



ARM OF THE LAW...

THERE HE STANDS—symbol of authority in an orderly World — controlling — directing — obeyed because absolutely trustworthy and reliable.

What a fitting comparison with BIRCH RESISTANCES, *Arms of the Ohm's Law.*

Backed by many years of practical experience in which their reliability has been tested under all conditions, BIRCH RESISTANCES, in their various applications, stand up to their job and can always be depended upon to provide specified service because of their first-class workmanship.

Birch

Please call upon us to help you solve any Resistance problem.

Resistances

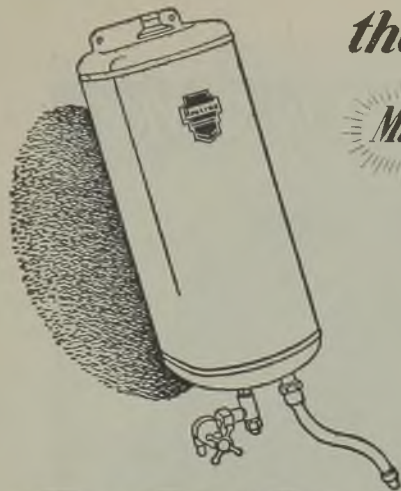
ARMS OF THE OHM'S LAW

May we quote you for any of the following:—

DIMMERS — REGULATORS (Field, Shunt, Voltage) — RESISTANCES (Arc Lamp, Charging, Regulating, Sliding) — RHEOSTATS — ELEMENTS and SPIRALS. ASBESTOS WOVEN RESISTANCE NETS AND GRIDS

H. A. BIRCH & CO. LTD., Wilohm Works, Wood Street, WILLENHALL, STAFFS.
Telegrams: "WILOHM" Willenhall. Telephone: Willenhall 494-495

the value of *new ideas*



Many years ago, a Mr. Dunlop conceived the idea of a pneumatic tyre to eliminate the many bumps of solid-tyred cycles. To-day — all the world "rides on air" thanks to Mr. Dunlop's pioneer idea.

* * *

More recently, Heatrae decided — after lengthy experiment — that Monel was the ideal metal for Electric Water Heater Construction. Another example of a "Pioneer idea" which must ultimately influence Water Heater design and vastly simplify Maintenance.

HEATRAE

leaders in electric water heaters

HEATRAE LTD., NORWICH

PHONE : NORWICH 25131

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Sole Manufacturers of "WESTMINSTER" ARC LAMPS

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and
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purposes



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Dynamos, Motors, Alternators
and Transformers Rewound
and Re-constructed

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**The WESTMINSTER
ENGINEERING CO. LTD.**

VICTORIA ROAD, WILLESDEN JUNCTION
LONDON, N.W.10

THE "FACILE" TERMINAL



Send for Prices
and List of all
kinds of
Terminals

ROSS COURTNEY & CO. LTD.
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OPERATING CLUTCHES



Makers of all types of repetition products from the Bar in all metals to the specific requirements of our customers



M-C-L and REPETITION LTD.
Pool Lane, Langley, Birmingham.



Ensign Lamps conform in all respects to rigid B.S.I. specifications. In other words, they are superlatively good lamps—as good as lamps can be: there's none better

Yet they offer definite price advantages.

Well worth while enquiring from your Wholesaler or direct before placing orders elsewhere.

ENSIGN *Lamps*

ENSIGN LAMPS LTD., PRESTON, LANCs.

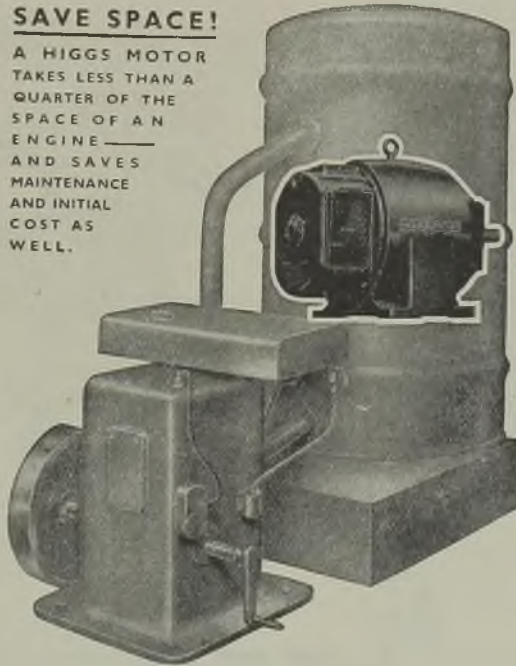
London (North): Clay Hill, Bushey, Watford, Herts.
 London (South): 10, Kingston Hill, Kingston-on-Thames,
 Glasgow C2: 42 York Street
 Manchester 4: 20 Swan Street.

Birmingham 1: 40 & 42 Summer Row
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SAVE SPACE!

A HIGGS MOTOR
TAKES LESS THAN A
QUARTER OF THE
SPACE OF AN
ENGINE —
AND SAVES
MAINTENANCE
AND INITIAL
COST AS
WELL.



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PLAIN ENDS.



No. 352. BEVELED
ALL WHIT SIZES.



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HARDENED AND
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No. 367.
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FLANGE WASHERS.
LARGE $2\frac{1}{2}$ - $3\frac{1}{2}$ " HOLE.
SMALL $1\frac{1}{8}$ - $\frac{5}{16}$ " HOLE.



No. 512.
FLAT SPRING
TIPPED ENDS



No. 1302.
B. S. F.
ALL SIZES.



No. 54.
LIGHT DOUBLE
COIL.



No. 554 D.
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TERRY'S SPRINGS

Spring and plain steel washers of every type and size . . . in round, square, flat section, etc. etc.
Let us know your requirements. We can fill them promptly and efficiently. