumer's ration card. This has been made possible by the improved inflow and storage positions on the Shannon. At the same time consumers are reminded that a continual check is still necessary to ensure that consumption is maintained within the required limits. An abnormal demand must result in a return to severe rationing.

TRANSPORT

Gateshead.—OPERATION OF TROLLEY-BUSES.—The Gateshead and District Tramways Co., Ltd., has applied for a three years extension from July 29th, 1948, of the time limit for converting the company's trams to trolley-buses. At a conference of representatives of the Gateshead Town Council, Felling Urban District Council, the Northern General Transport Co., Ltd., and the Gateshead and District Tramways Co., Ltd., it was stated that the route to Low Fell would be the first to be converted to trolley-buses by Newcastle City Council. It was stated that the City Council had also applied to the Transport Commissioner for sanction to run trolley-buses 8 ft wide on the south side of the Tyne.

Glasgow.—DEFICIT ON YEAR'S WORKING.—The total revenue of the Transport Department for the year to May 31st last shows an increase, compared with 1944-45, of £143,632 and the total working expenses an increase of £156,043. The net result of the year's operation was a deficit of £231,901 compared with a deficit of £376,984 in the previous year.

Wolverhampton.—PROFIT ON UNDERTAKING.—The annual accounts of the Transport Department show that the gross surplus on the trolley vehicle and motor omnibus accounts was £150,809. From the net surplus of £49,343, £10,000 has been paid to the relief of the rates, £9,678 for deferred maintenance of vehicles and equipment and £20,500 for deferred vehicle purchase, leaving £9,165 for transfer to reserve.

Making Electric Clocks

Production to Meet Greatly Increased Demand

ALTHOUGH electric clocks are still something of a rarity in the shop windows, production has already nearly, if not quite, reached its pre-war figure. The



Assembly of "Bijou" rotor with oiled felt washers

reason for the shortage is that the accumulated demands of the war period both at home and abroad, coupled with the growing appreciation by the public of the merits of electric clocks, has resulted in the immediate absorption of current production and manufacturers are now busily engaged on schemes for expanding their outputs very considerably. Smith's English Clocks, Ltd., for instance, now producing electric clocks at the rate of 10,000 a week, will within about six months be turning out 16,000 per week. To this end the company, besides reorganizing its Setric Works in Waterloo Road, Cricklewood, on the most up-to-date mass-production lines, is equipping two adjacent factories, one (previously belonging to Vactric, Ltd.) as offices, showrooms, sales, packing and dispatch departments; and the other (Good-

wood Works) purely for the production of wooden clock cases.

At the moment about twenty different models of electric clocks are being made (apart from automobile varieties) and to drive these there are four main types of movement—"De Luxe," "Bijou," 24-hour auto-alarm and 12-hour non-automatic types. The "Bijou" model is available in long-spindle, short-spindle, self-start, non-self-start, back and bottom-start forms. All the components used, such as the front, middle and back plates, wheels, worm shafts and pinions, etc., are made in the machine shops of Setric Works or in one of the company's other factories, and plastic moulding presses produce a wide variety of cases as well as back covers, handset knobs, etc. For use in conjunction with the electrically

operated power presses for making cases there are electric pre-heaters for warming up flaked moulding material employed to produce a mottled effect. Goodwood Works, which is waiting for dust-extraction plant before going into service, has already been equipped with the latest types of saws, planes, spray



"Bijou" movements undergoing 2,000-V breakdown test and (right) a pneumatic machine for printing dials



painting plant, polishing machines, etc., and it is aimed to make this the most modern clock case making plant in the country and perhaps the world.

Such operations as cleaning of castings, drilling and tapping, fitting pillars to back plates, rotor winding, impregnating bushes with oil, spot welding of identification plates on to the back

plates, etc., are carried out on sub-assembly lines before reaching the main assembly belts. Tracing first the assembly of the "De Luxe" model, the first operation done on the main assembly line is the fixing of the impulse starter on the middle plate. The second worm shaft and pinion which engages in the rotor starter are then added, followed by the centre wheel and impulse arm. The front plate and cannon pinion are then put on.

The coil and stator halves are assembled complete with terminal moulding, and the rotor and starting mechanism are added. The back plates are then screwed on. After an overload test at 2,000 V for a minute, ensuring that the coil insulation is in order, the top motion work is added. Besides being impregnated with oil the "Paxolin" bearings are provided with a reservoir of oil, making further lubrication unnecessary for at least five years. The rotor, which runs at 200 r.p.m., is sufficiently powerful to drive a 20-in. clock.

The production line handling "Bijou" models is laid out to produce 2,000 clocks a day. The fitting of the studs and pins to the middle plate is the first operation of assembly, the jig employed being arranged with two levers to ensure that both hands are out of the way of the press. Trays of twenty-two stator and rotor components are placed on the conveyor belt at 7½-minute intervals and the motors when assembled are screwed on to the middle plates. A sintered bronze bearing employed for the rotor embodies two felt washers under a brass sealing washer which is spun over, the bronze itself being impregnated with oil.

After the assembly of the minute wheel and pinion on the front plate, the first wheel, the one driven by the rotor, is fitted. For the sake of quiet running this wheel is made of fibre. The fixing of the handset spindle and handset knob is done two at a time to give simultaneous and symmetrical movements by using both hands together. When

the impulse starter arm has been fixed, the unit undergoes its 2,000-V overload test and passes on to receive its centre wheel, wheel train and front plate. The latest type of assembly trays ensure that all components are in the most convenient position for the operation.

Printing of the dials is carried out by an ingenious rubber stamp utilizing pneumatic

pressure. After the insertion of the glass and the assembly complete with the dial and hands in the case, the finished unit goes to the test department where it is placed on circuit for a period of 24/48 hours during which any necessary adjustments are made. The alarm types of clock follow the same general procedure of assembly.

Throughout manufacture considerable use is made of vacuum cleaning and compressed air plant to keep the delicate components free from dust.

Loch Carron Scheme

THE North of Scotland Hydro-Electric Board last week published Distribution Scheme No. 10, covering the Loch Carron and Loch Kishorn districts of Ross and Cromarty, where all but three houses depend on paraffin lamps for lighting and 250 of the 257 potential consumers live in crofts or cottages. Electricity supplies will be available to 90 per cent of the people in the area when the scheme is completed. The Board will bring electricity from the Nostie Bridge power station of the Lochalsh Scheme to Stromeferry. A submarine cable will cross the Loch Carron Narrows to Stromemore. The Board's block tariff of 6d., 1d. and ¼d. will be operative while power is supplied by Diesel generators. When hydro-electric development takes place in the area, the charges will be reduced to 5d., ¾d. and ¼d.



Clocks arriving off the end of the assembly belts for inspection

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

A. C. Cossor, Ltd.—A number of new developments were referred to by Mr. T. A. Macauley (chairman) at the recent annual meeting. He said that the company's radio valve and cathode-ray tube business had been transferred to Electronic Tubes, Ltd., a new subsidiary formed for the purpose. The new company had a nominal capital of £300,000 and under an agreement for the reciprocal exchange of patents and technical development with Sylvania Electric Products, Inc., of the United States, the new company would be able to manufacture and market valves and tubes of the latest development and design. Their subsidiary, the Sterling Cable Co., Ltd., had formulated plans for expansion and development, and had acquired and was in process of equipping a new factory at Aldermaston. With regard to the radio and television business they were rapidly swinging back to peacetime production. As a further part of their programme two other subsidiary companies had been registered under the names of Cossor Instruments, Ltd., and Cossor Radar, Ltd. The last mentioned company would be concerned with the development and exploitation of marine and general radar equipment. Their laboratories had in hand a vast programme of work in connection with both aviation and shipping. The most outstanding progress related to their marine navigation equipment. This made use of the plan position indicator and presented ships' navigation officers with a picture of all objects within a radius of up to thirty miles surrounding the ship by night or day and regardless of fog. They had undertaken numerous installations, among them one for the *Queen Elizabeth*. They had also made considerable progress in radar equipment in the field of aviation.

Pye, Ltd.—Dealing with reconversion at the company's annual meeting last week the chairman, Mr. C. O. Stanley, said that their hopes of a rapid reconstruction had been largely unfulfilled. The production of civilian radio and television apparatus had started, but owing to shortage of supplies the quantities made had fallen far short of the totals which would otherwise have been reached. A few television sets had been built and sent out for demonstration, but no real production had been possible. Their plans were constantly being upset by interruptions outside their control which set back production. They had begun to ship reasonable quantities of radio receivers to export markets. They suggested, however, that if the Government refrained from exporting raw materials and essential parts and instead allowed them to use their manufactured parts the ultimate benefit to the country's export trade would be much greater.

In television this country still led the world, but unless we moved much faster than we were doing America would quickly leave us behind. It was wrong that it should take such a long time to implement the Hankey Report. The authorities should review the position and

intensify and hasten the attack on this problem. During the year the company's research laboratories developed the Videosonic television system and they hoped soon to have the opportunity to prove its practical usefulness.

Telephone Properties, Ltd., reports a profit for 1945 of £29,935, as compared with £29,322 for 1944. The ordinary dividend for the year is maintained at 6 per cent and £43,835 is carried forward (against £43,002 brought in).

In a statement issued with the report and accounts, Sir Alexander Roger (chairman), says that the end of the difficulties of shortage of material and equipment so far as the Nacional Company in Venezuela is concerned is beginning to come within measurable distance. The administration of the Nacional Co. has had complete plans for improvement and expansion prepared for some time and for a period of several years ahead and the work based on these plans is going steadily forward. A new exchange building has been erected at Los Caobos, Caracas, and ground purchased at Chacao for another. The former is designed for an immediate installation of 7,000 lines with an ultimate capacity of 25,000. Equipment is also in course of manufacture for Maracaibo, Cuidad, Bolivar and Barquisimeto. Already in 1946 supplies to the approximate value of 1,750,000 bolívares (£130,000 at the current rate of exchange) have been shipped from Great Britain and the flow continues. In 1945, 490 exchange lines and 101 extensions were connected to the system. The total number of stations, including extensions at December 31st last, was 39,423.

The Telephone Manufacturing Co., Ltd., held its annual meeting on August 19th when Mr. F. T. Jackson (chairman and managing director), who presided, said that the profits to be earned in 1946 would not be on the same level as in the past three years. There was no lack of orders for their main factory, but they were very short of female labour and certain materials. They were continuing their research and development programme. Their woodworking plant was working to full capacity and their subsidiaries were all working at a profit. The sales company was dependent to a great extent on the works for supplies and was obtaining so much business that orders could only be accepted for forward delivery.

Newton Bros. (Derby), Ltd., report a net profit for the year ended March 31st last of £14,759, as compared with £13,645 for the previous year. The dividend for the year is maintained at 17½ per cent, and in addition a special bonus of 7½ per cent is being paid. Reserve receives £5,000, and £8,467 is carried forward (against £9,569 brought in).

Metal Industries, Ltd.—The accounts for the year to March 31st last show a net profit, before taxation, of £292,347 (against £263,998 in 1944-45). Taxation provision absorbs £148,427 (£143,071), and there are allocations of £14,450 and £59,000 respectively to the capital and general reserves which received nothing last

year. The ordinary dividend for the year is raised from 9 to 10 per cent by a final payment of 7 per cent and £98,454 (£161,390) is carried forward.

Silentbloc, Ltd., proposes to pay a final dividend of 12½ per cent, again making 25 per cent for the year.

New Companies

Swedish Ericsson Co., Ltd.—Registered August 8th. Capital, £5,000. Electricians, mechanical engineers and manufacturers, etc. Directors: H. Ericsson, Stockholm, Sweden (managing director of Telefonaktiebolaget L. M. Ericsson of Sweden) and T. A. Lundell, Weybridge. Regd. office: 32, Victoria Street, S.W.1.

Troughton & Young (Lighting), Ltd.—Registered August 9th. Capital, £15,000. Mechanical, electrical, wireless and general engineers, etc. Subscribers: A. H. Young and A. B. Read. Solicitors: Hugh Quennell, 12, Tokenhouse Yard, E.C.2.

British Power Transformer Co. (Northern Ireland), Ltd.—Registered in Belfast July 29th. Capital, £100. Manufacturers, importers and exporters of, agents for, and dealers in, electric transformers of all kinds, motor dynamos, etc. First directors: F. C. Mason, H. Paul-Hühne, R. G. Henniker and F. N. Phipps. Regd. office: Knockmore, Lisburn, Co. Antrim.

Medway Electrical Co., Ltd.—Registered August 9th. Capital, £1,500. To acquire the business of electrical engineers carried on by Heslop and Squires, trading as the Medway Electrical Co., at Edinburgh Road, Chatham. Directors: H. Fowle, A. L. Heslop, E. T. Squires and G. Fowle. Secretary: L. N. Fowle. Regd. office: 334, High Street, Chatham.

C. J. Roddis & Co., Ltd.—Registered July 13th. Capital, £100. Repairers, overhaulers and maintainers of electrical appliances and equipment, electrical contractors, etc. Directors: C. J. Roddis and S. F. Speight. Regd. office: 15, Kirkham Road, Bradford.

Electra Sales (Essex), Ltd.—Registered July 16th. Capital, £100. Manufacturers of, and dealers in, television, wireless and electrical apparatus and goods, etc. Directors: M. Wayne and A. G. Cushings. Regd. office: 142, The Grove, Stratford, E.15.

Thorpe, Glover & Co., Ltd.—Registered July 18th. Capital, £2,000. Electrical and mechanical engineers and manufacturers and distributors of electrical and mechanical apparatus and devices of all kinds, etc. Directors: D. Thorpe and D. H. Glover. Regd. office: St. Luke's Chambers, Bold Place, Liverpool, 1.

Goostry (Electric), Ltd.—Registered July 18th. Capital, £5,000. To acquire the business of an electrical contractor, including electrical engineering and construction and heating and power installation, carried on by S. Goostry at 50, Lower High Street and 2, Wharfedale Street, Wednesbury. Directors: R. Babb, H. S. Goostry, W. H. Babb and J. Babb. Regd. office: 50, Lower High Street, Wednesbury.

Factory Installations, Ltd.—Registered July 18th. Capital, £2,000. Mechanical and electrical engineers, etc. Directors: E. A. Blackburn

and C. D. Frost. Regd. office: 48, Northgate Street, Leicester.

Universal Electrical Co., Ltd.—Registered July 19th. Capital, £10,000. To carry on business as indicated by the title. Directors: W. F. G. Smith, R. A. Smith, W. J. T. Smith, and H. Victor-Smith. Regd. office: 50, Pall Mall, S.W.1.

Massey & Coggins, Ltd.—Registered July 19th. Capital, £2,000. Electricians and electrical, wireless and television engineers, etc. Directors: W. A. Massey and J. Coggins. Solicitors: Silverman & Livermore, 155, Dale Street, Liverpool.

Pepper & Haywood, Ltd.—Registered August 8th. Capital, £3,000. Electrical engineers and general electrical installation contractors, etc. Directors: A. Pepper, E. R. Haywood and A. L. Cain. Regd. office: Midland Bank Chambers, Letchworth, Herts.

Arthur Miers & Co., Ltd.—Registered July 22nd. Capital, £5,000. To acquire the business of electrical engineer previously carried on by A. S. Miers at Hallgate, Doncaster. Directors: E. S. Milan, N. S. Milan, and F. Melt. Regd. office: 62, Hallgate, Doncaster.

Carr & Whiting, Ltd.—Registered July 23rd. Capital, £1,000. Electrical engineers and general electrical installation contractors, etc. Directors: J. F. Carr and W. C. R. Whiting. Regd. office: 38, Lumley Road, Horley, Surrey.

Kirdon Electric, Ltd.—Registered July 24th. Capital, £100. Wholesalers, importers, exporters and manufacturers of, and dealers in, electrical components, etc. Directors: F. R. Hopkins and R. G. Ford. Regd. office: 113, High Holborn, W.C.

Radiac, Ltd.—Registered July 25th. Capital, £100. Manufacturers, importers and exporters of, and dealers in, dynamos, motors, armatures, magnetos, etc. Subscribers: S. F. Pulvermacher and C. Stevens. Solicitors: Sheffield Powell & Scott Tucker, 20, Bedford Square, W.C.1.

Whitmore & Warwick, Ltd.—Registered July 12th. Capital, £2,000. Electrical engineers and contractors, etc. Directors: H. A. H. Whitmore and C. T. Butcher. Regd. office: 55b, Allesley Old Road, Coventry.

Bankruptcies

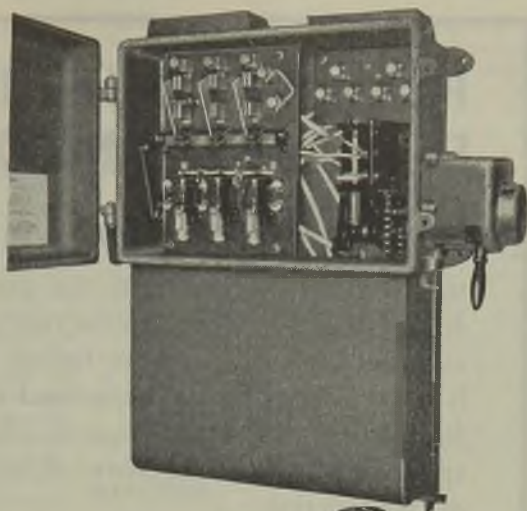
L. E. Holland, electrician, trading at 4, St. James's Churchyard, Haymarket, Bristol, and formerly at 67, Ashgrove Road, Horsfield, Bristol, and now residing at "Terra Cotta," West Kingston, Wilts.—Application for discharge to be heard on September 20th at the Guildhall, Bristol.

E. B. Page, electrical engineer, 10 and 12, John Street, Hyde, Cheshire.—First and final dividend of 6s. 6½d. in the £, payable August 30th at 20, Byrom Street, Manchester.

A. Ambrose, electrical engineer, 137, Market Street, Chorley, Lancs.—Application for discharge to be heard on October 29th at the Sessions Hall, Lancaster Road, Preston.

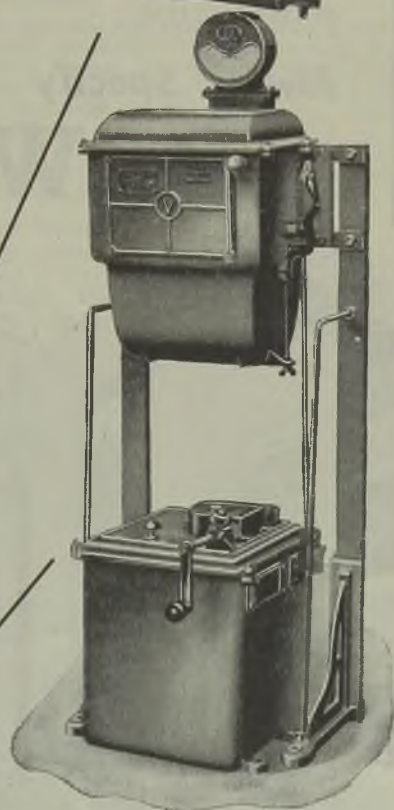
M. Skulnick, battery manufacturer, 83, Wellesley Court, Maida Vale, London.—First and final dividend of 20s. in the £, plus 4 per cent statutory interest, payable August 27th at 76, New Cavendish Street, London, W.1.

*control
for
slip-ring
motors
from*



Oil immersed combined rotor
and stator starter with or
without isolator up to 90 H.P.
400/440 V.

Oil immersed rotor and
stator control panel for
motors up to 250 H.P.
400/440 V.



WORKS: ASTON, BIRMINGHAM 6

Sales Headquarters : BRETENHAM HOUSE, LANCASTER PLACE. W.C.2

POST-WAR BUILDING EFFICIENCY DEPENDS UPON CONSTRUCTIONAL PLANNING

DURING the 'speed building' era when war factories were the great constructional problem, RAWLBOLTS played a vital role in the bolt fixings of fitments and machinery . . . those fixings hold, and will continue to hold so long as they are required to do so. In the days ahead RAWLBOLTS will continue to play their vital part, ensuring speed of erection, manpower economy, efficiency, and neatness of construction.

Always Specify

RAWLBOLTS

for bolt fixings

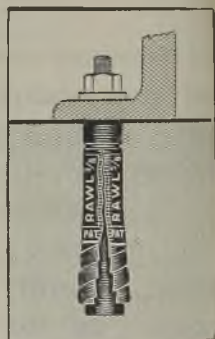
The world's Largest Manufacturers of Fixing Devices

**THE RAWLPLUG CO. LTD., CROMWELL ROAD
LONDON, S.W.7**

B289



T0804



This illustration shows the bolt projecting type of RAWLBOLT in concrete. RAWLBOLTS are made in two types—loose bolt and bolt projecting. Sizes 1/2" to 1" diam.

STOCKS AND SHARES

STOCK EXCHANGE markets are pursuing a somewhat erratic course. The amount of business passing in the various markets, however, is reasonably good for this time of year. Investment flows steadily in the gilt-edged sections and, among industrials, something of a feature has been an influx of buying orders from India for Imperial Chemicals, the price of which strengthened appreciably, to react as sellers took advantage of the spurt.

Declines in shares of companies which had been expected to distribute bonus shares in the more or less near future occurred as a result of the Treasury's insistence upon its refusal to permit such distributions to take place. Had it not been for nationalization uncertainties the prices of electricity supply shares would doubtless have advanced by reason of the advertisement given to electricity by the discomfort caused through the Gas Light & Coke workers' strike. Manufacturers of electrical apparatus are considered certain to benefit from the impetus which this strike has given to the demand.

Thirty Million Pounds

The additional £30 million which the Central Electricity Board is authorized to borrow, as already mentioned here, will naturally assist in providing employment and profit for a number of companies engaged in electrical equipment work. The present is too early for such consideration to exert any influence over share prices, but it may be of practical use to catalogue ordinary shares in some of the companies likely to benefit. The following list makes no claim to be anything but representative. Care has been taken to ensure that, in each case, shares are on offer in the Stock Exchange market at the prices quoted. The yields are calculated upon the dividends last paid by the companies.

Ordinary Share	Price	Yield
	s. d.	£ s. d.
British Ins. Callender's Cables ..	48 0	* * *
Enfield Cables ..	61 0	4 2 0
Enfield Rolling Mills ..	23 0	4 7 0
English Electric ..	62 0	3 4 6
General Electric ..	5 0	3 15 0
Gen. Cable Manufacturing ..	25 0	3 12 0
Henley (W. T.) Tel. ..	28 6	3 10 2
Johnson & Phillips ..	85 0	3 10 7
London Elec. Wire & Smiths ..	44 6	3 7 5
Siemens ..	36 0	4 3 4
Tel. Construction & Maint. ..	59 0	3 7 10
* Int. div. 4 per cent for 18 months.		

Price Fluctuations

At 45s. Associated Electrical ordinary show a half-a-crown gain, and Aron Electrics at 71s. have put on 2s. 3d. British Insulated Callenders' rose a florin to 48s. Johnson & Phillips are 6d. better at 85s., Tube Investments, once more 6½, are 6s. 3d. better. Lancashire Dynamo at 5½ have gone back to the same extent. Telegraph Constructions at 58s. 9d. and Walsall Conduits at 55s. 3d. are down 1s. 9d. Smaller falls left

Vactric at 18s. 9d. and Laurence Scott 14s. 3d. On the other side of the account, there are rises in H. J. Baldwin, 13s. 3d., English Electric, 61s. 6d., and Ever Ready, 47s. 6d. De la Rue, 12½ a month ago, have been down to 11½ since then and are now 11½. Telephone Properties are unchanged at 22s. 6d. on the issue of the report. Electrolux shares are up £1, at 24½.

Communication Stocks

Cable & Wireless ordinary at 113 and the 5½ per cent preference at 117 are up 3½ and 6 respectively. Speculation canvasses various possibilities that may emerge from the present interesting position of the combine's affairs. Great Northern Telegraphs at 31½ have lost 10s. International "Tel. & Tel." regained 1½ dollars, at 27½, and Anglo-American preferred is 2 higher at 136½.

London Passenger Transport "C" at 59½ has risen 2 points and Thomas Tillings advanced to 54s.

Radio Shares

In the radio list, Scophony rallied to half-a-guinea. Decca Records, after being 3½, went back to 58s. 9d. The Treasury's ban on bonus issues caused disappointment to holders who had been expecting Decca to "cut a melon." Pye deferred remain dull at 38s. 9d.; E.M.I. at 32s. 9d. are unchanged. Cossor are again a heavy market at 34s. 6d. Radio and Television at 9s. recovered half their fall of last week.

Thorn Electrical

Thorn Electrical recently issued 5s. ordinary shares at 27s. 6d., which now stand at 2s. 9d. premium. The money raised by these new shares is for expansion of the business, including equipment of a new factory in South Wales; also £150,000 was required for the purchase of the Ferguson Radio Corporation, which manufactures radio equipment. Thorn has been paying 20 per cent dividend, out of earnings of 50 per cent, on the old capital, and it is generally expected that the company will be able at least to maintain this rate—hopefulness looks for an increase. The new shares do not participate in the final dividend due to be declared this month.

British Electric Traction

The British Electric Traction Company falls into what has come to be known as the "nationalization" group, and the prices of the stocks have fallen to some extent on a little nervous selling. The deferred stock came on offer at 1120, at which the return on the money is 4 per cent. During the war years 1940-46, the annual dividend was 45 per cent, accompanied in the year just ended by a 10 per cent bonus. Before the war the company used to pay 5 per cent cash and 10 per cent in deferred ordinary stock. The net profit has risen since 1942 from £606,000 to £733,000 last year, the latter allowing a 55 per cent dividend and bonus payment, with a comfortable amount over.

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.

AKT.-GES. Brown, Boveri & Cie.—“Regulating device for pressure liquid controlled prime movers.” 3253/43. February 3rd, 1942. (579277.)

B.P.L. (Instruments), Ltd., and B. Digby.—“Electric amplifier.” 7681. April 25th, 1944. (579407.)

British Thomson-Houston Co., Ltd., and S. A. Couling.—“Apparatus for utilizing the exhaust from a gas or oil engine.” 1991. February 13th, 1942. (579318.)

British Thomson-Houston Co., Ltd. (General Electric Co.).—“Gas turbine power plants.” 14147. August 30th, 1943. (579420.)

British Thomson-Houston Co., Ltd., W. J. Scott, R. G. Saunders and R. Latham.—“Velocity-modulated electron discharge tubes.” Cognate applications 8639/41, 2643/43 and 5168/42. July 9th, 1941. (579412.)

C.F. Burgess Laboratories, Inc.—“Primary cells and batteries.” 278/43. December 26th, 1941. (579326.)

E. L. W. Byrne (Titeflex, Inc.).—“Ventilated radio-shielded spark plug.” 5915. March 30th, 1944. (579298.) “Radio-shielded enclosures for the ignition systems of internal-combustion engines.” 33813/45. March 30th, 1944. (Divided out of 579298.) (579308.)

H. A. M. Clark.—“Electrical systems for utilizing acoustic or electromagnetic vibratory energy for directional indicating purposes.” 33504. November 18th, 1938. (579360.)

Compania para la Fabricacion de Contadores y Material Industrial, and P. Viteau.—“Means for amplifying the deflection of a directed electron beam.” 3065. February 18th, 1944. (579394.)

H. Constant, D. M. Smith and Metropolitan-Vickers Electrical Co.—“Gas turbines, axial flow or turbine type gas compressors and the like machines.” 5943. May 7th, 1941. (579316.)

M. Cook, W. O. Alexander and Imperial Chemical Industries, Ltd.—“Wrought metal electrical resistance materials.” 14740. September 8th, 1943. (579380.)

A. C. Cossor, Ltd., and L. H. Bedford.—“Electrical calculating or measuring apparatus.” 14082. October 7th, 1942. (579274.)

A. C. Cossor, Ltd., and L. Josef.—“Electrical apparatus.” 6489. April 6th, 1944. (579299.)

A. C. Cossor, Ltd., L. H. Bedford, J. Bell and E. M. Langham.—“Electrical calculating apparatus.” 17006. November 30th, 1942. (579325.)

“Electrical measuring apparatus.” 20008/43. November 30th, 1942. (Divided out of 579325.) (579336.)

“Electrical measuring apparatus.” 20009/43. November 30th, 1942. (Divided out of 579325.) (579337.)

“Electrical measuring or control apparatus.” 20010/43. November 30th, 1942. (Divided out of 579325.) (579338.)

“Cathode-ray tubes.” 20011/43. November 30th, 1942. (Divided out of 579325.) (579339.)

J. A. Crabtree & Co., Ltd., W. E. Hill and T. D. G. Wintle.—“Electric fuse boxes.” Cognate applications 5275/44 and 13236/44. March 21st, 1944. (579357.)

A. G. Crossland.—“Electric circuit connections.” Cognate applications 7176/44 and 19114/44. April 18th, 1944. (579301.)

Ferranti, Ltd., and J. A. Darbyshire.—“Electric discharge devices.” 5849. March 30th, 1944. (579435.)

General Electric Co., Ltd., and E. T. Cooke.—“Adjustable concentric transmission lines.” 1042. January 20th, 1943. (579276.)

General Electric Co., Ltd., and V. J. Francis.—“Apparatus of which a h.p.m.v. electric discharge device is a part.” 10091. August 8th, 1941. (Addition to 518782.) (579270.)

“H.p.m.v. electric discharge lamps.” 13394. October 17th, 1941. (579366.)

General Electric Co., Ltd., V. J. Francis and E. Kettlewell.—“H.p.m.v. electric discharge lamps.” 15204. November 26th, 1941. (579272.)

General Electric Co., Ltd., V. J. Francis and E. H. Nelson.—“H.p.m.v. electric discharge lamps.” Cognate applications 12842/43 and 20477/43. August 9th, 1943. (579375.)

General Electric Co., Ltd., E. H. Nelson and V. J. Francis.—“Sealing electrical conductors through quartz and the like.” Cognate applications 14028/41 and 14050/41. October 31st, 1941. (579415.)

General Motors Corporation.—“Electromagnetic direction indicator systems.” 5957/44. May 19th, 1943. (579439.)

W. T. Gray and Metropolitan-Vickers Electrical Co., Ltd.—“Cranes, hoists and the like.” 1552. January 25th, 1940. (579410.)

J. W. Hill.—“Electron discharge devices employing hollow resonators.” 4040. March 26th, 1942. (579320.)

E. A. Hinksman.—“Control circuits for rectifiers.” 6491. April 6th, 1944. (579444.)

E. N. Kennedy.—“Fuse carriers or bridges for electric distribution boxes and the like.” 5149. March 20th, 1944. (579354.)

G. A. Laughton and H. N. Cox.—“Portable radio sets for mounting on vehicles, aircraft, or the like.” 7031. April 17th, 1944. (579300.)

G. Liebman and Cathodeon, Ltd.—“Electron discharge devices.” 2342. February 23rd, 1942. (579319.)

A. Mandl and Metropolitan-Vickers Electrical Co., Ltd.—“Dynamo electric machines.” 3371. February 22nd, 1940. (579411.)

M. Bowman Manifold.—“Electron discharge devices employing hollow resonators.” 4253. March 29th, 1941. (579315.)

Marconi's Wireless Telegraph Co., Ltd.—“Television transmitting apparatus.” 8555/42. June 21st, 1941. (579273.)

V. Mayer.—“Winding of dynamo-electric machines.” 5667. March 28th, 1944. (579400.)

H. T. Mitchell and T. Kilvington.—“Radio aid to navigation.” 3865. March 1st, 1944. (579346.)

M-O Valve Co., Ltd., and J. Bell.—“Thermionic valves, especially those adapted to

operate at very high frequencies." 17311. October 20th, 1943. (579389.)

M-O Valve Co., Ltd., and H. S. Smith.—"Bases of electron discharge devices." 11508. June 16th, 1944. (579304.)

A. F. Pearce.—"Hollow electrical resonators." 1918. February 13th, 1942. (579317.)

Phillips Lamps, Ltd., and E. C. Martin.—"Manufacture of ceramic materials of high permittivity." 6295. April 4th, 1944. (579404.)

Pritchett & Gold & E.P.S. Co., Ltd., E. M. O. Honey and C. R. Hardy.—"Acid containers." 14899. September 10th, 1943. (579382.)

Siemens Bros. & Co., Ltd., and B. A. Hensler.—"Telephone systems." 6985. April 15th, 1944. (579455.)

F. Sigmund and W. S. Hlavin.—"Dynamo-electric machines." 11058. July 7th, 1943. (579372.)

Standard Telephones & Cables, Ltd.—"Means for preventing the spreading of high density electron beams." 9486/43. June 15th, 1942. (579371.)

Standard Telephones & Cables, Ltd., and

T. A. J. Jaques.—"Electrical contact arrangements particularly for use with high frequencies." 7168. June 6th, 1941. (579365.)

Standard Telephones & Cables, Ltd., and D. C. Rogers.—"Electric wave filters." 13272. October 15th, 1941. (579414.)

A. H. Stevens (Gibson Electric Refrigerator Corporation).—"Domestic refrigerators of the continuous absorption type." 19093. November 16th, 1943. (579287.)

Western Electric Co., Inc.—"Electron discharge devices." 15238/43. June 19th, 1942. (579384.)

Westinghouse Brake & Signal Co., Ltd., L. E. Thompson and A. Jenkins.—"Rectifying detectors for high-frequency alternating electric currents." 12019. August 26th, 1942. (579322.)

A. H. Williams.—"Secondary batteries." 12854. October 4th, 1941. (579271.)

Amended Specification.

572911. Heating Construction, Ltd., and another.—"Electric reflector fires."

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.

Ashton-under-Lyne.—September 9th. Housing Committee. Electrical wiring of 70 permanent houses. (August 16th.)

Birkenhead.—September 13th. Electricity Department. Switchgear and transformers. (August 16th.)

Chesterfield.—September 12th. Electricity Department. Seven 250-kVA outdoor distribution transformers. H.v. and m.v. cables. (See this issue.)

Chester-le-Street.—September 2nd. Rural District Council. Electrical installations in 80 permanent houses at Plawsworth Road, Sacriston, and 80 houses at Birtley. F. Bowman, housing architect, Birtley Estate Office, Great North Road, Birtley. (Returnable deposit of £1 ls.)

Edmonton.—September 4th. Borough Council. Two vertical spindle centrifugal pumps, each complete with electric motors, switchgear, etc., for Cuckoo Hall sewerage scheme. (Deposit £3). E. J. Willis, borough engineer, Town Hall, Edmonton, N.9.

Kingston-upon-Thames.—September 30th. Borough Council. Tower wagon for street lighting purposes. (See this issue.)

Llandrindod Wells.—September 7th. Urban District Council. 400-kVA transformer, with h.v. and l.v. switchgear. (See this issue.)

Oldham.—August 31st. Electricity Department. Cable, earthenware ducts and cable covers. (August 2nd.)

Radcliffe.—August 28th. Electricity Department. One 750-kVA and two 500-kVA transformers. (August 16th.)

Sale.—August 26th. Town Council. Complete power and lighting installations in 88

houses on the Carrington Lane site. Borough electrical engineer.

Stockport.—September 11th. Town Council. Electrically-driven borehole pump for the Gas Department. T. Reynolds, gas engineer, Portwood Gasworks.

Stoke Newington.—August 27th. Borough Council. Conversion of radio apparatus on consumers' premises. (August 9th.)

Wilton.—August 31st. Town Council. Public lighting installation. Borough surveyor, Municipal Offices, Fugglestone House.

Orders Placed

Mansfield.—Electricity Committee. Accepted. Three 300-kVA transformers (£1,117).—Electric Construction Co. Switchgear (£2,901).—Met.-Vick.

Sleaford.—Housing Committee. Accepted. Electrical installations in houses on the Woodside estate.—J. T. Barnes & Sons.

Tynemouth.—Housing Committee. Accepted. Wiring 24 "Orlit" houses (£561).—J. B. Thomson.

Wallasey.—Electricity Committee. Accepted. Ripple control apparatus.—Automatic Telephone & Electric 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.

Adwick-le-Street.—Houses (34), for U.D.C.; C. F. Ward, builder, High Street, Carcroft, Doncaster.

Alfreton.—Houses (56), Firs estate; H. Taylor, architect, Regal Chambers, Cavendish Road, Chesterfield.

Ayr.—Hospital at Heathfield for Town Council; burgh surveyor.

Barnard Castle.—Houses (34), Middleton; F. Blenkinsopp, R.D.C. surveyor.

Bedlington.—Cinema; J. H. Simson, architect, 78, Bewick Road, Gateshead.

Belfast.—New cinema, dance room and café, Royal Avenue (£60,000); Odeon Theatres, London.

Bellingham (Northumberland).—Houses (30), for the R.D.C.; W. Dixon & Son, architects, 1, Collingwood Street, Newcastle-on-Tyne.

Birkenhead.—Houses (36), Mount estate (£37,158); Lloyd & Cross, Ltd. Dry-cleaning works; Merseyside Cleaners, Ltd., 96, Westbourne Grove.

Blackpool.—Houses (24) and 12 flats, Grange Park (£38,730); North Western Construction Co., Ltd.

Bristol.—Houses (96), West Town, Knowle; and houses (81), Doncaster Road, Southmead; H. W. Webb, city engineer, 7, College Fields, Clifton.

Caernarvonshire.—Police houses (50), on approved sites; W. Ll. Jones, county architect, County Offices, Caernarvon.

Cardiff.—Nurses' hostel, Newport Road, for Royal Infirmary; H. W. Fletcher, architect, 21, Dumfries Place.

Charlton Kings.—Houses (56), Ewens Farm estate (£64,983); J. Costello & Co., builders, 17, Rotunda Terrace, Cheltenham.

Chester-le-Street (co. Durham).—Houses (160), for R.D.C.; F. Bowman, surveyor, R.D.C. Offices.

Factory, Picktree Lane, for Rodney Dresses, Ltd.; J. G. Cowe & Son, architects, Central Chambers.

Croydon.—Primary school for 480, Heathfield estate; borough architect.

Darlington.—Houses (102), for Town Council; G. Dougill & Son, Chesnut Street.

Houses (86), for Town Council; H. Parvin & Son, Bondgate.

Block of offices for Whessoe Engineers, Ltd.; Nox, Ltd., 55, New Bond Street, London.

Dartford.—"Easiform" houses (100), Temple Hill estate; Gough Cooper & Co., Ltd. Works extensions, Millpond Road; Burroughs Wellcome & Co.

Derbyshire.—County primary school, Alles-tree; J. Harrison, county architect, St. Mary's Gate, Derby.

Dunston.—Factory for the Northern Bedding Co., Blaydon; Anglo-Scottish Construction Co., Gosforth, Newcastle-on-Tyne.

Felling (co. Durham).—Houses (200); surveyor, U.D.C. Offices.

Gateshead.—Factory for the Bren Manufacturing Co. on the North East Trading Estate; Anglo-Scottish Construction Co., Gosforth, Newcastle-on-Tyne.

Houses (160), Coach Road and Lobley Hill; G. Wimpey & Co., Ltd., builders, Dunston-on-Tyne.

Haddington (East Lothian).—Permanent houses (59), for Town Council; town clerk.

Hartley Wintney.—Houses (28), Odiham (£39,708); Pool & Sons, Ltd.

Hathersage.—Modern secondary school for Derbyshire Education Committee; F. H. Crossley, county architect, County Offices, St. Mary's Gate, Derby.

Hayes.—Primary school, Charville Lane (£47,000); Middlesex county architect.

Horbury (Yorks).—Houses (50), Manor Fields estate; H. Senior, clerk, Town Hall.

Jarrow.—Factory, Bede Trading Estate; G. Henderson, Boldon Lane, East Boldon, co. Durham.

Extensions, Technical School (£10,310); H. T. M. Wigham, Castletown.

Kettering.—Houses (36), for Town Council (£43,162); A. F. Keach & Sons, builders, 9, Station Road, Burton Latimer.

Knaresborough.—Houses (30), for U.D.C. (£34,247); H. Dodd, builder, 75, Leeds Road, Harrogate.

Lichfield.—Houses (62), Armitage, Chase-town, Botany Bay, Swinfen and Packington; G. K. Pullen, clerk, Rural Council House.

Lutterworth.—Houses (40), for R.D.C. (£47,642); J. Jelley & Son, builders, 42, Shenton Street, Leicester.

Maidstone.—Houses (46), for R.D.C.; J. H. Nicholson, surveyor, 26, Tonbridge Road.

Manchester.—Works extension, Collyhurst; Elliott & Crabtree, Ltd., starch manufacturers, Lilley Street.

Milford Haven.—Houses (50), Coombs estate (£59,000); Phelps & Owen, builders.

Northumberland.—Junior and infant school at Bebside; county architect, County Hall, Newcastle-on-Tyne.

Prudhoe-on-Tyne.—Houses (32) at Oaklands (£37,255); E. Jeffcock (Contractors), Ltd., Walbottle Road, Newburn-on-Tyne.

Rochdale.—Houses (200), for Town Council; J. Hobson & Sons, Ltd., builders, Newark Street Works, Nottingham.

Police stations and residences at Norden and Balderstone (£14,300); S. H. Morgan, borough surveyor, Town Hall.

Ryton-on-Tyne.—Houses (100), at Crawcrook; U.D.C. surveyor.

Seaham Colliery (co. Durham).—Houses (88); W. Leech, Clayton Street, Newcastle-on-Tyne.

Shipley.—Houses (51), Crag Road; U.D.C. surveyor.

Sunderland.—Additions to Corporation Quay including new cranes and cold storage facilities (£423,000); borough engineer.

Tain (Ross-shire).—Houses (50), for Town Council; A. Ross & Son, architects, 28, Queensgate, Inverness.

Timperley.—School, Mayfield Road, for Cheshire Education Committee; E. M. Parkes, county architect, The Castle, Chester.

Wallsend.—Houses (84), Churchill Street; J. H. James, builder, Archer Street, Willington Quay.

Wigan.—Extensions to schools (£17,000); L. Lyon, borough surveyor, Town Hall.

Wirral.—Houses (42), Somerset Pensby; W. F. Roberts, Council Offices, Heswall.

York.—Secondary school, Backfield Lane; city architect.



Which Stop Nut will you choose—Simmonds or Pinnacle—fibre collar or metal diaphragm? The Pinnacle is the newer product and has some advantages over its older brother. But there are still many conditions which are best satisfied by the fibre collar of the Simmonds Nut. Simmonds have learned the virtues and limitations of Stop Nuts in the only school that matters—the school of experience; ten solid years of it. In that time 90% of Stop Nuts used in British Industry have been supplied by Simmonds. We don't need to tell you that all we know, all we have learned is at your service. And you can be sure of an unbiased opinion because we design and make both types of nut; and—in our modest way—have no doubt at all that we make the best of both.



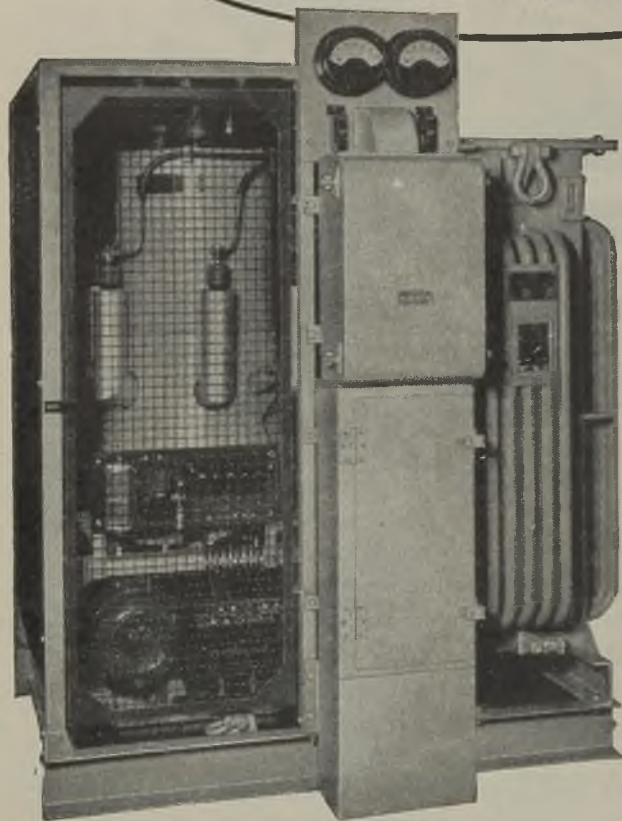
SIMMONDS STOP NUTS



Simmonds Aeroaccessories Limited · Great West Road · London · A Company of the Simmonds Group

G.E.C.

PUMPLESS AIR-COOLED RECTIFIER EQUIPMENTS



***A
complete
rectifier
sub-station
of unit
construction***

—comprising a
rectifier, transformer
and switchgear on

one base to provide a D.C. supply wherever it is wanted. The unit can be put down in a corner of a yard, works or other convenient place and connected directly to an A.C. supply.

SIMPLE, QUICK AND INEXPENSIVE ERECTION AND INSTALLATION

The Rectifier is completely screened.

WRITE for illustrated Technical Description No. 353

CLASSIFIED ADVERTISEMENTS

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

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

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

Original testimonials should not be sent with applications for employment.

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.

ROYAL BOROUGH OF KINGSTON-UPON-THAMES

TENDERS are invited for the supply and delivery of one Power-propelled and Operated Tower Waggon for street lighting purposes.

Tenders and all documents (which must be in plain sealed envelopes not bearing any name or mark indicating the sender), endorsed "Tender for Tower Waggon," must be delivered to the Borough Electrical Engineer, 17, High Street, Kingston-upon-Thames, from whom conditions of tender, specification and form of tender may be obtained.

Tenders must be delivered before noon on Monday, 30th September, 1946. No tender will be considered which does not comply with the above conditions and the Council does not bind itself to accept the lowest or any tender.

A. W. FORSDIKE,
Town Clerk.
Kingston-upon-Thames.
August, 1946.

2174

BOROUGH OF CHESTERFIELD ELECTRICITY DEPARTMENT

TENDERS are invited for the supply and delivery at sites within the Borough of Chesterfield of High Voltage and Medium Voltage Cables.

Specifications and forms of tender may be obtained upon application to W. W. Grimes, A.M.I.Mech.E., A.M.I.E.E., M.Inst.F., Engineer and Manager, Chesterfield Corporation Electricity Department, 172, Chatsworth Road, Chesterfield, and must be delivered to the undersigned in plain sealed envelopes not later than 10 a.m. on Thursday, 12th September, 1946, endorsed "Tender for Cable."

RICHARD CLEGG,
Town Clerk.
Chesterfield. 2180

BOROUGH OF CHESTERFIELD ELECTRICITY DEPARTMENT

TENDERS are invited for the supply and delivery at substation sites within the Borough of Chesterfield of seven (7) 250-kVA O.N. Type Outdoor Distribution Transformers for use on the 6.6 kV system.

Specifications and forms of tender may be obtained upon application to W. W. Grimes, A.M.I.Mech.E., A.M.I.E.E., M.Inst.F., Engineer and Manager, Chesterfield Corporation Electricity Department, 172, Chatsworth Road, Chesterfield, and must be delivered to the undersigned in plain sealed envelopes not later than 10 a.m. on Thursday, 12th September, 1946, endorsed "Tenders for Transformers."

RICHARD CLEGG,
Town Clerk.
Chesterfield. 2181

LLANDRINDOD WELLS U.D.C. ELECTRICITY DEPT.

THE Council invite tenders for the supply and delivery of one Indoor 400-kVA Transformer, together with H.T. and L.T. Substation Switchgear. Specification and form of tender may be obtained from Mr. C. C. Wilde, A.M.I.E.E., Engineer and Manager, Town Hall, Llandrindod Wells.

Tenders, in plain sealed envelopes, endorsed "Tender for Substation Plant," must be received by the undersigned not later than Saturday, 7th September, 1946. The Council do not bind themselves to accept the lowest or any tender.

W. EMLYN JONES,
Clerk of the Council.
Town Hall.
Llandrindod Wells.
16th August, 1946. 2231

SITUATIONS VACANT

BOROUGH OF BRIGHOUSE ELECTRICITY DEPT.

E.M.T. Plumber Joiner

APPLICATIONS are invited for the above position from Plumber Joiners experienced on cables up to 11 kV.

Conditions of service and rates of pay will be in accordance with the J.I.C. Schedule (No. 2 Area). The present rate is 2s. 4½d. per hour.

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

Applications, stating age and experience and accompanied by copies of two recent testimonials, should be received by the Electrical Engineer, Huddersfield Road, Brighouse, not later than Monday, the 2nd September, 1946.

Canvassing, directly or indirectly, is prohibited, and candidates should state in their application whether, to their knowledge, they are related to any member of, or the holder of any senior office under, the Council.

ERNEST H. CLEGG,
Town Clerk.
Brighouse. 2201

EAST DEREHAM URBAN DISTRICT COUNCIL ELECTRICITY DEPARTMENT

Maintenance Electrician

APPLICATIONS are invited for the above post at a wage in accordance with the National Joint Industrial Council for the Electricity Supply Industry, No. 8 Area, Zone B, at present 27.7d. per hour for a 47-hour week.

Applicants must have had practical experience in all classes of installations, industrial and domestic. Preference will be given to persons having similar experience with a supply authority. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the selected applicant will be required to pass a medical examination.

Applications, giving full particulars of age, experience and training, and accompanied by copies of recent testimonials, should be sent to the undersigned not later than the 31st August, 1946.

F. JACKSON,
Engineer and Manager.
Assembly Rooms.
East Dereham, Norfolk. 9448

BOROUGH OF KING'S LYNN ELECTRICITY DEPARTMENT

Appointment of Mains Superintendent Without Charge of Substations

APPLICATIONS are invited for the above appointment in accordance with the National Joint Board Schedule of Salaries and Conditions, Grade 4, Class E, commencing £558 per annum.

The appointment will be subject to the Local Government Superannuation Act, 1937, and to the passing of a medical examination by the Council's Medical Officer.

Applications, stating age, whether married or single, present position and duties, with particulars of technical training and past experience, endorsed "Mains Superintendent," should be delivered to the undersigned not later than Monday, 9th September, 1946. Corporate Membership of the I.E.E. will be an additional qualification.

FRANK G. REEVES,
Town Clerk.
King's Lynn. 2208

BOROUGH OF LEYTON ELECTRICITY DEPT.**Appointment of Mains Assistant**

APPPLICATIONS are invited for the position of Mains Assistant. Applicants must have had considerable experience of modern transmission and distribution systems and the erection and maintenance of substation equipment, including glass bulb rectifiers. Candidates should be Corporate Members or Graduates of the Institution of Electrical Engineers, or possess equivalent qualifications.

The salary and conditions of the Institution of Electrical Engineers, or possess equivalent qualifications. The salary and conditions of employment will be in accordance with the National Joint Board Schedule, Class F, Grade 8 or 8a, according to qualifications and experience. At the present rate of growth of load the undertaking is likely to transfer to Class G in the near future. The appointment is subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to satisfy the Council's Medical Officer of Health as to his medical fitness.

Applications, stating age, qualifications and experience, accompanied by copies of three recent testimonials, enclosed in a plain envelope endorsed "Mains Assistant," must be delivered to the Borough Electrical Engineer and Manager, Electricity Offices, Cathall Road, Leytonstone, E.11, not later than the 28th August, 1946. Canvassing, directly or indirectly, will be deemed a disqualification.

D. J. OSBORNE,

Town Hall, Leyton, E.10.
9th August, 1946.Town Clerk.
2057**ERITH CORPORATION ELECTRICITY
UNDERTAKING****Appointment of Chief Electrical Engineer and Manager**

APPPLICATIONS are invited from suitably qualified persons for the above appointment. The salary, in accordance with the Agreement dated 9th July, 1941, made between the National Joint Council for Local Authorities and Chief Electrical Engineers, based on the output, is at present £1,324 per annum, but in pursuance of Clause 10 of this Agreement, 85% of this salary will be paid in the first year, 92½% in the second year, the full salary being payable in the third and subsequent years. A cost of living bonus will also be payable at the rate of 55% 16s., together with a car allowance of £100 per annum.

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

Applications, on a prescribed form which can be obtained from the Borough Electrical Engineer, Electricity House, 9-15, Pier Road, Erith, Kent, together with not more than three recent testimonials, should be delivered to the undersigned not later than 12 noon on Wednesday, August 28th, 1946. Envelopes should be endorsed "Chief Electrical Engineer and Manager." Canvassing of members of the Council or Council's staff is strictly forbidden, and will cause disqualification.

J. A. CROMPTON,

Council Offices, Erith, Kent.
August, 1946.Town Clerk.
2079**METROPOLITAN BOROUGH OF WOOLWICH
ELECTRICITY DEPARTMENT****Appointment of Showroom Assistant**

A vacancy arises for the position of Showroom Assistant (Male) in the Electricity Department. Candidates, who should be over 21 years of age, should have had previous experience in electrical showrooms, be of good appearance and able to interview consumers.

The salary applicable is £160 per annum, plus £20 weighting for London, plus war bonus at the age of 21, rising to £300, plus £30 weighting, plus war bonus at the age of 30.

The appointment is subject to the provisions of the Local Government Superannuation Act, 1937, and the selected candidate will be required to pass a medical examination prior to appointment. Applications in candidate's own handwriting, stating age, qualifications and experience, together with not more than three recent testimonials, should be addressed to the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, and received not later than Saturday, 7th September, 1946. Canvassing members of the Council, either directly or indirectly, will be a disqualification.

DAVID JENKINS,

Woolwich, S.E.18.
29th July, 1946.Town Clerk.
2167**BOROUGH OF ERITH ELECTRICITY UNDERTAKING**

APPPLICATIONS are invited for the following appointments:-

(1) **ASSISTANT MAINS SUPERINTENDENT.** Candidates should have had a sound technical training, together with practical experience on the installation and operation of E.H.T. and L.T. underground distribution systems and equipment. Corporate or Graduate Membership of the Institution of Electrical Engineers or equivalent technical qualification is essential. The salary will be in accordance with the N.J.B. Schedule, Grade 5, Class G, plus 5% London area (at present £601 13s. rising to £634 4s.).

(2) **SUBSTATION CHARGE ENGINEER.** Candidates are required to have had suitable technical training and experience to carry out the duties of Substation Charge Engineer at the Walnut Tree Road Transforming Station. The salary will be in accordance with the N.J.B. Schedule, Grade 8B, Class G, plus 5% London area (at present £428 6s. rising to £443 2s.).

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

Applications on the appropriate form, which may be obtained from the Borough Electrical Engineer & Manager, Electricity House, Erith, Kent, must be returned by Monday, 2nd September, 1946. Canvassing, either directly or indirectly, will cause disqualification.

J. A. CROMPTON,

Council Offices, Erith, Kent.
August, 1946.Town Clerk.
2078**METROPOLITAN BOROUGH OF WOOLWICH
ELECTRICITY DEPARTMENT****Appointment of Testing Assistant**

APPPLICATIONS are invited for the position of Testing Assistant in the Meter Section of the Electricity Department. Candidates should be Graduate Members of the I.E.E., or hold equal qualifications, must have sound technical experience and should be thoroughly conversant with the construction of single and polyphase metering equipment and the operation of polyphase testing equipment. Previous experience in a type "A" testing station of a large electricity undertaking is essential.

The salary will be in accordance with Grade 9, Class J, of the National Joint Board Schedule, at present commencing at £446 5s. per annum.

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

Applications, stating age, qualifications and experience, together with not more than three recent testimonials, should be addressed to the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, and received not later than Saturday, 7th September, 1946. Canvassing members of the Council, either directly or indirectly, will be a disqualification.

DAVID JENKINS,

Woolwich, S.E.18.
29th July, 1946.Town Clerk.
2169**BOROUGH OF LUTON ELECTRICITY
UNDERTAKING****Appointment of Assistant Station Superintendent**

APPPLICATIONS are invited for the above position from persons with sound technical and practical training and experience in the operation and maintenance of a modern power station operating under the direction of the Central Electricity Board. Preference will be given to applicants under 40 years of age and who are Corporate Members of either the Institution of Electrical or Mechanical Engineers.

The salary and conditions of service will be in accordance with Class G, Grade 5, of the National Joint Board Schedule, which at the present time is £573, rising to £604 per annum.

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

Applications, giving age, details of training and experience, and accompanied by copies of two recent testimonials, must be delivered not later than Monday, September 9th, 1946, to C. T. Melling, M.Sc.Tech., M.I.E.E., M.I.Mech.E., Borough Electrical Engineer, Electricity Offices, St. Mary's Road, Luton. Canvassing, directly or indirectly, will be disqualify.

W. H. ROBINSON,

Town Hall, Luton.
14th August, 1946.Town Clerk.
2189

CITY OF CARDIFF ELECTRICITY DEPARTMENT

Appointment of Assistant Sales Engineer

APPPLICATIONS are invited for the position of Assistant Sales Engineer at a salary in accordance with Grade 8, Class J, of the N.J.B. Schedule (at present £521 p.a.).

The successful applicant must be a Corporate Member of the Institution of Electrical Engineers or possess equivalent qualifications, and have had experience in development of the use of electricity for all purposes, together with a thorough knowledge of showroom management.

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

Applications, endorsed "Assistant Sales Engineer," stating age, training, qualifications, full details of experience and accompanied by copies of not more than three recent testimonials, should be addressed to Edward Jones, M.I.E.E., M.I.Mech.E., City Electrical Engineer and Manager, The Hayes, Cardiff, to reach him not later than Monday, 2nd September, 1946.

S. TAPPER JONES,

City Hall, Cardiff.

Town Clerk.

14th August, 1946.

2199

TURTON URBAN DISTRICT COUNCIL

Mains Assistant

APPPLICATIONS are invited for the above position from engineers with the necessary qualifications. Practical experience in E.H.T. and L.T. overhead line work, underground distribution and substations, including erection, maintenance, fault location, control and organization of labour, and to carry out other duties as may be assigned to him by the Electrical Engineer and Manager. Minimum technical qualification Higher National Certificate. Salary in accordance with the Schedule of the National Joint Board Schedule Class A, Grade 8b, rising to Grade 8a, after 12 months' satisfactory service. The appointment will be subject to the provision of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination. Applications stating age, training, and experience, together with copies of two recent testimonials and endorsed "Mains Assistant" should be forwarded to the undersigned not later than 31st August, 1946.

ALBAN BALDWIN,

Clerk to the Council.

Council Offices,

Bromley Cross, Bolton.

2181

MILFORD HAVEN URBAN DISTRICT COUNCIL
ELECTRICITY UNDERTAKING

Appointment of Distribution Assistant

APPPLICATIONS are invited for the above appointment. The selected applicant will be engaged on the construction, maintenance and operation of rural and urban overhead and underground systems up to 11 kV. Mains records experience essential. Extension and change-over programmes are in hand.

The salary will be in accordance with the N.J.B. Schedule, Class B, Grade 7 (at present £368, rising to £379 per annum).

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

Applications, stating age, qualifications and experience, accompanied by not more than three testimonials, must be delivered to the undersigned by not later than September 9th, 1946.

A. J. DALTON,

Electrical Engineer and Manager.

Town Hall,

Milford Haven.

2154

SURREY COUNTY COUNCIL EDUCATION
COMMITTEE

Kingston Technical College, Kingston Hall Road,
Kingston-upon-Thames

REQUIRED to commence duties as soon as possible, Maintenance Engineer for Workshops and Engineering Laboratories at Kingston Technical College. Applicants must be skilled engineers with mechanical and/or electrical engineering training. Salary £6 8s. a week. Apply immediately in writing to the Principal.

2175

BOROUGH OF LEYTON ELECTRICITY DEPT.

Appointment of Electrical Fitter

APPPLICATIONS are invited for the position of Electrical Fitter. The rate of pay will be in accordance with the Schedule of the District Council (No. 10) London Area, Electricity Supply Industry, which at the present time is 2s. per hour, plus war bonus of 8d. per hour. Forty-seven hours will constitute a normal week of work.

Applicants should have had experience in the manufacture, erection and maintenance of E.H.T. switchgear.

The appointment is subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to satisfy the Council's Medical Officer of Health as to his medical fitness.

Applications, in candidate's own handwriting, stating age, experience, and when able to take up duties, accompanied by copies of two recent testimonials, to be sent to the Borough Electrical Engineer and Manager, Electricity Offices, Cathall Road, Leytonstone, E.11, not later than the first post on Saturday, the 31st August, 1946. Canvassing, directly or indirectly, will be deemed a disqualification.

D. J. OSBORNE,

Town Hall, Leyton, E.10.

Town Clerk.

August, 1946.

2159

CROWN AGENTS FOR THE COLONIES

Colonial Government Appointments

APPPLICATIONS from qualified candidates are invited for the following post:—

Technical Instructor in Electrical Engineering required by the Nigerian Government Education Department for a tour of 18 to 24 months in the first instance with prospect of permanency. Commencing salary according to age, experience or war service in the scale of £400, rising to £720 a year. On a salary of £400 there is a local allowance of £60 a year, and for married men a separation allowance of between £84 and £204 a year, according to number of dependants. Outfit allowance £60. Free passages and quarters. Candidates, not over 40 years of age, must have served an apprenticeship as an electrical engineer, be experienced tradesmen, have had experience in training apprentices, and should preferably hold the City and Guilds of London Institute's First Class Certificate in Electrical Engineering Practice or equivalent qualification. Some teaching experience an advantage. Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting M/N/16884 on both letter and envelope.

CITY OF MANCHESTER ELECTRICITY DEPT.

APPPLICATIONS are invited for the position of Assistant Chemist at Barton Power Station. Candidates must have had experience in general analysis, and hold the Higher National Certificate in Chemistry or equivalent.

Salary in accordance with Class K, Grade 10a (£357 p.a. to commence).

The appointment will be subject to the City Council Superannuation Scheme, and the successful candidate will be required to pass a medical examination.

Applications, giving full particulars of age, technical training and experience, together with copies of recent testimonials, must be endorsed "Assistant Chemist," and addressed to the Chief Engineer and Manager, Electricity Department, Town Hall, Manchester, 2, not later than 10 a.m. on Monday, 16th September, 1946. Canvassing, directly or indirectly, will disqualify.

PHILIP B. DINGLE,

Town Hall, Manchester, 2.

Town Clerk.

August, 1946.

2160

CENTRAL SUSSEX ELECTRICITY LTD. AND
ASSOCIATED COMPANIES

Appointment of Clerical Assistant

APPPLICATIONS are invited for the above Appointment at a commencing salary of £375 per annum including War Bonus.

Applicants must have had considerable experience in purchase and order routine associated with engineering materials, preferably in the Electricity Supply Industry Pension Scheme. Full details should be submitted to the undersigned.

H. DIXON, M.I.E.E.,

Electra House, Church Road,

Engineer and Manager.

Haywards Heath, Sussex.

2128

BRIERFIELD URBAN DISTRICT COUNCIL ELECTRICITY DEPARTMENT

Appointment of Technical Assistant and Draughtsman

APPPLICATIONS are invited for the above post from candidates who have a sound technical education, Graduateship I.E.E., or equivalent, and workshop and drawing office experience.

The salary and conditions of service would be in accordance with the N.J.B. Schedule, Class A, Grade 8, at present £337 per annum.

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

Applications, endorsed "Technical Assistant and Draughtsman," stating age, qualifications, particulars of training and experience, together with copies of recent testimonials, are to be delivered to the undersigned not later than midday, Saturday, 31st August, 1946.

L. G. ASTON, A.M.I.E.E.

Electrical Engineer and Manager.

Electricity House, Colne Road,

Brierfield, Lancs.

10th August, 1946.

2172

METROPOLITAN BOROUGH OF FULHAM ELECTRICITY DEPARTMENT

THE Council invites applications from candidates under 35 years of age for the following positions at the commencing salaries stated:-

Charge Engineer, Class L, Grade 8, of the National

Joint Board Schedule, £624 15s. per annum.

Electrical Tester, Class L, Grade 9a, £468 6s. per

annum.

Assistant Instrument Engineer, Class L, Grade 10b,

£374 17s. per annum.

Assistant Contract Engineers (three), Class G, Grade

9a, £360 3s. per annum.

Forms of application and general conditions of the appointments may be obtained on sending stamped addressed foolscap envelope to me.

Completed applications must be despatched to reach me not later than 12 noon on Monday, 16th September, 1946.

CYRIL F. THATCHER.

Town Hall, Fulham, S.W.6.

Town Clerk

August, 1946.

2227

BOROUGH OF FULHAM ELECTRICITY DEPT.

THE Council invites applications from candidates not over 40 years of age for the following positions:-

Structural & Engineering Draughtsman, salary minimum £4 per week (age 21 years) to £10 per week, dependent upon age and qualifications, plus cost of living bonus.

Mechanical Draughtsman, ditto.

Architectural Draughtsman, ditto.

Electrical Draughtsman, ditto, but maximum of 9s

per week.

Form of application and general conditions of the appointments may be had on sending stamped addressed foolscap envelope to me.

Completed applications must be posted to reach me not later than 12 noon on Monday, 16th September, 1946.

CYRIL F. THATCHER.

Town Hall, Fulham, S.W.6.

Town Clerk.

August, 1946.

2228

ELECTRICITY SUPPLY BOARD (EIRE)

Vacancy for Telephone Engineer

THE Electricity Supply Board invites applications for an engineer to take charge of maintenance work on carrier telephones and telemetering equipment associated with the Board's high-tension system. Applicants should preferably have knowledge and experience of carrier equipment and automatic exchanges.

It is desirable that applicants should be graduates of a University or Corporate Members of a recognised Institution but applicants having especially suitable experience or qualifications will also be considered.

The commencing salary will depend on the qualifications and experience of the selected applicant and the maximum of the scale will range from £500 to £800 per annum.

Applications, which must include date of birth, particulars of technical qualifications and experience, should reach the undersigned not later than Monday, 2nd September, 1946.

PATRICK J. DEMPSEY,

Secretary.

Electricity Supply Board,

62, Upper Mount St., Dublin.

8th August, 1946.

2113

CITY OF MANCHESTER ELECTRICITY DEPT.

APPPLICATIONS are invited for the following appointments on the staff of the Electricity Department:-

ONE SHIFT CHARGE ENGINEER at Stuart Street Power Station. Salary in accordance with Class J, Grade 7, of the N.J.B. Schedule (£563 p.a. to commence).

ONE ASSISTANT SHIFT CHARGE ENGINEER at Barton Power Station. Salary in accordance with Class K, Grade 8b, of the N.J.B. Schedule (£487 p.a. to commence).

Candidates must have served a workshop apprenticeship and have at least the Higher National Certificate in Electrical or Mechanical Engineering. Training and experience in boiler operation essential. Age limit, 40 years.

The appointments will be subject to the City Council Superannuation Scheme, and the successful candidates will be required to pass a medical examination.

Applications, giving full particulars of age, technical training and experience, together with copies of recent testimonials, must be endorsed "Shift Charge Engineer" or "Assistant Shift Charge Engineer" and addressed to the Chairman of the Electricity Committee, Town Hall, Manchester, 2, not later than 10 a.m. on Monday, 9th September, 1946. Canvassing, directly or indirectly, will disqualify.

PHILIP B. DINGLE.

Town Hall, Manchester, 2.

Town Clerk.

August, 1946.

2156

COUNTY BOROUGH OF BOLTON

Appointment of Deputy Borough Electrical Engineer and Manager

APPPLICATIONS are invited for the position of Deputy Borough Electrical Engineer and Manager from engineers who are Corporate Members of the Institution of Electrical Engineers and who have had considerable experience in the operation of a selected generating station and in the administration, distribution and commercial work of an Electricity Supply Undertaking.

The salary and conditions will be in accordance with Grade 1, Class H of the N.J.B. Schedule, at a basic salary of £818 per annum for the first two years, £843 for the third and fourth years and £867 for succeeding years.

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

Forms of application may be obtained from the Engineer and Manager, Back o' th' Bank Generating Station, Bolton, and when completed must be returned to the undersigned in envelopes endorsed "Deputy Borough Electrical Engineer" not later than 5th September, 1946.

Canvassing will be a disqualification.

PHILIP S. RENNISON, Town Clerk.

Town Hall, Bolton.

2146

METROPOLITAN BOROUGH OF WOOLWICH ELECTRICITY DEPARTMENT

Appointment of Lady Cookery Demonstrator

A vacancy arises for the position of a Lady Cookery Demonstrator at the Electricity Showrooms, Electric House, Powis Street, Woolwich. Candidates, who should hold the E.A.W. Certificate, or Diploma, should not be less than 21 years of age, and have had experience in demonstrating cooking by electricity.

The salary will be in accordance with the National Joint Council for Local Authorities' Administrative, Professional, Technical and Clerical Services, General Division (Female), which is, at the age of 21, £120 per annum, plus £16 weighting for London, plus war bonus, rising to £240 per annum, plus £24 weighting, plus bonus, at the age of 30.

The appointment is subject to the provisions of the Local Government Superannuation Act, 1937, and the selected candidate will be required to pass a medical examination prior to appointment. Applications, stating age, qualifications and experience, together with not more than three recent testimonials, should be addressed to the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, and received not later than Saturday, 7th September, 1946. Canvassing members of the Council, either directly or indirectly, will be a disqualification.

DAVID JENKINS.

Woolwich, S.E.18.

29th July, 1946.

Town Clerk.

2168

BOROUGH OF BECKENHAM ELECTRICITY DEPT.**Appointment of Charge Engineer**

APPPLICATIONS are invited for the position of Charge Engineer. Candidates should have had experience in boiler house control, operation of steam-raising plant and switchboard work.

The salary will be in accordance with the National Joint Board Schedule, at present Class D, Grade 8.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination by the Medical Officer of Health or an independent medical referee appointed by the Council.

Applications must be made on the prescribed form which is obtainable from the Borough Electrical Engineer and Manager at the Town Hall, Beckenham. The completed form to be enclosed in an endorsed envelope and to be addressed and delivered to the Borough Electrical Engineer's office not later than twelve noon on Thursday, 5th September, 1946. Canvassing in any form will disqualify.

C. ERIC STADDON.

Town Clerk.

Town Hall,

Beckenham, Kent.

16th August, 1946.

2226

**COUNTY BOROUGH OF HUDDERSFIELD
ELECTRICITY DEPARTMENT****Appointment of Switchboard Attendant**

APPPLICATIONS are invited for the position of Switchboard Attendant at the St. Andrew's Road Generating Station of the Huddersfield Corporation at a salary in accordance with the National Joint Board Scale, Class G, Grade 9a, now £343/358. The station should be transferred to Class H early in 1947.

Applicants should have had experience in the operation of large power station plant together with E.H.T. switchgear and Central Electricity Board grid supplies.

Applications, stating age, qualifications, practical and technical experience, and accompanied by at least two copies of recent testimonials, should be submitted.

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

Applications should be forwarded to the undersigned not later than the 2nd September, 1946, and enclosed in a sealed envelope endorsed "Switchboard Attendant."

F. A. ELLIS, M.I.Mech.E., M.I.E.E., M.I.F.E.

Borough Electrical Engineer and Manager.

Market Street, Huddersfield.

2218

BORD NA MONA

BORD na Mona invites applications for posts on its technical staff as follows:

(a) Fully qualified Electrical Engineer with experience in design, construction and erection-supervision of Overhead Distribution Networks, both high and low tension (highest voltage 10,000 v.).

(b) Fully qualified Electrical Engineer with experience in the design and construction of small substations and with some electrical manufacturing experience.

(c) Electrical Draughtsman experienced in the lay-out of Substations and Overhead Line Gear. Some mechanical experience is desirable.

The salaries which will attach to these posts will be commensurate with the qualifications and experience of the successful candidates. In the case of (a) and (b) above, the initial salary will be not less than £500 per annum.

Applications giving full details of qualifications and experience should be addressed to the Secretary, Bord na Mona, 21, Fitzwilliam Square, Dublin, and must be received not later than 2nd September, 1946.

Note.—Bord na Mona is a Statutory Corporation entrusted with the development of the Irish peat industry.

2122

ARMATURE Winders and Improvers required. A.C. and D.C., top rates, good working conditions.—Electrical Power Repairs (Gillingham) Ltd., Strover Street, Gillingham, Kent. 9365

BUYER for electrical mfg. co., must be energetic and capable of maintaining first-class chasing system. Permanent progressive position. State age, salary, and include testimonials.—Box 2137, c/o The Electrical Review.

CORPORATION OF BRISTOL ELECTRICITY DEPT.**Junior Engineers**

CONSEQUENT upon promotions and expansion, there are a number of vacancies in several branches of the Undertaking for Junior Electrical and Mechanical Engineers.

Applications are invited from men having a good general education and theoretical qualifications admitting to Graduate Membership of the Institution of Electrical or Mechanical Engineers, preferably between 25 and 30 years of age. Allowance will be made for interrupted training in the case of applicants who have served in H.M. Forces. Facilities for study for these examinations are available in Bristol.

Appointments will be made generally in accordance with N.J.B. conditions at appropriate commencing salaries within the range £350 to £550, and subject to the Local Government Superannuation Act, 1937, and to the Corporation's resolutions.

Applications, stating age, education, theoretical qualifications, apprenticeship and subsequent experience, should be submitted by 2nd September, 1946.

E. C. WILLIS,

General Manager.

Dorset House,

Clifton Down, Bristol, 8.

2082

BOROUGH OF WATFORD ELECTRICITY DEPT.**Mains Assistant**

APPPLICATIONS are invited for the above position with salary and conditions in accordance with Grade 8b, Class H (plus 5% London Area), of the National Joint Board Schedule, also a car allowance. Candidates must have had a good technical education and experience in general mains work, including operation of E.H.T. and L.T. switchgear, laying and jointing L.T. cables, testing and connecting in substations and kiosks. Corporate or Graduate Membership of the Institution of Electrical Engineers is desirable.

The successful applicant will be required to pass a medical examination, as the appointment will be subject to the provisions of the Local Government and Other Officers Superannuation Acts, 1922-1937. Applications, stating full details of experience, age and qualifications, together with copies of not more than three recent testimonials, must be submitted to the undersigned not later than 4th September, 1946, endorsed "Mains Assistant."

A. W. BARHAM,

Chief Engineer and General Manager.

Electricity House,

The Parade, Watford.

2206

APPPLICATIONS are invited for temporary appointments as Mechanical and Electrical Engineering Assistants in the Directorate General of Works of the Air Ministry in London and the provinces, at an inclusive salary up to £398 per annum, according to qualifications and experience. Candidates, who must have had sound engineering training and experience, should be capable of preparing simple finished designs with schedules of quantities for the following types of work at Royal Air Force Stations and Establishments: (1) Illumination of Buildings, (2) internal wiring of buildings, (3) electrical plans for H.V. and M.V. distribution, including sizing of conductors, and, under the guidance of an engineer, of preparing drawings of more complicated work of this type, together with layouts of plant and machinery. Ability to keep drawing office records and plant details is essential, and a knowledge of hot water and compressed air installations will be an advantage. Applications to be addressed to: Ministry of Labour and National Service, Hanway House, Red Lion Square, W.C.1 (Room 220). 2157

BBRITISH Electrical and Allied Industries Research Association. Electricity Supply Research. The Electrical Research Association requires one or two Technical Assistants for research into problems of electricity distribution, e.g., load characteristics of consumers and groups of consumers, determination of costs of supply, etc. Salary £350-£450 exclusive of cost-of-living bonus (Whitley Council) and superannuation (F.S.S.U.), according to qualifications and experience. Candidates should have some practical experience in electricity supply. Applications should be made to the Director, E.R.A., 15, Savoy Street, London, W.C.2. 2232

CHIEF Planning Engineer required for factory in London, experience in precision light engineering essential, in meter production desirable, age 35/45, salary £650.—Box 2203, c/o The Electrical Review.

CHIEF Progress Engineer required by firm of electric motor manufacturers, London dist. State experience and salary required.—Box 2084, c/o The Electrical Review.

CIVIL Service Commission. The Civil Service Commissioners announce that a special competition will be held for appointments as Probationary Assistant Engineer (Male) in the Engineering Department of the Post Office. Approximately 80 vacancies will be filled by competitive interviews spread over a period of two or three years. Every candidate must normally have passed an examination qualifying for an Honours degree in engineering or possess qualifications equivalent in the opinion of the Civil Service Commissioners, but exception to this rule will be made in special cases, for details of which candidates should consult the regulations governing the competition. Candidates must have been born on or after 2nd March, 1915, and have attained the age of 20 by the 1st January of the year in which they compete. Allowances will be made for service in H.M. Forces prior to 3rd September, 1939, or as Assistant Traffic Superintendent in the Post Office, the latter allowance being subject to a maximum of five years. The starting pay for men in London will range from £533 to £541 per annum, according to age, rising to £665 per annum by annual increments. There will be prospects of promotion to higher grades. Candidates now serving in H.M. Forces must send in their application forms in time to reach the Civil Service Commission not later than four months after the completion of their service. All other candidates must send them in by 1st October, 1946. (Service candidates may apply without regard to the date of their release in Class A). Copies of the regulations and forms of application may be obtained from the Secretary, Civil Service Commission, Burlington Gardens, London, W.1, or from the Chief Officer, Civil Service Commission, at the following addresses: Quoting No. 1501, (India) 10, Underhill Lane, Delhi. (Egypt) 9, Sharia El Birgas, Cairo. (Italy) c/o Headquarters, No. 3 District, C.M.F. (Germany) c/o 2nd Echelon, G.H.Q., B.A.O.R. 2158

CONTRACTS Engineer required by cable makers to supervise power cable distribution contracts. Must have had considerable experience in super tension cable installation work, and be familiar with the operation of high voltage portable testing equipment. Salary £450 to £500 p.a., plus allowances. Write, stating age and particulars of experience, to—Box L5978, A.K. Advg., 2123, Shaftesbury Avenue, W.C.2.

CONTROL Gear Manufacturers, near London, require young engineers for estimating and technical work.—Box 9458, c/o The Electrical Review.

DEPARTMENTAL Superintendent required by progressive North London Company to develop and expand the final assembly of domestic electrical appliances. Liberal salary to suitable applicant with energy and determination.—Box 2234, c/o The Electrical Review.

DESIGNER required, experienced in work on telephone cable accessories. Responsible and progressive post. Apply, stating full particulars, to—Staff Officer, British Insulated Callender's Cables Ltd., Prescot, Lancs. 2161

DRAUGHTSMEN (Electrical and Jig and Tool); One Senior Electrical Draughtsman accustomed to design of motors up to 5 h.p. and one Jig and Tool Designer-Draughtsman. Salaries according to qualifications and experience, progressive posts. Full particulars to—Personnel Manager, Small Electric Motors Ltd., Churchfields Road, Beckenham, Kent. 1991

ELECTRIC Junction Boxes. Manager possessing first-class design and works organization experience required to take control of electric junction box department. Excellent opening and permanent position for suitable candidate. Applications, which will be treated in strictest confidence, should state age, experience and salary expected, and should be addressed to—Managing Director, Scottish Cables Ltd., Redreth, Scotland. 2202

ELECTRIC Motor Repairs, Winding, etc. Foreman required for small repair shop, London district. Partnership basis could be considered.—Box 2233, c/o The Electrical Review.

ELECTRICAL Engineer required for North East Coast iron and steel works. Must be experienced in maintenance and/or production of heavy electric equipment; should also be capable of planning for development of plant. Apply, stating age, experience, technical qualifications and salary required, to—Box 2214, c/o The Electrical Review.

ELECTRICAL Engineer to take charge of relay linesmen. Preferably with knowledge of relay amplifiers and public address equipment. Excellent opportunity for energetic and progressive man in the Durham County area.—Box 2205, c/o The Electrical Review.

ELECTRICIAN. Must be good at power and used to automatic control. Also Armature Winder for repair shop.—Boys Ltd., 187, Goswell Road, E.C.1. 2060

ELECTRICAL Fitters required for general overhaul work on all types of electrical plant for large repair shop in London area. Only men with previous experience need apply. E.T.U. rates and conditions. Write, stating age, experience, to—Box 2030, c/o The Electrical Review.

ELECTRICIAN (Working) for electrical maintenance contracts on all classes of A.C. and D.C. industrial motor installations in London area. Only men with previous experience on automatic control gear, lifts and similar equipment need apply. Permanency and good wages and conditions to selected applicant. Write, stating age and experience, to—Box 1987, c/o The Electrical Review.

ELECTRICIANS and Mates wanted for work in London and the Home Counties. Apply—Bective Electrical Co. Ltd., 36, Davies Street, London, W.1. 2223

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

ESTIMATING Electrical Engineer, able to prepare own schemes for all classes of electrical installations, including distribution. Permanent progressive position. Full details of experience and salary required to—R. J. Kemp & Co. Ltd., Coalville, Leicester. 9395

ESTIMATING Electrical Engineer required by leading London firm of electrical contractors. Write, stating age, experience in detail and salary expected.—Box D.63, Scripps, South Molton Street, W.1. 2177

ESTIMATORS required. Age 25 to 40, with experience in small electro-mechanical parts. Preference will be given to applicants with workshop experience and knowledge of finishing and assembly departments. West London area. Write, stating age, fullest details of experience and salary required, to—Box 2236, c/o The Electrical Review.

EXCEPTIONAL opportunity offered to capable Foreman Electrician by new company. Prospects of executive appointment for right man. Experience in supervising and estimating an advantage. Write, stating age and experience, to—Box 9457, c/o The Electrical Review.

EXPERIENCED Counter Salesman for wholesale electrical counter. Apply—Farmer, Stedall & Co., 145, St. John Street, E.C.1. 2185

EXPERIENCED Draughtsmen are required by large electrical firm in Midlands. Must be familiar with mechanical design and construction of medium and large A.C. and D.C. machines. Reply with full particulars to—Box 289, S. Serle Street, London, W.C.2. 1981

EXPORTERS of electrical goods and machinery require experienced Secretary, male or female. Write, stating experience and salary required.—Box 394, Reynolds, 41, Chancery Lane, London, W.C.2. 2197

FIRM in London area require several Senior Draughtsmen for their transformer dept. Experience on large high-voltage units an advantage but not essential. Very good salary and excellent prospects to suitable men. State age and experience.—Box 2032, c/o The Electrical Review.

FOREMAN Armature Winder and two extra Winders.—Box 1992, c/o The Electrical Review.

FOREMEN, Heavy Electrical Power, for factories in the Isle of Wight, Hove and Preston areas, experienced and capable of taking complete charge for augmented supplies, 400 kVA and upwards.—Box 9380, c/o The Electrical Review.

INTERESTING position offered to enterprising young Draughtsman in industrial design section of leading electrical manufacturers in London, engaged in development of domestic appliances, fluorescent lighting fittings. Write, stating age, experience and salary required, to—Box No. A. B. 196, c/o 5, New Bridge Street, London, E.C.4. 2163

LEADING domestic appliance manufacturers urgently require commission only Representatives covering the following counties: Bedfordshire, Essex, Huntingdonshire, Cambridgeshire, Norfolk and Suffolk. Full particulars to—Box 2182, c/o The Electrical Review.

LEADING Draughtsman, electric motors and centrifugal pumps. Thorough understanding of drawing office system and its relation to works. Experience of motors or pumps preferred. Birmingham district. Full details to—Box 2196, c/o The Electrical Review.

MAN aged 20 to 25 years, with R.Sc. (Engineering) or Higher National Certificate in Electrical Engineering required for investigation and testing of high voltage power cables and accessories. Salary £900 to £400 according to qualifications.—Apply Staff Officer, British Insulated Callender's Cables Ltd., Belvedere, Kent, quoting Ref. SR/3. 2121

MAN. Under 30, with B.Sc. in Physics or Engineering or Higher National Certificate in Electrical Engineering, with specialised knowledge of electronics, required for investigation and test of power cables and accessories. Write, stating qualifications and salary required, to—Staff Officer, British Insulated Callender's Cables Ltd., Beldere, Kent. 2053

OVERHEAD Linesmen, experienced in construction and maintenance of E.H.T. and L.T. overhead lines, transformers and switchgear. D.J.I.C. conditions. Attractive rates offered. Apply in writing to—South Somerset & District Electricity Co. Ltd., East Street, Crewkerne, Som. 2183

PHYSICISTS (two), graduates, or with equivalent practical experience, required by South Beds manufacturers of domestic gas and electrical appliances to train for positions of responsibility in laboratory testing and production control. Salary £400 to £500 per annum, according to qualifications.—Box 2173, c/o The Electrical Review.

POWER Plant Superintendent required for large Birmingham industrial concern to take charge of operation and maintenance of back pressure turbines, large water tube boilers, auxiliary plant and steam services. Must be technically qualified (membership of Institution of Mechanical Engineers and/or Institute of Fuel desirable), and have had sound practical experience in order to operate and maintain plant at highest efficiency. A house is provided at nominal rent. Annual remuneration approx. £475.—Box 2033, c/o The Electrical Review.

PRODUCTION Manager required for London factory moving to Brighton. Thoroughly experienced with all stages of production, particularly low voltage lamps of all types, must be able to take full control. Please write full details of experience and salary required.—Box 2186, c/o The Electrical Review.

REPRESENTATIVES wanted with good connections, home and abroad, for new domestic combination oven. Also rotary switch.—Box 9431, c/o The Electrical Review.

REQUIRED for supervisory posts in Birmingham, Glasgow and Cardiff, Engineers to control small staff engaged on installation and maintenance of high grade electronic and light electro-mechanical equipment throughout branch office area. Applications invited from men with practical experience, sound electro-technical training, good education and personality. Salary approximately £550 per annum, plus car allowance and expenses. Two months' training given in London, with salary, plus living allowance by arrangement. Write full details, stating age, training, experience and when available.—Box 2083, c/o The Electrical Review.

REQUIRED for the Manchester district, Electrical Engineer with experience in preparing quotations for A.C. and D.C. motors, generators and appropriate control gear, etc. Knowledge of current B.S. specifications necessary. Write, giving full details of experience, age and salary required.—Box 2056, c/o The Electrical Review.

SALES Representative with experience required for large manufacturer for north-west area, specialising in electric cookers, water heaters, kindred appliances.—Box 2184, c/o The Electrical Review.

SANTON Ltd. invite applications for the position of Chief Designer. Applicants should have had extensive experience in the design of light electrical equipment and drawing office administration. The possession of academic qualifications equivalent to A.M.I.E.E. is essential. The position includes responsibility for the design of bakelite mouldings, die castings, hot and cold pressings, stampings, etc., together with jigs, tools and gauges, for light press work. The post is pensionable under the firm's superannuation scheme. The salary offered will be commensurate with applicant's experience and qualifications. Replies will be treated in the strictest confidence, and should be addressed to—Works Director, Santon Ltd., Somerton Works, Newport, Mon. 2187

SECRETARY—Accountant, male or female, for electrical mfg. co., employing 200/250, capable and energetic. Permanent progressive position to suitable applicant. State age, salary and include testimonials.—Box 2135, c/o The Electrical Review.

SENIOR Draughtsman, pref. experienced electrical industry, for small drawing office firm supplying insulation components. Able handle jig and fixture drawings and some plant.—Box 2072, c/o The Electrical Review.

STATION Engineer capable of designing, erecting and running 500-kVA steam generating station in Devonshire. Permanent position. Write—Wilson, Branscombe, Highweek, Newton Abbot, Devon. 2162

STOREKEEPER, able to control despatches, required for electric lamp factory in Wimbledon. Steady berth for the right man with initiative. Apply, stating age, experience and salary required, to—Box 2204, c/o The Electrical Review.

STOREKEEPER for electrical mfg. co., must be competent to take complete charge and maintain records. Permanent progressive position. State age, salary and include particulars of previous positions.—Box 2136, c/o The Electrical Review.

SURVEYORS and Engineers with field experience of H.V. and L.V. overhead lines required by firm of electrical contractors for work in Scotland. Good wages and prospects for energetic men. Write, giving full details of experience, age, etc., with copies of testimonials, and state when free, to—Box 2170, c/o The Electrical Review.

THE Salcombe Gas & Electricity Co. Ltd., Jointer/Linesman required immediately, D.J.I.C. conditions, No. 12 Area, single man essential. Applications, giving age and experience, to be addressed to—"Silverlands," 37, Alexandra Road, Epsom, Surrey. No interviews except by appointment. 2209

TYPIST—Clerk wanted (age 20-30), able to take charge branch office. Must have some electrical experience. State salary and experience. Apply—Aerialite Ltd., 91/93, Baker Street, London, W.1. 9440

URGENTLY required, Electrical Testers with experience of testing A.C. and D.C. machines, also transformers. Applicants should possess technical knowledge equivalent to Ordinary National Certificate. Apply, stating age, experience and details of technical training, to—Superintendent, Personnel Dept., British Thomson-Houston Co. Ltd., Rugby. 2063

WANTED by cable company, for contract North of England, Plumber-Jointer with first-class experience in E.H.T. and L.T. work. Give full particulars of experience, age, and copies of recent testimonials.—Box 9430, c/o The Electrical Review.

WELL—established firm of sign manufacturers have a vacancy in their Neon Dept. for an Assistant Estimator. Applicants should be capable of interviewing clients and supervising installation and maintenance work. Permanent and progressive post for suitable man. Apply, stating experience, age and salary required, to—Box 2036, c/o The Electrical Review.

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

APPOINTMENTS FILLED

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

BOX 9373—Electrical Engineer; T. Clarke & Co. Ltd.—Supervising Engineer. All applicants are thanked.

SITUATIONS WANTED

A capable Electrical Engineer with exceptionally wide experience covering all phases of A.C. and D.C. motor construction, application and installation, estimating and labour control, seeks situation where originality and organizing ability have full scope.—Box 9356, c/o The Electrical Review.

A position with a future required by ex-Flight Lieutenant, experienced sales manager and buyer in the electrical trade.—Box 9438, c/o The Electrical Review.

A young man, 31, ex-R.E.M.E., secondary education, seeks situation. Four years' pre-war managerial position; good commercial knowledge with technical background (radio and electrical). Progress and stores experience. Has designed practical production and stock control system for small and varied assemblies giving advantages of mass production methods. This system can be adapted for large or small organizations. Will accept moderate initial salary for progressive post. Has no illusions about present conditions. Good references.—Box 9425, c/o The Electrical Review.

A CCOUNTANT seeks position. Experienced in all books of account and preparation of final figures, management, staff control, costings, statistics, general correspondence and all office routine.—Box 9394, c/o The Electrical Review.

A SSISTANT Chief Ratefixer and Time Study Engineer, mass production chokes to 45,000 kVA, transformers, f.h.p. motors to 50,000 kW, turbo-alternators, cores, windings, assembly, fitting, etc., costing, estimating, latest time methods and procedure, present position last 10 years, after apprenticeship and practical experience, age 37, seeks change, chief or managerial.—Box 9399, c/o The Electrical Review.

ACCOUNTANT'S Secretary, 37, 14 years' experience electricity supply industry, England and abroad. requires position with progressive concern.—Box 9439, c/o The Electrical Review.

ADVERTISER (32) seeks position as Technical Sales Representative. Administrative and technical experience in manufacture, design, production, costing, etc., of small motors and associated equipment.—Box 9404, c/o The Electrical Review.

BRISTOL. Has any employer a vacancy in Bristol or district for a reliable, intelligent engineer, 20 years' experience electrical and radio maintenance, sales and service. Present income £440. Change necessary in order to live at home.—Box 9455, c/o The Electrical Review.

BUYER for all domestic appliances and electric fittings seeks change of post. Present employed as buyer for showrooms in London for large company, 12 years' experience. Ex-Army Staff Captain.—Box 9460, c/o The Electrical Review.

BUYER (35), varied industrial experience, keen and adaptable, seeks post South or South-Western Counties.—Box 9451, c/o The Electrical Review.

CABLE Foreman seeks progressive position, 20 years' experience all types and processes of rubber cable manufacture.—Box 9414, c/o The Electrical Review.

CHARTERED Electrical Engineer (39), design, technical sales and consulting experience motors, control gear, transformers and instruments, invites enquiries re senior executive post, London area or Home Counties. Knowledge of marine, mining and industrial markets. Willing to undertake representation.—Box 9424, c/o The Electrical Review.

CHARTERED Electrical Engineer, 42, seeks post. experienced administration and installation of electrical and radio equipments.—Box 9423, c/o The Electrical Review.

CLERICAL or Storekeeper, over 20 yrs.' exp. trade. Ltg., htg., power, contracting and w'sale, inc. costing, buying, wages/rates, plus practical working exp. Age 36.—Box 9466, c/o The Electrical Review.

D.F.H. (Hons.), A.M.I.E.E., A.I.Mech.E., age 33, 4 years design, construction and maintenance H.T. and L.T. rural supply systems, 5½ years in Government research establishment on design of aerial rotation systems and other electro-mechanical problems in connection with Radar Stations; some radio research work, with experience in pulse and C.W. techniques, seeks permanent and progressive post, London area preferred.—Box 9408, c/o The Electrical Review.

ELECTRICAL Engineer, requiring change of employment, seeks progressive and responsible post, preferably in South or South-West England. Wide experience in installation and maintenance. Good worker.—Box 9435, c/o The Electrical Review.

ELECTRICAL Engineer seeks position, thoroughly qualified practical and technical, power and lighting A.C. and D.C. layouts, over 30 years' experience, highest testimonials, age 53, supervisory position preferred.—Box 9415, c/o The Electrical Review.

ELECTRICIAN, capable, long experience installation and maintenance, seeks advantageous change, S.W. London, N. Surrey areas.—Box 9464, c/o The Electrical Review.

ELECTRICIAN wants job anywhere, 30 yrs. in trade, all systems, charge or otherwise.—B. 13, South Vale. S.E.19. 9427

ELECTRICIAN, 25 years' experience industrial power installation and maintenance, erecting large motors, control, switchgear and equipment. Good refs.—Box 9465, c/o The Electrical Review.

ENGINEER, age 41, practical experience covers most aspects electricity supply work and organization. Specialised knowledge tariffs, measurements, relays, H.V. and general testing techniques applied over a wide field: A.M.I.E.E., versatile, adaptable, desires change, moderate salary.—Box 9426, c/o The Electrical Review.

ENGINEERING Executive, A.M.I.E.E., Int. A.M.I.P.E. (31), desires position as Works Manager in small or medium size progressive electrical company. Good technical and administrative experience.—Box 9353, c/o The Electrical Review.

EXPERIENCE counts. Estimating, supervising, specifications, schemes for complete installations, introduce new business, make contracts pay, good salesman, would represent good firm, age 48, own car, London or Home Counties.—Box 9429, c/o The Electrical Review.

FURTHER experience sought by Electrical Engineer, keen worker, Inter-B.Sc., Nat. Certificate, proceeding to Higher Nat. Two years laboratory testing exp. Good references. Testing preferred but not essential.—Phone Syd. 4576 or write, 71, Tansfield Road, S.E.26 9366

GENERAL Manager seeks an appointment with electrical engineering firm where wide knowledge of the electrical industry can be fruitfully employed. Works, commercial and sales experience gained at two of the largest organizations in the country. Products covered include motors, transformers, switchgear, bakelite accessories, lighting units, cables, electric cookers and domestic appliances generally. Capable organizer and staff controller.—Box 9433, c/o The Electrical Review.

GRAD.I.E.E. (26), ex-Armt. Q.M.S., R.E.M.E., 4 yrs. instructor electronics, servo-mechanisms, synchronous transmission, motors, power plants, installation. Electronics, U.S.A.; 18 months' tropical research, Nigeria. Capable, steady, ability to supervise. Seeks development work or sales. Salary £550-£600.—Box 9357, c/o The Electrical Review.

GRAD. I.E.E. (28), having Ordinary and H.N.C., at present in charge of small contracting firm, desires a more progressive post with large firm. Technical sales or installation preferred.—Box 9446, c/o The Electrical Review.

INDUSTRIAL, Electronic Designer seeks responsible post.—Box 9442, c/o The Electrical Review.

INSTALLATION Engineer, aged 29, desires situation in London or Essex, experienced estimating, supervising installations, costing and office management, 13 years' training and experience with power company, own car. Salary £400 per annum.—Box 9436, c/o The Electrical Review.

KEEN Electrical Engineer (21), disengaged Oct., desires progressive position; having H.N.C. and served an indentured apprenticeship.—Box 9444, c/o The Electrical Review.

KEEN young Engineer (28), disengaged Sept., desires progressive position. Six years' experience production and testing all types H.T. and power transformers, T.C.O.L., auxiliary gear, etc. Five years' mechanical experience boilers, prime movers, etc. N.E. Coast area preferred, but not essential.—Box 9352, c/o The Electrical Review.

LIVERPOOL district, Electrical Engineer with technical and extended commercial experience desires occupation with manufacturers, contractors or others. Experienced estimator; familiar with markets.—Box 9462, c/o The Electrical Review.

MAINTENANCE Electrician, disengaged, comprehensive knowledge all installations.—Box 9368, c/o The Electrical Review.

MANUFACTURERS' Agent desires to represent a Manufacturer, in the Midland Counties, a good long established connection in the wholesale electrical and radio trade, remuneration by commission, use own car.—Box 9410, c/o The Electrical Review.

NAVAL Officer (Electrical Branch), aged 32, desires situation of trust and responsibility. Over 5 years' Commissioned Service, 2 years teaching R.A.F. Electrical School. Released 30th September.—Box 9463, c/o The Electrical Review.

PATENT expert, age 36, electrical and radio degree standard, capable of directing new technical design, requires position in southern provinces.—Box 9449, c/o The Electrical Review.

SALES Manager, 26 yrs. formerly cont. agent, wide exp. tech. and pract., good correspondent, typist (own machine), whole or part time, London area. Nom. remuneration.—Box 9386, c/o The Electrical Review.

STOCK record, stores control, buying and general office experience, transformer manufacture with sound knowledge of component materials, aged 36, desires change.—Box 9413, c/o The Electrical Review.

STUDENT Electrical Engineer (20), Higher National, seeks wider experience. Electrical supply trade preferred, but other considered. Will be grateful to all interested.—Box 9461, c/o The Electrical Review.

SUPERVISING and Estimating Engineer (44) requires position with London firm catering for first-class work. Will take complete control of contracts and labour. Would consider consultants' assistant or engineer to multiple concern or property owners. Car.—Box 9349, c/o The Electrical Review.

SWITCHGEAR Engineer, B.Sc., 20 Years' technical and commercial experience, tenders and contracts, good connection, desires post with manufacturer or consultant.—Box 9406, c/o The Electrical Review.

TECHNICAL Sales, F.H.P. Motors. Young man (24), 9 years' experience small motors, seeks position, home or overseas.—Box 9393, c/o The Electrical Review.

WORKS Manager requires similar position London area, 25 yrs' production experience light electro-mechanical industry, radio, television, radar, domestic appliances. Efficient organizer and administrator. Excellent references.—Box 9379, c/o The Electrical Review.

AUCTION NOTICE

By direction of the Canadian Knights of Columbus War Services
"VERNON HOUSE," FARNHAM, SURREY

Important Auction Sale of
ELECTRICAL AND RADIO EQUIPMENT,
FURNITURE AND EFFECTS,

including

16 NEW ELECTRIC GENERATING SETS, Arc Welder, DRILLING MACHINE, LATHE and other electric tools; Fans, Heaters, Dynamometers, Voltmeters, Rotary Converters, Transformers, Accumulators, Wet and Dry Batteries, Spotlights and Floodlights.

26 PUBLIC ADDRESS SYSTEMS,

7 RADIO SYSTEMS,

Numerous Mains and Battery Radio Receivers and Components, Microphones, Slide Projectors, Steel Safes, Office Desks and Chairs, Portable Typewriter, 2 National Cash Registers, 38 Settees, 38 Easy Chairs, 70 Fireside Chairs, 225 Folding Chairs and Miscellaneous Effects.

to be sold by

GERMAN, ADDY & CO.

on the premises as above

on WEDNESDAY, 4th SEPTEMBER, 1946.

Catalogues (price 6d.) from the Auctioneers, German, Addy & Co., 110, West Street, Farnham (Phone No. 5283/4).

2153

FOR SALE

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

COUNTRY BOROUGH OF SUNDERLAND

Sale of Used Electrical Apparatus

TENDERS are invited for the purchase and removal from the Electricity Undertaking's Dunning Street Stores, Sunderland, of the following used time-switches and metering apparatus:-

945 Public Lighting Time-switches.

9 Voltage Transformers.

52 Current Transformers.

31 Power Meters.

162 Thermal Maximum Demand Indicators.

155 Single-phase, 220-volt Prepayment Meters.

39 Switchboard Indicating Instruments.

The apparatus is as removed from use and is for disposal as it lies.

The apparatus may be inspected by appointment and schedule of apparatus, forms of tender and further information required obtained from the Borough Electrical Engineer and General Manager, Electricity Offices, Dunning Street, Sunderland.

Tenders should be in sealed envelopes endorsed "Tender for Used Electrical Apparatus" and addressed to "The Town Clerk, Town Hall, Sunderland," and must be received by me not later than 10 a.m. on Friday, 13th September, 1946. The Corporation do not bind themselves to accept the highest or any tender.

G. S. MCINTIRE,

Town Hall, Sunderland,
20th August, 1946.

Town Clerk.
2155

URBAN DISTRICT COUNCIL OF COULSDON AND PURLEY

Lister Diesel Engine, etc.

THE Council has for disposal one Lister Diesel Engine, 9 h.p., 1,000 r.p.m., with D.C. Generator, 230 volts, 19.6 amps., complete with self-feeding oil container with valve and supply tank for wall fitting. Also switchboard and 30-amp. meter and 300-volt meter and voltage control. The engine is housed at the Council Offices, Purley, and can be inspected by appointment upon application to the Surveyor to the Council.

Sealed tenders, endorsed "Lister Diesel Engine," must be delivered to the undersigned not later than noon on Friday, 6th September, 1946.

The successful tenderer will be required to provide his own labour for taking out and removing the equipment, and to make good any consequential damage. The Council do not bind themselves to accept the highest or any tender.

ERIC F. J. FELIX,

Clerk of the Council.

Council Offices,
Brighton Road, Purley.
8th August, 1946.

2164

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

A number of Dynamos from 10-80 kW, 110 v. and 220 v., for belt drive or coupling of various descriptions available.—The Electroplant Co., Wembley, Middx. 2211

A C. and D.C. House Service Meters, all sizes, quarterly and prepayment, reconditioned, guaranteed one year. Repairs and recalibrations.—The Victa Electrical Co., 47, Battersea High Street, S.W.11. Tel. Battersea 0780. 19

A C. and D.C. Motors, all sizes, large stocks, fully guaranteed.—Milo Engineering Works, Milo Road, East Dulwich, S.E.22 (Forest Hill 2278-9). 9055

A C. Motors. 1/3rd Crompton Parkinsons, .78 amps., 1.435 rev., cont. rated s.e. Electrominor 1/3rd by L.S. & E., 400/3/50, 2,830 r.p.m., dated 1939. 1-h.p. Trident Scaler, 200, 2-ph., 50 cy., 1,500 r.p.m., open. 5-h.p. B.T.H. Flange Mounting, type K.V.2.3519, cont. rated, 400/440/3/50, 1430. Three 3-h.p. Electric Specialty, clip mounted, 400/3/50, a.c., 1450. D.C. Motors: 5-h.p. Metro-Vick, drip-proof, 1430, 220 v. 3-h.p. Metro-Vick, 13.2 amp. cont. rated, open protected, 300 r.p.m. 1-h.p. maker unknown, 1,440, open protected, 220 v. 2 h.p., cont. rated, shunt wound, 12.7 amps., 1,350, open protected, City Electric, 30-h.p. Metro-Vick., protected, cont. rated, 220 v., 960 r.p.m. 6-h.p. Metro-Vick., protected, cont. rated, 220 v., 960 r.p.m., shunt, 25.2 amps., pulley approx. 5" x 6". 10-h.p. Siemens, 500 v., shunt wound, open protected, type 120 GF, 1,100 rev. 10-h.p. Maudsley, shunt wound, cont. rated, 18.5 amps., 210 volt, 1,000, with starter and fuse box and 3-pin plug mounted over, 3-step vee pulley. 4-h.p. Crypto, 220 v., 1,530 revs., cont. rated, open protected, 20 amp., size 261. 13-h.p. E.C.C., 440 v., shunt wound, open protected, 875 revs. 30-h.p. E.C.C., 440 v., shunt wound, open protected, geared 480/680 revs. 30-h.p. Siemens, shunt wound, 220/240 v., speed 765 revs. at 230 volt, open, with starter.—Thos. W. Ward Limited, Brettenham House, Lancaster Place, London, W.C.2. 2091

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

A ERIAL Wire (covered), 50 ft. for 4d.—Hendon Distributors, 136, Hendon Way, N.W.2. 9445

A LMOST new Diesel Generating Set, 60 kW, 230 v. D.C., 1,500 r.p.m., on common bed, Fowler/B.T.H. 1941, cold start, latest type.—Box 2212, c/o The Electrical Review

A LTERNATING Diesel Set, 350 kW, 400/3/50, direct coupled; excellent condition; can be seen running. Complete.—Box 2213, c/o The Electrical Review.

A LTERNATING Sets, 80 kVA, 400/3/50, engine driven, direct coupled; 2 cold start Diesels (1944) and 2 semi-portable Petrol Sets, unused, all ex-Gov. surplus. Many others.—The Electroplant Co., Wembley, Middx. 2210

A PPROXIMATELY 130 unused 6.75-kW Meadows portable petrol driven Generating Sets with voltage regulators. Export enquiries invited.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 2220

A USINE 7 Van, 1934, new body just fitted, tyres and engine in very good condition, £120.—Middlesex Electron Co. Ltd., Molesey 3541. 9452

BATTERY Chargers for home and export, 4 models, 2.6-12 v., 1, 2 or 4 amp. D.C., any mains voltage. Generous trade terms. Write for catalogue.—The Banner Electric Co. Ltd., Hoddesdon, Herts. Tel.: Hoddesdon 2659. 97

BEEANTIE Festoon Striplight Holders, made of X20 Bakelite, for use with 7/022 T.T.R. cable, require no tools or screws for wiring. Immediate delivery of any quantity. Passed by the fire authorities. Used by corporations and supply companies all over the world. Large quantities of British made Electric Lamps and Cable always in stock.—The Beantee Illuminations (London) Ltd., Temporary Address, 6, Upper Street, Islington, London, N.1 (Phone, Canonbury 4555). 71

B.T.A. A comprehensive service is now available for all classes of tools and equipment for the accumulator trade.—B.T.A., 245 Cavendish Road, London, S.W.12. Tel.: Balham 6691/2. 92

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

COMPLETE Power Station Plant for sale, consisting of 4 B. & W. Boilers 30,000 evaporation, 250 lb. w.p.; 2 Turbos; 5,000 kW Pumps, Motors, etc. Erected or f.o.b.—Burford, Taylor & Co. Ltd., The Boiler Specialists, Middlesbrough. 85

CONTROL Panel for two Electric Furnaces, with switchgear, new, by Wilde-Barfield, fitted with Cambridge instruments and Watford switchgear.—W. H. Sugden Ltd., Glenny Road, Barking, Essex. 2040

CONDENSERS, 21, 38, 146 kVA, 3-phase, 50 cycles, for P.F. correction. 200-amp, 3-phase, B.B. Trunking and accessories. 1,000 gals. Switch Oil. L.C. and Armoured Cable, 12 to 3 sq. inch. 3 and 4 core. Oil-immersed Sw. Gear, 1,100 amp to 100 amp, A.C. Starters for Squirrel Cage Motors.—Midland Counties Electrical Engineering Co. Ltd., Grice Street, Spon Lane, West Bromwich. 66

COPPER Wire, enamelled, silk and cotton covered in different gauges, also a quantity of Eureka Wire. Several tons available from stock. Enquiries, stating exact requirements to—Box 2116, c/o The Electrical Review. 66

D.C. Electromotors, all half-hour rating: 4.5 h.p., 480 volts, 850 r.p.m.; 4 h.p., 440 volts, 800 r.p.m.; 3.75 h.p., 400 volts, 900 r.p.m.; 6 h.p. (Mawdsley), 400 volts, 1,000 r.p.m.—Boys Ltd., 187, Goswell Road, E.C.1. 2179

D.C. Motors, new, 200/230 volts, 1,400 r.p.m., 8 to 31½ h.p., also 110 volts, D.C., 21 h.p., several available with starters. Stewart Thomson & Sons (Lpool) Ltd., Fort Road, Scaforth, Liverpool, 21 (Telephone Number, Bottle 2697), or 28, Victoria Street, Westminster, London, S.W.1 (Telephone Number, Abbey 2101). 96

ELECTRIC Motor, ¾ h.p., 1,450 r.p.m., 400 v., 50 cycles, 3-phase, squirrel cage. Re-wound and completely reconditioned.—Box 2229, c/o The Electrical Review. 96

ELECTRIC Motors and Dynamos. We hold one of the largest stocks of new and secondhand motors. Second-hand machines are thoroughly overhauled. Inspection and tests can be made at our works. For sale or hire. Send your enquiries to—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, City Road, London, N.1 (Phone, 5512-3 Clerkenwell). 13

ELECTRIC Motors, etc. We supply all types and sizes, etc., of electrical machinery. Send your enquiries to—Be-Ec Engineering, 3, Retreat Close, Kenton, Middx. Wordsworth 4928. 42

ELECTRIC Motors, reconditioned as new, 400 v., 50 cy., 3-ph., 960 r.p.m. 2 15-h.p. Crompton Parkinson with auto transformer starters and ammeters. 12½-h.p. Crompton Parkinson with Allen West oil-immersed star delta starter and ammeter. 15-h.p. Crompton Parkinson. 14-h.p. Higgs, 710 r.p.m., with E.A.C. star delta starter.—Venn & Justin, 67/69, Redcliffe Hill, Bristol. Phone 25778. 2216

ELECTRIC Motors, 1/3 h.p., 3,000 r.p.m., D.C., 110 volts. Also 22 volts. Stock delivery, 26 each.—John Steel, Clyde Mills, Bingley, Yorks. 84

ELECTRIC Welding Plant, Engine and Electric, A.C. driven, 300 amps. output, complete with weather-proof covers.—Box 34, c/o The Electrical Review. 110

ELECTRICAL Box Signs. Large quantity in various sizes. Cheap.—Cooke, 1-2, Broadway Parade, West Drayton. Phone 2872. 2165

ELECTRICIANS. Wood Pattern Blocks for sale. All sizes to suit your requirements. Send P.C. for samples and prices.—Easiway Electrical Co., 68 Cross St., Gorton, Manchester 18. 2143

ELECTRICITY for Country House. Complete equipment for sale, including 20-h.p. Oil Engine, Electric Generator and Booster Set, Switchboard, Battery and Motors, 200 volts supply, in good running order. Inspection. Apply—Baily, Grundy & Barrett Ltd., Electrical Engineers, Cambridge. 9333

FLUORESCENT Chokes, 80 watt, wax filled, silent in operation. Prompt deliveries.—Micramatic Ltd., Meico Works, Congleton, Cheshire. 73

FLUORESCENT Fittings. Wholesalers can offer immediate and regular deliveries of Super Quality 5' Trough and Distributive Type Units, complete with all gear.—Box 2010, c/o The Electrical Review. 63

FLUORESCENT Lighting Fittings. Extensive range, including Trough and Flush type, fitted with "All in One" "Constead Unit." Delivery 7 days, with tubes. Write—Scenco Ltd., 6/7, Soho Street, London, W.1. Phone, GEC. 2034. 100

FOR immediate disposal, approximately 7,000 yds. 14/36 3-core Workshop Flexible.—Box 2178, c/o The Electrical Review. 63

FOR Sale, G.E.C. Telephone Switchboard, 50 lines, central battery type, 6-ord circuits. In good working order, £40. Apply to The Buyer, Taylor, Taylor & Hobson Limited, Stoughton Street, Leicester. 2224

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

INSTALLATION Tester, 500 v. Record Minor, £11. From stock—Robins Electrics, 222 & 222b, West End Lane, N.W.6. 83

JUNCTION Electric Irons, superior design and quality, supplied with suitable stand. Also Junction Nickel-plated Torch Cases. Supplied for home trade and export. Distributors—Brooks & Bohm Ltd., 90, Victoria Street, London, S.W.1. Tel. Vic. 9550. 49

KETTLE Elements, Mica Elements and Spiral all voltages, all wattages, highest quality, competitive prices. Enquiries to Irish Domestic Electrical Appliances Ltd., 34 South Frederick Street, Dublin, Eire. 76

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

LAMINATIONS, quantity stator and rotors for fractional h.p. motors.—Fosters, Ottways Avenue, Ashted, Surrey. 9428

LARGE quantity 25-s.w.g. Double Silk-covered Wire, recent manufacture and in perfect condition, also few gauges enamelled available. Instrument Rectifiers, 1 ma. and 5 ma., quantities.—Champion, 43, Uplands Way, London, N.21 (Lab. 4457). 9378

LARGE range of toasters, fans, portable and wall electric fires, radiators, convector heaters, floor standard and table lamps, electric irons (heat controlled and others), vacuum cleaners, hair dryers, novelty bowl fires, boiling rings, electric kettles, immersion heaters. (Radios very shortly available.) Large range of torch cases, cycle lamps and all types of lighting and H.T. batteries, etc. Detailed list and catalogues available. Place your orders in good time.—Brooks & Bohm Ltd., 90, Victoria Street, London, S.W.1. Phone, Victoria 9550/1441. Inland Telegrams, "Beebats, Sower, London." 65

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

MEGGER, 500 v., Evershed, perfect. Nearest offer £10.—Barker, 11, Warren Rd., London, W.2. 9432

MODERN Transformer by Elec. Cons. Co., 150 kVA, 3-ph., 50 cycles, 10 to 400 volts, 8.06 to 217 amps.—Acocks Green & Olton Laundry Ltd., Warwick Road, Birmingham, 27. 2176

MONOMARK. Permanent London address. Letters redirected. 5s. p.a. Write—BM/MON053, W.C.1. 68

MOTOR Generator Sets and Convertors, all sizes and voltages from ½ kW up to 500 kW in stock.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, City Road, London, N.1. Telephone, Clerkenwell 5512, 5513 & 5514. 110

NAMEPLATES, Engraving, Disinking, Stencils, Steel Punches.—Stillwell & Sons Ltd., 152, Far Gosford Street, Coventry. 31

ONE-ton Short Wheel Base Open Trucks by Guy, Morris, Ford, etc., new in 1941/43, ex M.O.S., all in excellent condition. New batteries, good tyres, rugged construction and will withstand considerable hard wear. Prices from £120 to £180.—Mathew Brothers, Matbro Works, Sandy Lane North, Wallington. Phone, Wallington 4050. 1699

PACKING Cases, all sizes and descriptions, for home and export trade; also S/h Cardboard Cartons, all sizes.—L. Goldser & Sons, 14a, Rectory Sq., London, E.1. Phone, Stepney Green 2550. 75

PHONE 98 Staines. 90-kW Ruston Diesel Set, 110 v. D.C.; 25-kVA Mirlees ditto, 110 v.; 7/9-kW Ruston ditto, 110 v.; 5-kVA Ruston ditto, 400/1/50; Weir Feed Pump, 8½" x 6" x 13".—Harry H. Gardam & Co. Ltd., Staines. 60

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

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

REBUILD 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 0895). 28

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

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

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

SECONDHAND D.C. Motors, ring oil bearings, from 1 h.p. to 60 h.p., 220 to 500 volts, in good running order. Prices according to size and condition. Can be inspected at—Cox & Danks Ltd., Plant & Machinery Dept., Faggs Road, Feltham, Middx. 2047

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

SPIRALS, first quality, 500, 600, 750 and 100 watt, all voltages, for immediate delivery.—Box 59, c/o The Electrical Review.

STAFF Time Checking and Job Costing Time Recorders (all makes) for quick cash sale. Exceptional condition. Write—Box 528, Smiths, 100, Fleet Street, London, E.C.4. 31

STREAM Generating Plant. The following is a selection of sets available in our comprehensive stock: 2,000 kW B.T.H. Turbo-Alternator, 6,600/3/50, 180/210-lbs. pressure, complete with surface condenser and all auxiliaries, seen running. 1,250-kW Brush Ljungstrom Turbo-Alternator, 400/3/50, 200-lbs. pressure, complete with surface condenser and all auxiliaries, seen running. 750-kW Adamson/Mather & Platt High-pressure Pass-out Turbo-Generator, 200-lbs. initial steam pressure, passing out 25,000 lbs. per hour at 80-lbs. pressure, 600 volts, three-wire D.C., with balancer, complete with surface condenser and all auxiliaries. First-class condition. Full particulars from—Stewart Thompson & Sons (Liverpool) Ltd., Fort Road, Seaford, Liverpool, 21 (Tele. No. Booth 2697); or 28, Victoria Street, Westminster, London, S.W.1 (Tele. No. Abbey 2101). 98

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

TANKS for Fuel Oil Storage. 150 New Pressed Steel Sectional Enclosed Tanks, each 8' x 8' x 8', formed of plates 4' square, supplied loose, together with necessary bolts, nuts and jointing material; specially suitable for erecting in awkward positions; capacity 3,200 gallons each. 100 Welded Steel Dittos, 7' x 5' x 5', first class, secondhand; capacity 1,100 gallons each.—George Cohen, Sons & Co. Ltd., Quadrant Street, Canning Town, London, E.1. 2192

TR.S. Government Surplus Cables, 7/044, 7/064 and 7/064 Henley P.V.C. coils up to 600 yards offered below half price. Lists available.—Electrical Agencies (Belfast) Ltd., 32, College Street, Belfast. 9388

Two plating sets fitted with 440/3/50 motors direct coupled to generators, 600 amps, 10 volts. Also large number of plating and anodising generators for the most part unused. Send requirements to Fyfe, Wilson & Co. Ltd., Bishop's Stortford, Tel. R. S. 1000/1. 2221

USED Double Flanged Bobbins, good condition, 2,000 gross approx. Measurements 37" overall, 32" traverse, 3" diameter flange. Will sell all or part.—Joseph Harari, 42, Whithurst Street, Manchester. 99

VACUUM Cleaner Parts. Hoses, braided, all diameters. Commutators, bearings, fans, carbon brushes, driving belts, brushes, attachments and fittings for all makes. Wholesale only.—Vacuum Cleaner Supplies, 543, Moseley Road, Birmingham. 12 80

WATER Tube Boilers in stock. Two 25,000 lbs. evap., 250 lbs. W.P.; One 25,000 lbs. evap., 175 lbs. W.P.; Two 20,000 lbs. evap., 175 lbs. W.P.; Two 16,000 lbs. evap., 190 lbs. W.P.; One 12,000 lbs. evap., 200 lbs. W.P.; One 9/10,000 lbs. evap., 200 lbs. W.P. 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.—Burdord, Taylor & Co. Ltd., Boiler Specialists, Middlesbrough (Telephone, Middlesbrough 2622). 32

1-h.p. Motors for immediate delivery, 200-220 and 4 230-250 volts, 50 cycles, split phase, sleeve bearing, automatic thermal protection, starting torque 225%. £8 15s. each in lots of 6 or more.—Box 9422, c/o The Electrical Review.

1 2-h.p., 400-v., 3-phase, 50-cycles, slip-ring, 690-r.p.m. Fuller MKA13 Motor, less slide rails, pulley and starter. What offers?—A. S. Howarth Ltd., 41, Toad Lane, Rochdale. Tel. 4057. 2215

2 Motor Generator Sets, 400 volts, 3-phase, 50 cycles, generators 50 volts, 250 amps. D.C., with control panels. Can be seen running at—James Gibbons Ltd., Church Lane, Wolverhampton. 2198

3 Cambridge 6-point Temperature Recorders up to 1,200 deg. C.; 3 C. 03 Recorders by Cambridge Instrument Co.; Murex 22.5-h.p. Arc Welding Sets, 440 volts, 3-ph., 50 cycles, 50, 150, 400 and 450 amps.; Murex 8.5-h.p. ditto, 50, 100 and 150 amps.; 2-ton Herbert Morris Electric Lifting Blocks, 400 volts, 3-phase, 50 cycles, for 6' joist; Six 1-h.p. English Electric Geared Motors, 1,440 to 350 r.p.m., 400 volts, 3-phase, 50 cycles; Eight 1-h.p. Sturtevant Geared Motors, 1,440 to 61 r.p.m., 440 volts, 3-phase, 50 cycles; Ten 1½-h.p. Double Worm Reduction Gears, 1,440 to 65 r.p.m.; Croft's gears, English Electric motor, 440 volts, 3-phase, 50 cycles; Two 23-kW Diesel Generating Sets, 220 volts D.C.; Two Mather & Platt 1½" Centrifugal Pumps, 30 galls. per min. to 64 ft. head, with 23-h.p. E.E.C. Motor, 440 volts, 3-phase, 50 cycles, 1,420 r.p.m.—Reed Brothers (Engineering) Ltd., Bevis Marks House, London, E.C.3. Phone, Avenue 1901/4. 2017

5-kW and 24-kW, 230/250-volt D.C. Generating Sets, complete with 4-cylinder, 10-h.p. Austin Engines, with petrol tanks, radiators, fans and switchboards. Large number available.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 103

5 to 20 kW D.C. and A.C. Petrol & Diesel Generating Sets, some packed for shipment.—Box 87, c/o The Electrical Review.

10 lbs. of 46-s.w.g. Double-wound Silk Copper Wire, 30s. per lb.—Stewart Thompson & Sons (L'pool) Ltd., Gladstone Works, Fort Rd., Liverpool 21 (Booth 2697-8). 2065

60 kW Generator, 220/250 volts, 800 revs., by Brush Electrical Co.—W. H. Sugden, Glenny Rd., Barking, Essex. 2039

100 kVA, 3-phase Hackbridge Transformer, type 'ON,' with corrugated steel tank and terminals on cover, ratio 5,500/440 volts or 400 volts, with plus and minus 3% and 6% tapplings. Apply—A. S. Wilkin Ltd., Cremona Park, Newcastle-on-Tyne, 7. 2188

100 unused 4-h.p. B.T.H. 119-volt D.C. Motors, comp. wound, 1,425 revs.—Electric Machinery Co., Union Works, Ancoats, Manchester, or 28, Victoria Street, London, S.W.1. 95

135-amp., 460-v., Compound Interpole Protected Generator by Crompton, 950 r.p.m., pulley 17" x 9", 65-amp., 460-v. Ditto by B. E. White, 750 r.p.m., pulley 11½" x 8", 65-amp., 460-v. Ditto by D. & M., oil ring bearings. 200-amp., 500-v. Ditto by Crompton, oil ring bearings, half coupling.—Thos. W. Ward Limited, Brettenham House, Lancaster Place, Strand, London, W.C.2. Phone, Temple Bar 9631. 2090

230-volt A.C. Portable Generating Set, in perfect working order, may be seen any time. Offers—R. T. Challenger Ltd., Eccleshell Garage, Stone Road, Eccleshell, Staffs. 2194

250-kW Rotary Converters (2), with transformers and switchgear, input 6,600 volts, 3-phase, 50 cycles, output 420/210 volts; also A.C. and D.C. Motors, Switchgear, Generating Sets, Welders, etc.—Midland Counties Electrical Engineering Co. Ltd., Grice Street, Spon Lane, West Bromwich. 36

290-h.p. D.C. Motor by G.E.C., 500 volts, 750 r.p.m., 230-h.p. D.C. Motor by Lanc. Dynamo Co., 400 volts, 500 r.p.m., with Ignic automatic starter; 30-h.p. D.C. Motor by G.E.C., 500 volts, 630 r.p.m., ball bearings and starter.—Reed Brothers (Engineering) Ltd., Bevis Marks House, London, E.C.3. 1883

600-amp., 8/12-volt Plating Set, motorised 400/3/50, unused, complete with starter and voltage regulator.—Electric Machinery Co., Union Street, New Islington, Manchester. 41

600-w. Spiral Elements, 230 v., ex stock, surplus from order, 54d. ea. Sold in 1,000 lots. Electric Heating Pads, 15" x 18", 30s. each wholesale.—Middlesex Electric Co. Ltd. Molesey 3541. 9454

ARTICLES WANTED

ACETATE and other thermoplastic scrap; polythene and P.V.C. in any form; also scrap cable and insulated wire; urgently wanted.—Elton Levy & Co. Ltd., 18, St. Thomas Street, S.E.1.

ELEMENTS for kettles and cupolas, contractor desires contact with suppliers. Write—Box 9456, c/o The Electrical Review.

ENGINEERING Export Merchants urgently require to contact actual manufacturers of Domestic Electric Appliances able to give reasonable delivery Kettles, Irons, Toasters, Fires, Saucepans, Immersion Heaters, etc.—Box 2207, c/o The Electrical Review.

ENGINEERING Technical Books (new or secondhand) wanted in any quantity. Attractive cash offers. Call—Third floor, 356, Oxford Street, W.1, or "Stoneleigh," St. George's Avenue, Weybridge. 62

FLUORESCENT Lamps, 5ft., urgently required, any quantity, retail prices paid. Collected London area.—Box 2100, c/o The Electrical Review.

MOTOR Generator Set. Motor 440 volts, 3-phase, 50 cycles. Generator approx. 140 volts, 300 amps. shunt wound. Direct coupled on baseplate, starter and control gear. Give details and price.—Tungstone Products Ltd., Market Harborough, Leics. 2219

MOTORS required, 1,500 r.p.m., 3-phase, 400/440 volts, 50 cycles. Fifteen 1 h.p., twelve 1½ h.p., six 2 h.p., one 3 h.p., one 10 h.p. Particulars to—J. W. Squire Limited, 169, Humblestone Road, Leicester. 2225

NEW or secondhand 1.5-h.p. Motor, 400/440 volt, 3-phase, 50 period, 1,450 r.p.m., 1" dia. spindle.—Fit Ltd., Harpenden, Herts. 2191

ONE 1-h.p., one 1½-h.p., 220-v. D.C. Motors; one 2-h.p., three 5-h.p., 440-v. D.C. Motors.—Gwalia Relay Service, Holton Road, Barry, Glam. 9364

REQUIRED: Mica Electric Iron Elements; Toaster Elements; Suitals, nichrome wire; Cotton-covered Flexes; Brass, Copper and Steel Sheets, min. size 9" x 6"; Alu. Strip, 8" x 1/4"; Machinery, new and used; Timber; Glazing; Rubber Grommets; Asbestos; Switches; Iron Connectors, etc., etc. Offers to—British Diamix Ltd., Metrum Works, Beatty Street, N.W.1. Euston 5951. 44

THERMOCONTROLS (small) wanted for electric hot-pads and blankets for export. Immediate delivery and forward contract.—Box 9322, c/o The Electrical Review.

TUBULAR Heating. A quantity of secondhand 230-v. required. Thermostats if possible. State lengths and prices to—The Mettoy Co. Ltd., Northampton (Phone 9396) 3520.

WANTED. D.C. and A.C. ball-bearing Motors. Full details to—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 29

WANTED, Rotary Converters, any size.—Universal, 221, City Road, London, E.C.1. 22

WANTED to purchase for immediate use, 200-kVA, 6,600/400 and 230-v. Transformer with tapplings 2½ and 5% up and down. Particulars to—Weston-super-Mare & District Electrical Supply Co. Ltd., 20, Waterloo Street, Weston-super-Mare. 2166

WANTED, 400/350 Squirrel Cage Motors, 3 h.p. (3), at 720 r.p.m.; 7½ h.p. at 720 r.p.m.; 10 h.p. at 960 r.p.m. New or good secondhand.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 2222

1-h.p., 230-v. A.C. or D.C. Motor.—Universal Electrical, 221, City Road, London, E.C.1. 25

1 10-h.p., shunt wound, 420-volt D.C. Motor, 500 r.p.m. to 1,000 r.p.m., controlled by Shunt Regulator, also required. 2 10-h.p. Compound D.C. Motors, 1,000 r.p.m., 230 volt. 1 8-h.p. Compound D.C. Motor, 230 volt, 1,000 r.p.m. All small frame size. 2 1-h.p. Brook Motors, 500-volt, 400 volt, 3-phase, 50 cycles s.c. 1 10-h.p., 500-volt, 1-phase, 50-cycles, 1,500 r.p.m. Motor.—Box 2190, c/o The Electrical Review.

10-h.p., 400-v., 3-phase, 50 p., squirrel cage or slip ring induction, 2-speed Motor, 960 r.p.m. and 1,440 r.p.m. To give an effective 10 h.p. at 960 r.p.m.—Box 2235, c/o The Electrical Review.

40/50-h.p. D.C. Motors, 440 v., 750 revs., also smaller sizes, ball bearings; also several 2-phase motors, 2/10 h.p.—W. H. Sugden, Glenny Rd., Barking. 2042

1,000 Motors from 1-w. h. to 10 h.p., 400/350. Send particulars.—W. H. Sugden Ltd., Glenny Rd., Barking. Rippleway 3302. 2041

20,000 ft. 1" Screwed Conduit, light or heavy, galvanized or enamelled. Required at once in small or large quantities. Building licence available.—Middlesex Electron Co. Ltd. Molesey 3541. 9453

WORK WANTED AND OFFERED

ALL makes and kinds of Electrical and Radio Instruments repaired by skilled technicians, A.I.D. approved. Over 60,000 instruments repaired for R.A.F. All work quoted by return without charge.—C. Gertler, Dept. A, 29-31, Crosswell Street, E.C.1 (Cle. 6783). 9193

BRISCOE Plating Co. Ltd. now have available capacity for Silver and Nickel Plating, in which we are specialists. Enquiries invited to—3.5, Maddox Street, London, W.1. 2012

Coil winding capacity (50 S.W.G. to 22 S.W.G.) now available due to completion of war-time contracts. Small power transformers, chokes (including fluorescent lighting), field coils, etc., accurately wound to specification or specially designed to meet your requirements. Accuracy guaranteed and regular deliveries maintained.—Box 9434, c/o The Electrical Review.

Coil Winding.—I.O.G. Industries Ltd., 476, High Road, Leytonstone, London, E.11. Telephone, Leytonstone 3877. 2105

ELECTRIC Motor Repairs. We specialise in the re-winding and repair of fractional h.p. motors, induction, repulsion and capacitor for refrigerators, washing machines, etc. Also D.C. Good deliveries at reasonable prices.—The Johnson Engineering Company, 319, Kensington Road, London, S.E.11. RELIANCE 1412/3. 89

DRAWINGS and Tracings prepared from models or sketches. Electrical, radio and light mechanical engineering.—Box 9447, c/o The Electrical Review.

ENGINEERS, Precision, South England, seek manufacture of electrical, mechanical or domestic assemblies or components. Press tools, gauges, small stampings, capstan turning, also Internal and External Grinding. Write—Box 74, c/o The Electrical Review.

HIGH Vacuum Equipment. Hard glass mercury diffusion pumps, traps, manifolds, gauges supplied. Apparatus designed and built to specification.—Box 9441, c/o The Electrical Review.

MACHINING Work, for Centre Lathes up to 64 in. centres and medium-sized milling (good grade work preferred).—The London Electric Firm, Croydon. Up-lands 4871. 56

NICKEL and Chrome Plating, large capacity output. Bulk quantity inquiries invited. Send full requirements and, if possible, samples to—I.E.I. (N.I.) Ltd., Lower Lodge Factory, Flax Street, Belfast, Northern Ireland. 82

PAINT and Metal Spraying. Large capacity available for efficient and prompt handling of all goods sent for treatment. Enquiries to Sales Dept., C.S. Ltd., Staffa Works, Staffa Road, Leyton, E.10. 2237

REWINDS: 1/10 to 10 h.p., Armatures, Stators and Rotors. All types of redesigning done. All work guaranteed.—Zephir Appliance Co., 89, Hoe Street, Walthamstow, E.17. Lar. 6005. 9326

TRANSFORMERS, 5 VA/5 kVA, coil winding, light assembly, immediate deliveries.—The Transformer & Electrical Co. Ltd., Eastern Road, London, E.17. 61

WINDING. All types of stators, rotors, armatures rewound and repaired. 1-phase and 3-phase, ½ to 10 h.p. All work guaranteed.—Bright Bros. 50, Orford Road, Walthamstow. 9411

AGENCIES

AGENCIES required by Rex Lighting & Radio Co. at 246a, King Street, Hammersmith, W.6. Tel. Nos. Riverside 2283-4. New showrooms offer excellent opportunity to display first-class domestic, electrical and radio products of every description. 2195

AGENCIES required for London, South of England, for the following: (1) Domestic electrical appliances; (2) Brass electrical accessories, switch plugs, etc.; (3) Conduit. Advertisers have clientele with every wholesaler in the territory mentioned. Immediate turnover can be guaranteed. Either commission or buying basis. Post-war arrangements considered.—Box 64, c/o The Electrical Review.

AGENCIES required, South of England, including the London area: (a) Cables; (b) Small Switchgear; (c) Transformers; or any lines suitable for distribution for wholesalers' business.—Box 40, c/o The Electrical Review.

AGENTS wanted everywhere to sell direct to the retail trades. Electrical Floor Standards, Pendants and Shades. Would consider permanent agencies.—Box 9421, c/o The Electrical Review.

AUSTRALIAN firm wants agencies for Switches for Portable Electric Tools (Trigger Switches), Ball Bearings, Drill Chucks, ½-h.p. Motors, etc.—William P. Sher. 66, St. John Street, Prahran, S.1. Victoria. 9420

CENTURY old Merchant House desires Agency or offers for various markets. Cash F.O.B.—Box 9467, c/o The Electrical Review.

CHILE. Well-connected firm seek agencies for British light elect. equipment. Orders waiting for Domestic Appliances and Pick-ups.—Box 9443, c/o The Electrical Review.

LARGE and progressive Wholesale Firm with substantial Home Trade and Export business dealing in all kinds of Household and Domestic Goods including Electrical appliances, lighting fittings, Hardware, Cutlery, Household Furnishings, etc., wish to contact Manufacturers of these lines. Orders placed for quantities. Please write—Box AC 11840, Samson Clarke, 57/61, Mortimer St., W.1. 2022

LIGHTING Fitting Manufacturers require Commission Agents for home trade. Car essential. State connection and references.—A.B. Electrical Fittings Ltd., 115, Stratford Road, Birmingham, 11. 9437

LIVE Electrical Wholesaler in process of developing South London and Southern Counties seeks suitable agencies for Electrical Domestic Appliances, Electrical Accessories of all types, Switchgear, Electric Lamps, etc.—Box 9385, c/o The Electrical Review.

MANUFACTURERS' Agents, covering the whole of Great Britain and Colonies, are desirous of contacting manufacturers with a view to sole selling rights (either commission or buying), post-war arrangements considered.—Box 23, c/o The Electrical Review.

MANUFACTURERS' Agent, well connected Midlands, desires to contact manufacturer reflector fires and other domestic appliances.—Box 9459, c/o The Electrical Review.

MANUFACTURERS' Agents, with offices London and South Coast, wish to hear of additional lines, including Cables and Domestic Appliances, for sale to corporations, wholesalers, retailers.—Box 9376, c/o The Electrical Review.

REPRESENTATIVE or Agent required for Lancashire for Cables, Transformers, Chokes; state terms; appointment will be arranged in Lancashire.—Box 2200, c/o The Electrical Review.

BUSINESS OPPORTUNITIES

ENGINEER, M.I.E.E., with exceptional influential wide connections and exclusive designs, desires to arrange an association with switchgear and instrument firms to mutual advantage.—Box 9450, c/o The Electrical Review.

PARTNERSHIPS

ENGINEER, resident abroad with established commercial connection overseas, would like to take substantial financial interest in established firm in Great Britain manufacturing Switchgear and Control Gear. Can guarantee regular monthly contracts for export. Cash against shipping documents.—Box 9381, c/o The Electrical Review.

PARTNERSHIP required, manufacture or wholesale, by M.I.E.E., M.I.Mech.E., age 52, administrative, commercial and technical experience. £4,000 available.—Box 9416, c/o The Electrical Review.

PATENT NOTICES

PATENT Agents.—A. E. Hill, Chartered Patent Agent, 27, Chancery Lane, London, W.C.2. Tele.: Chancery 8444. 65

MISCELLANEOUS

BATTERY Chargers Modernised. Your old Charger made like new by specialists. Conversion from valve to metal rectification. Send for interesting leaflet "Q.D." on this service.—Runkben Electrical Products, Manchester, 1. 45

EDUCATIONAL NOTICES

ENGINEERING Careers and Qualifications. Both Government and industry have announced and emphasised that young men with technical knowledge and qualifications must receive every chance of rising to the highest posts within their capacity in post-war engineering and allied industry. Write to-day for "The Engineer's Guide to Success"—200 courses—free—which gives particulars of the first-class training supplied by the T.I.G.B. for the A.M.I.E.E., A.M.Inst.C.E., A.M.I.Mech.E., A.F.R.Ae.S., A.M.I.P.E., B.Sc.(Eng.), C. & G., etc., examinations in which T.I.G.B. home-study students have gained 44 first places and over 1,000 passes. The Guide covers careers in all branches, Electrical, Mechanical, Radio, Aeronautical, etc.—The Technological Institute of Great Britain, 35, Temple Bar House, London, E.C.4. 77

LATEST A.M.I.E.E. Results. In the recent examinations held by the Institution of Electrical Engineers 477 candidates sat who had taken B.I.E.T. courses. Of these 457 were successful in passing the examinations. We believe this record of 457 successes out of 477 entrants has never before been approached by any oral or correspondence tutorial organisation, and indicates the very high efficiency of the modern system of technical training which we have laid down. The B.I.E.T. tutorial organisation is waiting to assist you either with a short specialist course or complete training for a recognised examination. We have available a large full-time staff of instructors, while the efficiency of our extensive organisation is a byword among engineers. We guarantee—"No pass—no fee." May we send a copy of "Engineering Opportunities"? Containing a great deal of useful advice and detailed information on over 200 home-study courses and examinations, this handbook is of very real value to the ambitious engineer. Our highly informative handbook will be sent free and without obligation on request.—British Institute of Engineering Technology (established 1927—over 200,000 students), 12, Shakespeare House, 17, 18 & 19, Stratford Place, Oxford Street, London, W.1. 33

PLASTICS offers particularly good prospects to experienced Engineers with a sound knowledge of Plastics Technology. Authoritative home-study courses are now available in General Plastics and specialised branches of the science. Full details of these courses and the prospects in the rapidly expanding Plastics industry will be found in our Handbook "Opportunities in Plastics"—sent free on request.—British Institute of Plastics Technology (Dept. 301), 17, Stratford Place, London, W.1. 1971

COMPANY MEETINGS

TELEPHONE MANUFACTURING

Increased Volume of Business

THE Annual General Meeting of the Telephone Manufacturing Co. Limited was held on 19th August in London. Mr. Fred T. Jackson, O.B.E., Comp.I.E.E. (Chairman and Managing Director), who presided, in the course of his speech said: Our gross profit on trading is £410,500 as against £373,000 for the corresponding period of last year, which reflects in part the increased volume of business which we carried out during the year under review and also the slightly better prices we obtained. The net profit on the year's operations is £272,500 against £217,700 for the previous year.

It is usual at the annual general meeting to endeavour to give shareholders some indication of the future trend of events as affecting their company. In present political circumstances it would be impossible to forecast the course of business for any considerable time ahead. The profits to be earned in 1946 will not be on the same level as in the past three years. There is no lack of orders for our main factory, but we are very short of female labour and certain materials.

Up to the present we have not been able to run many contracts on mass production lines without breakdown after breakdown through shortage of materials, necessitating the transfer of workers to other jobs, which has a detrimental effect on output. I feel strongly that shortages are caused by unnecessary controls and the abolition of free markets, with the result that bulk purchases are made by Civil Servants who can only have very slight knowledge of the commodity markets.

We have a Government largely made up of ideologists with little knowledge of industry. They continually discredit private enterprise and the profit motive and think nationalisation the panacea for all evils. This passion for nationalisation will end in disaster. A case might be made out for the coal industry, but not for the long list of industries to be nationalised. It is an axiom of all successful industrialists not to have more than one enterprise on the plate at one time, and when that is running on oiled wheels to take up the next project. I do not understand the mentality of the few business men who are willing to assist in this national calamity. Is it for personal kudos? If so, I would say: Life is short, but our country will live on to recover from this disastrous experiment in years to come. If the Government desire increased production they should permit more goods in the shops for the public to buy.

We are continuing our research and development programme. This work will be of great future importance to your company. Our subsidiaries are all working at a profit. The wood-working plant is working to full capacity. The Sales Company is dependent to a great extent on your Works for supplies and is obtaining so much business that orders can only be accepted for forward delivery. I have every faith in our future progress.

The report was adopted.

2230

YOU CAN RELY UPON STEWARD'S

Motor Repair Service

URGENT REWINDS
COMPLETED AT SHORT NOTICE

EVERY JOB GUARANTEED

Repairers to Admiralty, Air Ministry, Ministry of Supply, War Department, L.C.C., B.B.C., etc.

WM. STEWARD & CO. LTD.

154 ALBANY ST. LONDON, N.W.1

Telephone: EUS. 3763



CLEVEDON

RIVETS IN COPPER, BRASS, ALUMINIUM, NICKEL AND ALL THE KNOWN LIGHT ALLOYS.

IN WAR— Every Fighter and Bomber had vital parts securely held by our **RIVETS**.

IN PEACE— We offer our acknowledged skilled service and attention to your orders

FOR RIVETS IN ANY NON-FERROUS METAL

SUTTON COLDFIELD
4160

A Technical
Representative is as
near as your Telephone

CLEVEDON RIVETS & TOOLS LTD.

Reddicap Hill, Sutton Coldfield, Birmingham



**DAY AND NIGHT
ELECTRIC SERVICE**



FOR

**QUICK RELIABLE REPAIRS
AND
REWINDS**

THE MIDLAND DYNAMO Co. Ltd.
LEICESTER

Phone 20172 (3 lines)

CREOSOTED POLES

for
**POWER
LINES**

Telegraph Poles,
Engineering and
Constructional
Timbers of Every
Description.



BURT. BOULTON & HAYWOOD LTD.

BRETENHAM HOUSE, WELLINGTON STREET, W.C.2
Telephone: Temple Bar 5801/5 (lines) Telegrams: Burboul, Rand, London

Depots: LONDON
NEWPORT, SOUTHAMPTON Etc.

It's Here!

STARTING SWITCHES for FLUORESCENT LAMPS

By ELECTRO METHODS LTD.

Telephone : GLAdstone 6611-2

112 BRENT ST., HENDON, N.W.4

PERMALI

Laminated, Densified, Impregnated Insulating Material
Outstanding for **STRENGTH**

ELECTRIC CONSTANT 50,000 VOLTAGE RESISTANCE 28,000 PSI

designers ➔

Write for Data Booklet 24B, giving Electrical and Physical Properties and Mechanical Characteristics of this extremely useful material, to the **NEW INSULATION CO. LTD.** Gloucester (Eng.) Telephone 4941

Litholite

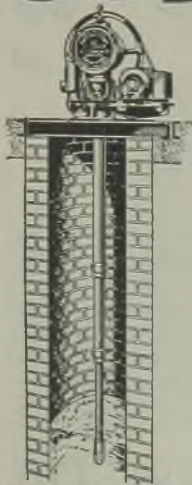
40 Years
of
Plastic
Moulding

LITHOLITE INSULATORS &
ST. ALBANS MOULDINGS LTD

WATFORD

PHONE: WATFORD 4494

CODWIN



Electric PUMPS

**FOR WELLS &
BOREHOLES OF
EVERY DEPTH**

TYPE E.O.E. for Wells and Boreholes exceeding 25 ft. in depth. Totally enclosed self-acting mechanism of Patented design. Precision workmanship throughout. Pump can be supplied complete with 1 h.p. Electric Motor or with fast 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.
QUEENINGTON, GLOS.

Telephone: Glos. St. Aldwys 36 (2 lines)

Telegram: Pump, Queenington.

IT CAN BE MADE QUICKER IN PLASTICS!

Consult

LORIVAL

Many a complete article or component can be made not only more quickly but also better in plastics, and Lorival can place at your disposal the designing and manufacturing service you require.



UNITED EBONITE & LORIVAL LTD.
LITTLE LEVER, NEAR BOLTON, LANCs.



WHAT
IF I AM?

Well, what if we ARE newcomers to the Transformer business? It would be presumptuous to claim that we are making better Transformers than older established firms, but we can, with all due modesty, say that ours are a good workmanlike job. If you want Transformers up to 5 kVA. please write to us.

R. M. ELECTRIC LTD.
TEAM VALLEY, GATESHEAD 11

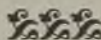
LANCOMOTORS LIMITED

Manufacturing
• **Electrical** •
• **Engineers** •

Specialists in the manufacture of
COILS

Shunt, Series, Commutating,
Brake, Armature, etc., etc.

Electric Motors and Equipment
made to Customers' Specification



**CLOUGH ST., HANLEY
STOKE-ON-TRENT**

TELEPHONE 2378-9

*Here are a few
Specialities*

- MINIATURE WIRE
WOUND RESISTORS
- INSTRUMENT STUD
SWITCHES
- VARIABLE
ATTENUATORS

*from
the House
of*



PAINTON & COMPANY LTD. • KINGSTHORPE • NORTHAMPTON

"HAILWARE" LIGHTING GLASS

HAILWOOD & ACKROYD LTD.

GLASS MANUFACTURERS AND ENGINEERS

BEACON WORKS · MORLEY · YORKS

LONDON :—

ALBION HOUSE,

59 NEW OXFORD STREET, W.C.1

Telephone : TEMPLE BAR 6594 & 7358

BIRMINGHAM :—

SOMERSET HOUSE,

TEMPLE STREET, BIRMINGHAM 2

Telephone : MIDLAND 6014

LIGHTING GLASS "HAILWARE"

THE TECHNICAL AND SCIENTIFIC REGISTER

A national appointments service for qualified engineers, scientists, architects, etc., and for employers who need them

A REGISTER of civil, mechanical and electrical engineers, physicists, mathematicians, chemists (not pharmacists), metallurgists, biological scientists, architects, surveyors, town planners, estate agents and valuers. Qualification for registration is, in general, possession of a University degree or its equivalent, or membership of the appropriate recognized professional institutions. Free and confidential service. Professionally qualified Interviewing Officers. More than 45,000 applicants placed since 1941.

TECHNICAL AND SCIENTIFIC REGISTER
Appointments Department

YORK HOUSE, KINGSWAY, W.C.2
TEMPLE BAR 8020

Ministry of Labour and National Service

1089-1



HERMAN SMITH LTD.
RELANCE WORKS, DUDLEY, WORCS

Telephone: DUDLEY 4211 (3 lines) Telegrams: "RELIANCE, DUDLEY"
Established 1895

FOR EVERY TYPE OF MODERN ELECTRICAL SWITCHGEAR

COOKE & FERGUSON

ELECTRICAL



DIVISION

LTD.

VICTORIA STREET OPENSHAW
MANCHESTER II

TELEPHONE EAST 1616 TELEGRAMS "FABRICATE M/CR"

London Office

40 41 CRAVEN HOUSE KINGSWAY WC2

CF 54



WE CAN EITHER SUPPLY
or

PREFERABLY MAKE THESE
ADAPTORS

from Lampholders supplied by you

HELIOS LABORATORIES

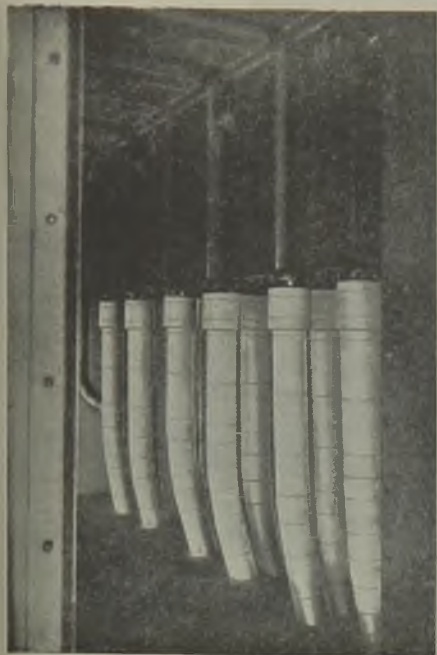
6 Angel House, Pentonville Road
LONDON, N.I. Telephone: TER. 2256-7

*The Shop
with a
TECHNIQUE
for
TECHNICAL
Books*

All Standard Works for the
Electrical Engineer
English and American

THE SPON BOOKSHOP

129 VICTORIA STREET, LONDON, S.W.1



To

PREVENT damage
to your Electric
Cables by fire
PROTECT them with
**NEWALLS MOULDED
ASBESTOS**

Full particulars from: —

Newalls
Insulation Co. Ltd.
WASHINGTON, Co. DURHAM



IGRANIC
Electric Control Gear

Equip your electrically driven machines
with the "right" control gear —
IGRANIC, which will give positive
protection to motor and machine and
keep them working to secure maximum
production.

*Illustration shows IGRANIC Contactor
Panel for control of Travel motion of
6-ton Slab Charger for Steel Mill.*

IGRANIC ELECTRIC CO. LTD
BEDFORD & LONDON

Index to Advertisers

PAGE

Aerialite Ltd.	31
Agro Electrical Co. Ltd.	46
Appleby & Co.	96
Armorduct Cable Co. Ltd.	Cover iii
Association of Steel Conduit Manufacturers	89
Automatic Coil Winder & Elec. Equipment Co. Ltd.	22
Beeantee Illuminations (London) Ltd.	78
Belling & Co. Ltd.	12
B.E.N. Patents Ltd.	80
Berger, Lewis, & Sons Ltd.	40
Bill Switchgear Ltd.	3
Birkbys Ltd.	19
Birmingham Battery & Metal Co. Ltd.	82
Bolton, Thomas, & Sons Ltd.	2
Bowker, S. O., Ltd.	86
Braithwaite & Co. Engineers Ltd.	102
Britannic Electric Cable & Construction Co. Ltd.	99
British Aluminium Co. Ltd.	Cover ii
British Insulated Callender's Cables Ltd.	83
British Made Electrics Ltd.	94
British National Electrics Ltd.	90
British Thomson-Houston Co. Ltd.	18
Brush Electrical Engineering Co. Ltd.	27
Bulphitt & Sons Ltd.	Cover iii
Burt, Boulton & Haywood Ltd.	72
Cinema-Television Ltd.	88
Clarke, H., & Co. (Manchester) Ltd.	48
Clevedon Rivets & Tools Ltd.	72
Cole, E. K., Ltd.	20
Concordia Electric Wire & Cable Co. Ltd.	48
Consolidated Pneumatic Tool Co. Ltd.	7
Cooke & Ferguson Ltd.	76
Corrugated Packing & Sheet Metal Co. Ltd.	34
Crompton Parkinson Ltd.	Cover i, 35 & 101
Cryselco Ltd.	16
Dacier Ltd.	102
Davis & Timmins Ltd.	104
De La Rue Insulation Ltd.	17
Dennis, G. P., Ltd.	96
Donovan Electrical Co. Ltd.	104
Drake & Gorham Wholesale Ltd.	8
Drayton Regulator & Instrument Co. Ltd.	94
Duratube & Wire Ltd.	102
Dynamo & Motor Repairs Ltd.	88
Elcordia Ltd.	94
Electrical & General Accessories (Leicester) Ltd.	34
Electricity Services Ltd.	92
Electro Methods Ltd.	73
Elliott Bros. (London) Ltd.	6
Ellison, George, Ltd.	39
English Electric Co. Ltd.	21
Ensel Electric Co. Ltd.	80
Evans, F. W., Ltd.	96
Everett Edgcombe & Co. Ltd.	54
Evershed & Vignoles Ltd.	49
Ferranti Ltd.	11 & 93
Geipel, William, Ltd.	96
General Electric Co. Ltd.	44 & 58
Gibson, Todd & Co. Ltd.	88
Glenfield & Kennedy Ltd.	Cover iv
G. M. Engineering (Acton) Ltd.	87
Godwin, H. J., Ltd.	73
Green, E., & Son Ltd.	41
Hackbridge Electric Construction Co. Ltd.	95
Hailwood & Ackroyd Ltd.	75
Hawkins, L. G., & Co. Ltd.	41
Heatrae Ltd.	1
Helios Laboratories.	76
Henley's, W. T., Telegraph Works Co. Ltd.	13 & 81
Heyes & Co. Ltd.	53
Higgs Motors Ltd.	9
Howells (Electric Motors) Ltd.	97
Igranic Electric Co. Ltd.	77
Ismay, John, & Sons Ltd.	92
Johnson & Phillips Ltd.	51
Johnson, Richard, Clapham & Morris Ltd.	32
Keighley Lifts Ltd.	94
Keys, W. H., Ltd.	28
Kimber, B., Allen & Co.	32
Kodak Ltd.	26
Lancomotors Ltd.	74
Legg (Industries) Ltd.	91
Litholite Insulators & St. Albans Mouldings Ltd.	73

(Continued on page 80)

No TOOLS or SCREWS

Required for Wiring

"BEEANTEE"

BAKELITE

FESTOON STRIPLIGHTING
HOLDERS

USED BY THE
ADMIRALTY,
CORPORATIONS
AND
MUNICIPAL
BODIES

STOCKED BY ALL
LEADING
WHOLESALE

Please send your enquiries to:-

THE "BEEANTEE" ILLUMINATIONS

(LONDON) LTD.

6 UPPER STREET, ISLINGTON, N.1

CANonbury 4555

*Six good reasons
for fitting the*
SIMMERSTAT

The
all-heat
HOTPLATE
CONTROL

- Helps you sell your cookers.
- Reduces hot-plate maintenance.
- Reduces peak-load.
- Improves cooker load factor.
- Is the only SATISFACTORY simmering device.
- Costs only 21/- (subject).

IMMEDIATE DELIVERY!

Write now for Technical Leaflet ST. 10/16

SUNVIC CONTROLS LTD., STANHOPE HOUSE
KEAN STREET, LONDON, W.C.2

TAS/SC 118

1907 The Marco Fridgeette

1927 THE MARCO ELECTRIC

Landmarks in Refrigeration

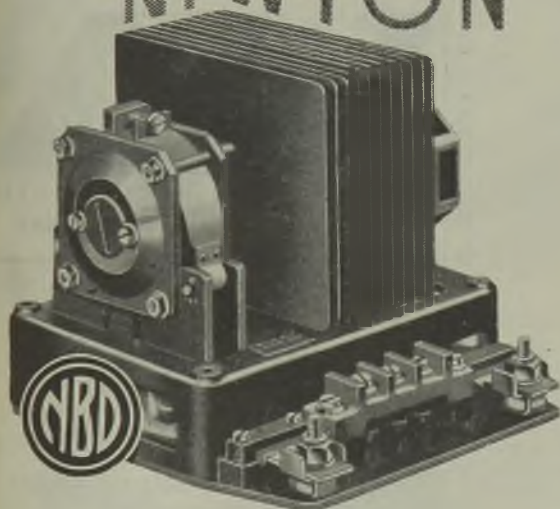
1946 THE MAGNIFICENT NEW **MARCO**

BACKED by nearly 40 years' experience in making refrigerators that have won Nation-wide popularity, Marco have designed yet another sales-winning model. The magnificent new, streamlined Marco has that extra roominess, those superior fittings and new features which housewives demand to-day. Every new Marco will carry a 12 months' guarantee. Available when Government restrictions are removed.

MARCO REFRIGERATORS LTD., Streatham,
London S.W.16



NEWTON DERBY



AUTOMATIC VOLTAGE REGULATORS

Also Makers of—

ROTARY TRANSFORMERS
& ANODE CONVERTORS,
WIND & ENGINE-DRIVEN
AIRCRAFT GENERATORS,
HIGH FREQUENCY ALTERNATORS & HIGH TENSION
D.C. GENERATORS.

NEWTON BROTHERS (DERBY) LTD

Head Office and Works : Alfreton Road, Derby. Tel. : Derby 4286-7. Grams. : "Dynamo," Derby

Index to Advertisers

(Continued from page 78)

	PAGE
Londex Ltd.	104
Marco Refrigerators Ltd.	79
Mather & Platt Ltd.	30
Matthews & Yates Ltd.	34
McKeechic Bros. Ltd.	103
M.C.L. & Repetition Ltd.	1
Meadows, Henry, Ltd.	4
Mercury Switch Mfg. Co. Ltd.	24
Metropolitan-Vickers Electrical Co. Ltd.	23 & 84
Metway Electrical Industries Ltd.	26
Midland Dynamo Co. Ltd.	72
Midland Electric Mfg. Co. Ltd.	33
Milne & Longbottom Ltd.	92
Ministry of Labour & National Service	75
Mullard Wireless Service Co. Ltd.	34
Multicore Solders Ltd.	28
Nelco Ltd.	32
New Insulation Co. Ltd.	73
Newalls Insulation Co. Ltd.	77
Newton Bros. (Derby) Ltd.	79
Newton, L. H., & Co. Ltd.	36
Painton & Co. Ltd.	74
Parmiter, Hope & Sugden Ltd.	81
P. & B. Engineering Co. Ltd.	46
Philips Lamps Ltd.	5
Pickerings Ltd.	50
Pirelli-General Cable Works Ltd.	10
Pritchett & Gold & E.P.S. Co. Ltd.	99
Rands & Co. Ltd.	82
Rawplug Co. Ltd.	56
Revo Electric Co. Ltd.	42
Reyrolle, A., & Co. Ltd.	15
R.M. Electric Ltd.	74
Robinson, Lionel, & Co. Ltd.	86
Ross Courtney & Co. Ltd.	1
Rotoplunge Pump Co. Ltd.	96
Rotunda Ltd.	26
Rowlands Electrical Accessories Ltd.	43
Runbaken Electrical Products	104
Sanders, Wm., & Co. (Wednesbury) Ltd.	45
Sankey, Joseph, & Sons Ltd.	14
Savage Transformers Ltd.	28
Scholes, George H., & Co. Ltd.	8
Siegrist, E., Ltd.	102
Siemens Electric Lamps & Supplies Ltd.	50
Sifam Electrical Instrument Co. Ltd.	90
Simmonds Aerocoorsories Ltd.	57
Simplex Electric Co. Ltd.	25
Sims, F. D., Ltd.	91
Smith, Frederick, & Co.	38
Smith, Herman, Ltd.	75
Southern Forge Ltd.	95
Spencer Wire Co. Ltd.	88
Sperryn & Co.	46
Spicers Ltd.	Cover
Spon Bookshop	76
Standard Telephones & Cables Ltd.	47
Statter, J. G., & Co. Ltd.	100
Statite & Porcelain Products Ltd.	85
Sternaw Co. Ltd.	92
Steward, Wm., & Co. Ltd.	71
St. Helens Cable & Rubber Co. Ltd.	52
Sunvic Controls Ltd.	78
Symonds, R. H., Ltd.	24
Thorn Electrical Industries Ltd.	98
T.M.C.-Harwell (Sales) Ltd.	46
Tungstallite Ltd.	102
Tyne Truck & Trolley Co. Ltd.	103
Uhlhorn Bros. Ltd.	90
United Ebonite & Lorival Ltd.	74
Vandervelde, L.	94
Veritys Ltd.	55
V.G. Manufacturing Co. Ltd.	103
Walsall Conduits Ltd.	29
Ward, Chas. F.	104
Ward & Goldstone Ltd.	97
Ward, Thos. W., Ltd.	24
Watliff & Co. Ltd.	3
Westinghouse Brake & Signal Co. Ltd.	37
Westminster Engineering Co. Ltd.	1
Westool Ltd.	80
Wholesale Fittings Co. Ltd.	22
Wingrove & Rogers Ltd.	28
Yorkshire Electric Transformer Co. Ltd.	82

Electric Lamps

ALL TYPES
ALL VOLTAGES
ALL WATTAGES



MADE TO LATEST
B.S.I. SPECIFICATION

ENSEL ELECTRIC CO LTD

314, GRAYS INN RD LONDON, W.C.1

TELEPHONE TERMINUS 6255/7

E.R.23



B-E-N BLOW GUNS

B-E-N PATENTS LTD.
HIGH WYCOMBE

LET **WESTOOL** HELP

WITH YOUR POST-WAR PROBLEMS ON ALL
Electro-Mechanical Apparatus
Solenoids and Electro-Magnets

FOR TECHNICAL ADVICE, WRITE :-

WESTOOL Ltd.
ST. HELENS AUCKLAND
BISHOP AUCKLAND
Co. DURHAM



Telephone:
WEST AUCKLAND
317



FUSES for BREAKING CAPACITY and THERMAL CAPACITY

Aeroflex fuses are available in breaking capacities up to 75 M.V.A., covering conditions of the maximum possible severity on medium pressure circuits. They also exhibit the thermal capacity under permissible operational overloads necessary to secure freedom from ageing and unnecessary shut-down.

PARMITER, HOPE & SUGDEN LTD.

Longsight, Manchester 12

London : 34 Victoria Street, S.W.1



Illustration shows a standard 65 watt model; other types and sizes available.



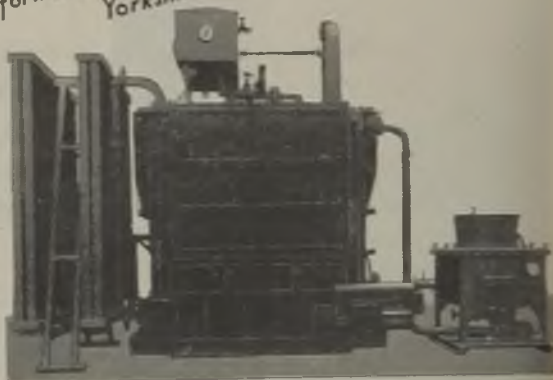
With the Solon there's no waste heat—the heating element is inside the copper bit itself! All the heat is at the point—where you want it. The terminals are at the other end; safely housed away from the heat and easy to get at. Every Solon is supplied complete with 6 ft. of Henley 3-core flexible. Made for the following standard voltages:—200/220, 230/250.

Made in England


W. T. HENLEY'S TELEGRAPH WORKS CO. LTD. (Engineering Dept.)
51-53 Hatton Garden, London, E.C.1

TRANSFORMERS

When you think of
Transformers—think of
Yorkshire



YORKSHIRE ELECTRIC TRANSFORMER CO. LTD. DEWSBURY

 **FOR POWER STATIONS**

SPECIFY
"BATALBRA"
 CONDENSER TUBES
 AND "BB"
 CONDENSER PLATES

FOR SWITCHGEAR
"BB" PLAIN H.C.
DRAWN COPPER
STRIP

THE BIRMINGHAM BATTERY & METAL CO. LTD.
 SELLY OAK, BIRMINGHAM

**Wall
Bracket
Fittings**

for



Indirect Lighting

Supplies of this new fitting are now available. Strongly constructed of cast aluminium with an attractive Crackle Finish in either Gold, Silver, Copper, Bronze, or Cream. Exceptionally attractive and completely modern in design.

List Price £2.15.9 + 12.4 Purchase Tax

(Cream Finish 10% extra)



We can now supply also the 'HICON' Tubular Heater, in 3 feet lengths.

List Price 24/6.

Rands

Wholesale
Electrical
Suppliers

RANDS & CO. LTD. 34 Victoria St., London, S.W.1

Telephone ABBEY 5973



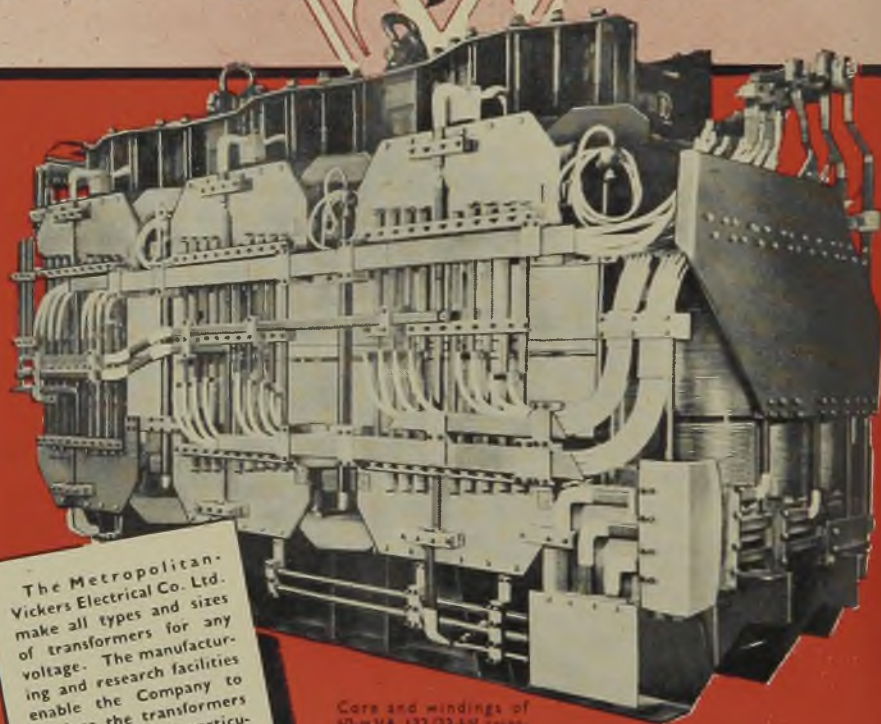
*"A quaint little
Old Fashioned Town"*



Burford, the lovely Oxfordshire town described in this song, truly represents in its Cotswold stone buildings, half-timbered houses and steep high street, the serenity of an "old-fashioned town." Though holding to its ancient traditions, Burford has modern ideas in street lighting and the recent installation by the Burford Electric Light & Power Co., Ltd., using our cables, was carried out with special regard for the dignity and grace of old buildings.

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

60 MVA, 132 kV.



The Metropolitan-Vickers Electrical Co. Ltd. make all types and sizes of transformers for any voltage. The manufacturing and research facilities enable the Company to produce the transformers required for any particular application.

Metrovick transformer Engineers are always glad to help you with your transformer problems.

Core and windings of 60-mVA 132/33-kV transformer supplied to CEB.

METROPOLITAN Vickers

ELECTRICAL CO. LTD.
TRAFFORD PARK — MANCHESTER 17.



E/A601

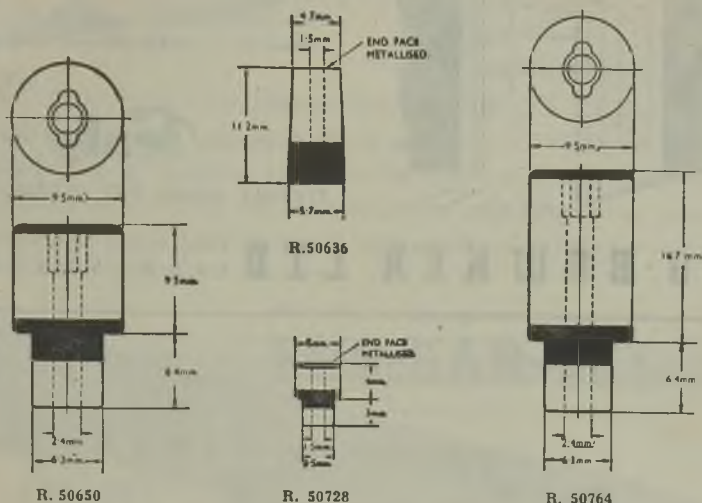
*Light aids
production*

IMPROVE YOUR LIGHTING *in consultation with*
METROVICK'S ILLUMINATING ENGINEERS

METALLISED CERAMICS

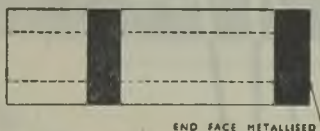
for hermetic seals and soldered assemblies

FREQUENTITE BUSHES



PORCELAIN BUSHES

Details of standard
sizes will be sent
on application.



For full information and prices please write to :

STEATITE AND PORCELAIN PRODUCTS LIMITED

Stourport-on-Severn Worcs. Telephone : Stourport 111. Telegrams : Steatitain Stourport



S.P. 402

There's nothing in it



Like Old Mother Hubbard
We find—in OUR cupboard
The shelves are depressingly bare.
We'd hand out the stuff,
But there isn't enough
To give anyone much of a share.

So—Don't blame us . . . don't 'phone us . . . don't
shoot us . . . We're definitely doing our best.

ELECTRICAL **Tenby** ACCESSORIES

TERRIBLY GOOD BUT TERRIBLY SCARCE

S · O · B · O · W · K · E · R · L · T · D TENBY WORKS · 19-21 WARSTONE LANE
B I R M I N G H A M · 1 8

RP—926A

*Resistance
Wires*

Insulating Beads

**Lionel Robinson
& Co. Ltd.**

**3 Staple Inn
London, W.C.1**

Telephone - - HOLborn 6322

WOULD YOU PUT THESE WHEELS ON SUCH A MODEL?



YOU may have a fine, spacious machine shop with first-class plant, yet the efficiency of both may be hampered by a "dated" system of Electric Power distribution. By installing our Bus-Bar-Tee Overhead Trunking method of power conveyance you bring the complete factory unit into perfect unison. Machines can be aligned at will, forests of belting removed and the whole shop given a new air of streamlined efficiency.



● Bus-Bar-Tee is supplied in 12 ft. lengths in which bare copper bars are totally enclosed.

● Earthing is positive and automatic.

● Tapping Points are provided every 2ft. complete with safety cover plates.

● Dimensions 3-phase, 3-wire— $9\frac{3}{8}$ " x $3\frac{1}{2}$ "; 3-phase, 4-wire— $11\frac{1}{2}$ " x $3\frac{1}{2}$ ".

● Continuous ratings up to 300 Amps per run. H.R.C. outgoing fuse units for 30, 60 and 100 amps.

● Approved and used by Government Departments.



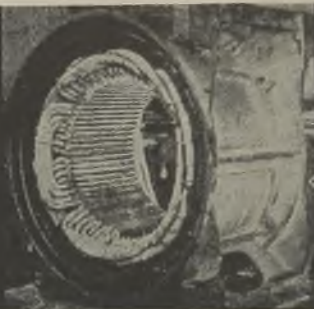
Switchgear Manufacturers

Mechanical Engineers

STANDARD RD., NORTH ACTON, LONDON, N.W.10.

Tel : ELGar 6601

REPAIRING RECONDITIONING REWINDING



DYNAMO & MOTOR REPAIRS LTD.

Wembley Park Works
WEMBLEY, MDDX.

Phoenix Wks., Soho Rd.
BIRMINGHAM



Photo-Electric Cells



Manufacturers of over forty different types of Photo-electric cells from standard ranges to "miniatures" and "specials" designed to meet all requirements in industry and the laboratory, with characteristics and physical dimensions over the widest possible range.

- Multiplier cells for amplification of the primary photo current.
- Quartz cells for use with ultra violet radiation.
- Guiger Muller tubes for Cosmic Ray research and other applications.
- Nitrogen Helium Discharge Lamps.

New Brochure and price list now available on application.

CINEMA - TELEVISION LTD.,

INCORPORATING BAIRD TELEVISION LIMITED

WORSLEY BRIDGE RD., LONDON, S.E.26

Telephone: Hither Green 4600

Suppliers to ADMIRALTY, MINISTRY OF AIRCRAFT PRODUCTION, MINISTRY OF SUPPLY, ARMAMENT RESEARCH, etc. Manufacturers of Scientific Instruments and Photo-electric cells.

WE MANUFACTURE

covered bars,

machined parts,

tubes round

and

square,

shapes.

flexible

and

moulding

sheet,

tapes, etc.

First Class
MICANITE
in every form



GIBSON, TODD & CO, LTD

ALBERT MILLS · HOLLINWOOD · LANCASHIRE

TEL: FAIRFORTH 1520

ON ADMIRALTY LISTS

THE SPENCER WIRE CO. LTD.

WAKEFIELD

YORKSHIRE

manufacturers
of
IRON · STEEL & COPPER
WIRE

For Purposes of Identification



A cheque only becomes an implement of Credit when authenticated by the issuer's signature.

Equally — the A. S. C. M. "Signature" on every length of Steel Conduit manufactured to A.S.C.M. Standards represents an "ability to pay" in terms of efficiency and durable service. Look for the A.S.C.M. "Signature" on the Conduit you purchase

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

MCDUGALL, 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.



Advertisement of the Association of Steel Conduit Manufacturers, 21 Waterloo Street, Birmingham 2

CHARLTON ELECTRIC STORAGE WATER HEATERS


Introducing the

B.N.E. NEWS SERVICE

British National Electrics Ltd. is now the domestic appliances section of Johnson and Phillips Ltd. and will combine the manufacturing experience and resources of both companies.

The B.N.E. factory at Newarthill is large; the combined production technique and experience are great; the collaboration will give you better products in larger quantities.

Like our production, our advertising at the moment is not equal to our demand, but we will use what "space" we can obtain to keep you informed of our progress at Newarthill through the B.N.E. News Service.



BRITISH NATIONAL ELECTRICS LTD.
 (Incorporating Archibald Low Electrics Ltd. and J. P. Tubular Heater Co. Ltd.)
 The Domestic Appliances Section of **JOHNSON & PHILLIPS LTD.**
 NEWARTHILL • MOTHERWELL • SCOTLAND

BRITISH NATIONAL ELECTRIC COOKERS & FIRES

INSTRUMENTS FOR SPECIAL PURPOSES



HIGH-GRADE
MODERN
DESIGN.

SIFAM

ELECTRICAL INSTRUMENT
COMPANY LIMITED
TORQUAY DEVON



ESTABLISHED 1887

PLASTIC RAW MATERIALS

IN SHEETS, RODS & TUBES

EBONITE
LAMINATED BAKELISED SHEET
CASEIN CAST RESIN
ETC.

53, CITY ROAD
LONDON, E.C.1



MADE BY
F.D
SIMS LTD

lead the way in quality.
Let us have your next
enquiry

F.D. SIMS LTD

PHONE: RAMSBOTTOM 2213-4

HAZLEHURST WORKS
RAMSBOTTOM-LANCS

Legg

THE NAME
Guarantees

MODERN
DESIGN
& PERFORMANCE

INCORPORATING
ALL IMPROVEMENTS



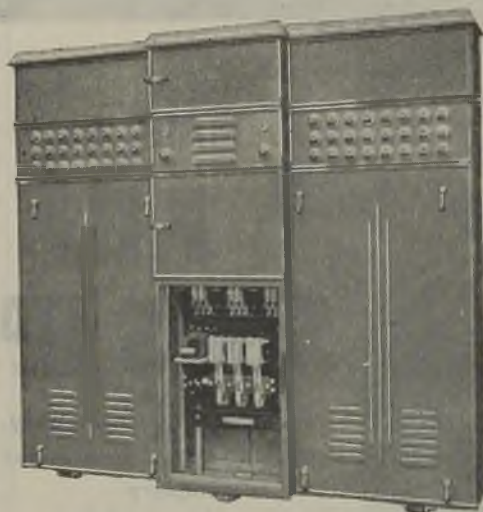
BATTERY CHARGERS
RECTIFIER UNITS
TRANSFORMERS ETC.

*Trouble-free
Service
Assured
No Replacement
Valve Costs*

our
After Sales Service

IS ALWAYS AVAILABLE TO
EVERY LEGG EQUIPMENT USER/
(ON REQUEST)

BRITISH THROUGHOUT
Manufactured by
LEGG (INDUSTRIES) LTD,
WILLIAMSON STREET,
WOLVERHAMPTON.
PHONE: 24091/2 (2 LINES)



"ELM"

**SWITCHGEAR DESIGNED
to CUSTOMERS' SPECIFIC
REQUIREMENTS FOR ALL
TRADES USING ELECTRIC
DRIVE AND POWER**

**AUTOMATIC MAIN
SWITCHBOARD**

MILNE & LONGBOTTOM LTD.

ESTABLISHED
1927

ROCHDALE, Lancs.

Phone 4031
Grams : "ELM"



Enquiries to :
JOHN ISMAY & SONS LTD.
10 Bedford Street, London, W.C.2
Telephone : Temple Bar 7347

Fine and Very Fine
Covered
Instrument Wires



STERNAW
COMPANY LTD.

425 Upper Richmond Rd., East Sheen, London, S.W.14
Telephone : Prospect 7287/8

INVISAFLEX

**INDUSTRIAL LOCAL
LIGHTING UNITS**

CABLE ENCLOSED



THROUGHOUT

*Bench, wall
or universal
conduit base*



ELECTRICITY SERVICES LTD., 86 CANNON ST., E.C.4



Check

with

FERRANTI

Instruments

D.C. TEST SETS • A.C. TEST SETS • CELL TESTERS

A.C./D.C. CIRCUIT TESTERS • LIGHT TESTERS

HIGH VOLTAGE INDICATORS • CLIP-ON AMMETERS

FERRANTI LIMITED • HOLLINWOOD • LANCs.

LONDON OFFICE: KERN HOUSE, KINGSWAY, W.C.2.

F160

Soldering - then ELCO

ELCO design and build soldering irons, machines, melting pots, and special furnaces for all soldering needs to suit any voltage from 24 v. up. Illustrated are four interchangeable units. There are many others.

Write for leaflet to Sale Agent —



ELCORDIA LTD.
225 Westminster Bridge Rd. S.E.1.

Tel.: WATERLOO 5502/3



Let
ELCO
Solve
Soldering
Problems



Your enquiries invited for

HOTRIC

Thermal Storage Heaters
in following capacities :
1½ gallons, 3 gallons and
20 gallons "Duplex."

Also Immersion Heaters
(1, 2 or 3 k.w.) for con-
verting existing Hot
Water Systems.

Manufactured by:

BRITISH MADE ELECTRICS LTD

Hotric Works, Braxburn, West Lothian, Scotland
Telephone: Braxburn 191 (PBX)

Sales Office: 198 Fore St., Edmonton, London, N.18
Telephone: Tottenham 1321 (PBX)

ELECTRIC LIFTS

One of the most important features in connection with the rebuilding of Industry will be the modernisation of Electric Lift Service.

We should be very happy to send a technical representative to advise on the best type of Passenger, Goods or Service Lift for your Offices, Works or Canteen, without the slightest obligation.

On account of the anticipated heavy demand on our services, your prompt enquiries would be greatly appreciated and will avoid possibility of long delivery delays.

KEIGHLEY LIFTS Ltd.

(Dept. 3)

LONDON OFFICE :

9 Victoria Street, S.W.1. Phone : Abbey 4184

LEEDS OFFICE :

Bardon Chambers, Infirmary St. Phone : Leeds 26518

KEIGHLEY OFFICE :

Dalton Lane. Phone : Keighley 3298

MANCHESTER OFFICE :

Haworth Buildings, 5 Cross St. Phone : Blackfriars 2903

BIRMINGHAM OFFICE :

Unitas House, 24 Livery Street. Phone : Central 6552

BRISTOL OFFICE :

6 Unity St., College Green, 1. Phone : Bristol 26974

MICA

Processed for all uses,
Commutator Segments,
Heating Elements,
Switchgear, Etc.

Special Organization for prompt deliveries

VARNISHED COTTON

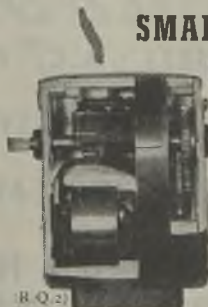
INSULATING SLEEVING

In various colours • Deliveries from stock

L. VANDERVELDE

GNOME WORKS, STANSTED, ESSEX
Phone : Stansted 3261

SMALL GEARED MOTOR UNITS



(1) UNIDIRECTIONAL
Final Shaft Speed: Max. 280
R.P.M. 60 min. per rev.
TORQUE 37 lbs. in. max.

(2) REVERSING
Final Shaft Speed: Max. 600
R.P.M. 27 min. per rev.
TORQUE 60 lbs. in. max.

DRAYTON REGULATOR & INSTRUMENT
CO. LTD., WEST DRAYTON, MIDDLESEX



POWER for INDUSTRY

THE Hackbridge Electric Construction Company brings to the peacetime task of reconstruction and development a quarter-century of specialised experience and a tradition of good design and workmanship in the manufacture, for world-wide service, of **transformers** of every type, size and voltage. Much of the power for the new world will flow through



HACKBRIDGE

TRANSFORMERS

HACKBRIDGE ELECTRIC CONSTRUCTION
CO. LTD.

WALTON-ON-THAMES, SURREY

Telephone: Walton-on-Thames 760 (8 lines)
Telegrams: "Electric," Walton-on-Thames

PLAN YOUR NEW PRODUCT
IN CO-OPERATION WITH AN
ORGANISATION WHICH IS
EQUIPPED AND OPERATED
FOR THE LARGE SCALE
PRODUCTION OF

STAMPINGS · PRESSINGS

EXTRUSIONS IN LIGHT

METALS . . . SOUTHERN FORGE

OFFERS DIVERSIFIED

PRODUCTION FACILITIES AND

A PRACTICAL ENGINEERING

DESIGN & RESEARCH

SERVICE . . .

AVAILABLE

TO ALL ELECTRICAL
MANUFACTURERS



Southern Forge

FOREMOST IN LIGHT METAL FORGING

SOUTHERN FORGE LTD · LANGLEY · BUCKS

Telegrams: "Patella, Sedist, London"

Telephone: Hop 0594 (4 lines)

CABLE

V.I.R., BRAIDED, LEAD COVERED & TOUGH RUBBER SHEATHED

WILLIAM GEIPEL LTD. Head Office: 156-170 Bermondsey Street, LONDON, S.E.1
 Cable Works: WEMBLEY, MIDDLESEX

DENNIS SWITCHGEAR


 SPECIALISTS IN FUSES, DISTRIBUTION
 BOARDS, SWITCH FUSES, SWITCH
 BOARDS, CONTROL PANELS, ETC.

G.P. Dennis Ltd
**Perfection
in Design
*Reliability
in Service*

 FLEMING ROAD, SPEKE, LIVERPOOL 19. Hunts Cross 1217/8
 LONDON OFFICE—ABFORD HOUSE, WILTON RD., S.W.1
 Telephone: Victoria 5957/8


SALES ARE SOARING!

 Stale and fume laden air within a room is
 cleaned and deodorised; carbon di-oxide is
 absorbed and a freshness maintained, by the
 fitting of a Kleanair Unit

Price £8 15s. 0d. (including P.T.)

KLEENAIR

Trade Enquiries

APPLEBY & CO.

 6-10 CHANDOS HOUSE
 BUCKINGHAM GATE
 LONDON, S.W.1

 TELEPHONES:
 ABBey 5011-2

BAKELITE AND
 MOULDINGS

 TO ANY
 SPECIFICATION

FREDERICK W. EVANS LTD.

PLASTIC WORKS

LONG ACRE, BIRMINGHAM 7

TELEPHONE: EAST 1286 & 1287

 PUMPS FOR:
 CREOSOTE PITCH
 AS SUPPLIED TO
 PETROLEUM
 BOARD

**ROTOPLUNGE
PUMPS**

 Pumps for
 Petrol, Water,
 Tar, Fuel Oil, etc.
 Suction lifts 25ft.
 without priming.

 Variable stroke and Auto-
 matically Reversible pumps.

ROTOPLUNGE PUMP Co. Ltd.
 58 Victoria Street, S.W.1

Phone: VIC 4395

Grams: Rotoplunge

Made to a Standard



BS.280

This illustration shows one of many types of Connectors manufactured by us for use with **PORTABLE APPLIANCES.**

We specialise in complete flexible assemblies.

Let us quote for your requirements.

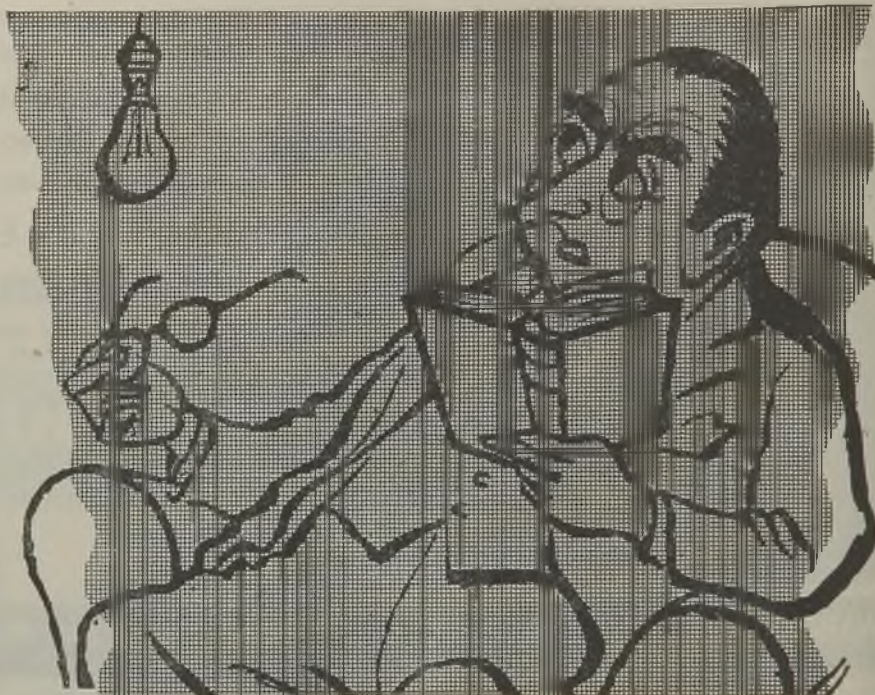
WARD & GOLDSTONE LTD. PENDLETON, MANCHESTER. 6.

ESTABLISHED OVER HALF A CENTURY

HOWELLS MOTORS

THE WORLD OVER

HOWELLS (ELECTRIC MOTORS) LIMITED, STOKE-ON-TRENT, ENGLAND



NEXT TIME HE'LL GET AN ATLAS

Men and women who buy lamps remember the Atlas message because it strikes the right note. That moment of baffled exasperation when a lamp fails—that is the moment when the public is really lamp conscious.

At that moment they remember the Atlas message . . . it is always in the right place . . . at the right time . . . in the leading newspapers and magazines . . . on the best poster sites . . . in the best dealers windows.

Atlas offer the dealer generous rebates and discounts—without any restrictions. Sales aids include attractive display material and a comprehensive window-dressing service. Give YOUR lamp sales new staying power! Write for Atlas terms today.

ATLAS LAMPS

FOR STAYING POWER

EXPORT ENQUIRIES WELCOMED



Thorn Electrical Industries Ltd., 105-109 Judd Street, London, W.C.1. Phone : EUSTon 1183

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

N. E. Depot : 46 Sandhill, Newcastle-on-Tyne 1.

Phone : Newcastle 24068



BRITANNIC CABLES



AN INDEPENDENT COMPANY, MAKERS OF E.H.T. AND L.T.

PAPER MAINS CABLES, VARNISHED CAMBRIC C.T.S. MINING

TRAILING, "IVERITE" INSULATED CABLES AND THERMO-

PLASTIC CABLES (P.V.C.) FOR 250 VOLT LIGHTING CIRCUITS

FOR BUILDINGS OF ALL TYPES.

BRITANNIC ELECTRIC CABLE AND CONSTRUCTION CO. LTD.
IVER, BUCKS.

Telephone :
IVER 491

Telegrams :
"BRITANNIC, IVER."

EVERYTHING HAD A BEGINNING—



There may be some doubt as to who made the *first* aeroplane that could rise in the air, but it is well known that we made the *first* electrical accumulators to be fitted to British aircraft, also the *first* British ground starter Batteries, and the *first* British moulded battery containers.

Our experience has been gained from the year 1882 when we made the first storage batteries. They were used to supply light in the Royal Exchange, the Royal Mint, and other important buildings.

When you hear heavy aircraft engines leap into life, or see the navigation lights of aircraft, you can be certain that the energy is provided as a direct result of those pioneer days of 1882, when P. & G. and E.P.S. produced the first commercial accumulators.

REPLATING

Ensure long and reliable service by having your present batteries replated by us.

PRITCHETT & GOLD and E. P. S. CO. LTD

— formerly the Electrical Power Storage Co., Ltd. —

MADE THE FIRST BATTERIES



50, GROSVENOR GARDENS, LONDON, S.W.1. Phone: SLOane 7164. Grams: Storage, Sowest, London

PG15/46




Switchgear

Only a few representative types can be illustrated here, but almost every switchgear requirement can be met from our extensive range.

Long experience in design and manufacture, combined with technical research and testing, results in absolute dependability and assures complete satisfaction in operation.

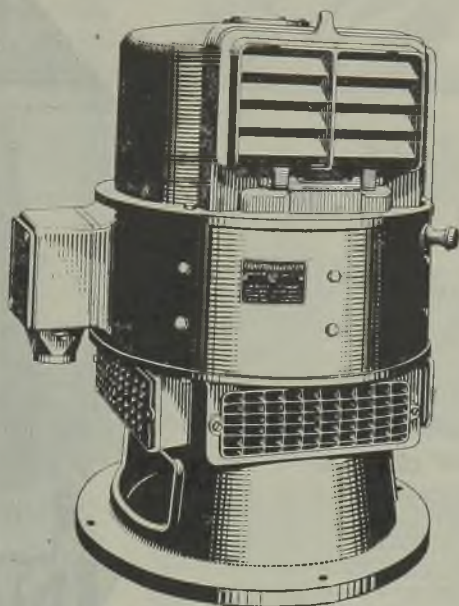


STATTER

J. G. STATTER & CO. LIMITED
43 VICTORIA STREET, LONDON, S.W. 1



*Where does life
bear hardest
on a D.C. motor?*



*That's where
CROMPTON STRENGTH
is greatest*

In the brushgear and commutator where sparkless performance and exceptional stamina are the result of 60 years' experience in D.C. machine construction. In the field coils, too, where the special impregnation process ensures complete protection from dirt, oil or moisture. That's where Crompton leadership shows itself.



CROMPTON PARKINSON

LIMITED

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

Sell

TUNGSTALITE
BRITISH GAS FILLED.
THE LAMP OF PROVED EXCELLENCE.
"The Light that Saves!"

Generous Discounts on Application

Made in England and Guaranteed

Manufactured by
TUNGSTALITE LTD., 47, FARRINGTON ROAD, LONDON, E.6.
Telephone: Holborn 2321 & 2332 (2 lines).



*Fashions change with every clime
but Siegrist stays put all the time*

Neat, quick fitting Siegrist Latex Sleeves cling tenaciously round the smallest cable—and stretch easily over the largest. They DEFY temperature changes and retain their snug fit under climatic extremes of tropical heat or arctic cold. Siegrist Latex EXPANDS ten-fold without splitting. Printed markings can be coated with Latex making them permanently indelible.

PROMPT DELIVERIES. We offer a 24-hour service on special printed orders (except Latex coated). Immediate deliveries from stock for standard sleeves.

**Siegrist
LATEX**

CABLE MARKERS AND SLEEVES
E. SIEGRIST LTD., 39 Berners St., W.1. Tel. MUS. 0032

PETROL PROOF

Trustworthy Friends...

DURAWIRES **DURACABLES**

DURATUBE & WIRE LTD
FELTHAM-MIDDLESEX

NON-FLAMMABLE **NON-AGING** **OIL PROOF**

MICA

Processed Parts
Precision Gauged
for
CONDENSERS, ETC.

**Bakelite
Micanite**

Sheet & Machined Parts
of all kinds.

DACIER LTD. 22, Bargates, Christchurch, Hants

Telephone: Christchurch 1011

Electrical Insulation Specialists

BRAITHWAITE
**Pressed Steel
Tanks**
BRAITHWAITE & CO. ENGINEERS, LTD.

London Office (Temporary Address):
45 King's House, Haymarket, London, S.W.1
Telephone: WHI 3993 Telegrams: Bromkirk-Phone

TYNE TRUCK & TROLLEY
CO. LTD
66/68 NORTHUMBERLAND STREET
NEWCASTLE UPON TYNE, I



HAND-TRUCKS
OF EVERY DESCRIPTION
"WEASEL" LIFTING TRUCKS
WITH PLATFORMS

LIGHTING PAST & PRESENT
1660



The
Candle

The candle is of Phœnician origin. First introduced in this country in the second century A.D., and generally adopted for lighting purposes about the 17th century.

There is no finality to progress as these comparisons illustrate, but for all wiring purposes, Scrut Connectors are the 'final word' in efficiency, speed and reliability.



SCRUT ONE-PIECE CONNECTORS

Distributors: S. O. Bowker Ltd., and GEE (Birmingham) Ltd., Birmingham.

V.G. MANUFACTURING CO. LTD.
Gorst Road, Park Royal, London. N.W. 10

McKECHNIE
metal technique

solves
many production
problems



There are distinct advantages in the use of hot brass stampings compared with rough sand castings.

Sometimes machining is eliminated entirely by the employment of McKechnie stamped parts.

This may be a reason why "the other people" sometimes seem to be producing quicker, cheaper and even better than you had thought possible.

McKechnie
BROS. LTD.

ROTTON PARK ST., BIRMINGHAM, 16

'Phone: Edgbaston 3581 (7 lines)

Branches: **London** — 62, Brook Street, W. 1 'Phone: Mayfair 6182/3/4. **Leeds** — Prudential Buildings, Park Row. 'Phone: Leeds 23044. **Manchester** — 509-513, Corn Exchange Buildings, 4. 'Phone: Blackfriars 5094. **Newcastle-on-Tyne** — 90, Pilgrim Street. 'Phone: Newcastle 22718.

SCREWS • TERMINALS • PRESSWORK



*If it's threaded
— we make it!*

DATIM

DAVIS & TIMMINS LTD
 Head Office: BILLET ROAD, WALTHAMSTOW, LONDON E.17
 TELEPHONE: LARKSWOOD 1011 (4th LINE)

TURNED PARTS & INSERTS



ELECTROPLATER

This small electroplater deposits Gold, Silver, Nickel, Chromium, etc. No special skill required. Operates from any power socket. Send for leaflet.

Runbaken
MANCHESTER 11

WARD

ROTARY CONVERTERS

Petrol Electric Generating Plants, H.T. Generators, D.C. Motors, Frequency Changers, etc., up to 25 K.V.A.

CHAS. F. WARD, 37 WHITE POST LANE
 Phone: Amherst 1393. **HACKNEY WICK, E.9**

DONOVANS

EARTHING CLIPS WITH SPECIAL BITE AND GRIP INTO TUBE OR ARMOURING

Note the tongue which ensures perfect and permanent contact. Easy to fix. Nuts cannot turn. All sizes from half to two inches.

THE DONOVAN ELECTRICAL CO. BIRMINGHAM 9. LTD.



LONDEX for RELAYS



RELAY LQA approved by the G. P. O.

Ask for Leaflet SPN/ER

LONDEX • LTD

MANUFACTURERS OF RELAYS
 ANESLEY WORKS, 207 ANESLEY ROAD, LONDON S.E.20



ARMORDUCT CABLES

ALL TYPES
of
HOUSE-WIRING
CABLES

ARMORDUCT CABLE CO. LTD.
 256 WESTMINSTER BRIDGE ROAD, LONDON, S.E.1
 Phone: WATerloo 6056/7
 also at BRISTOL, LEEDS, BIRMINGHAM and LONG EATON

P. V. C.
CABLES
PLAIN AND
BRAIDED



THE LIGHTWEIGHT INSULATOR

An ideal material that can be specified with confidence for any job requiring an insulator combining mechanical strength with high dielectrical properties.

Manufactured to B.S.S. 972, 668 and 1137, etc.

Our technical staff can help you with your problems

SPICERS LTD.

19 NEW BRIDGE STREET, LONDON, E.C.4. CENTRAL 4211 Ext.

Production
now
Restricted ...



SWAN BRAND

**ALUMINIUM DOMESTIC WARE
& ELECTRICAL APPLIANCES**

But not
for
always

Kennedy POSITIVE METERS



A KENNEDY POSITIVE FEED
WATER METER INSTALLED
ON BOILER PLANT.

Kennedy Hot Water Meters are specially designed for measuring boiler feed, and are extensively used for this purpose in all parts of the world. They are extremely accurate at all speeds, since they measure the actual distance travelled by the piston, and not the number of strokes. Thus long or short strokes, due to rapid or slow working, do not affect their accuracy, which is guaranteed to be within 1% at all rates of flow. They cause very little extra back pressure on the pumps on account of their large delivering capacity, for which reason a smaller nominal size of meter than the size of pipe can often be employed. All parts are of substantial construction, and there is no delicate mechanism exposed to the action of the water.

If oiled and cleaned periodically, the meters can be maintained almost indefinitely at a very small cost, and we have records of these meters working continuously for eighteen years without being dismantled or requiring repair.

All parts are made accurately to gauge so that spares can be easily and quickly substituted, and parts subject to pressure are tested to 500 lb. per square inch.

Glenfield

GLENFIELD & KENNEDY, LIMITED, KILMARNOCK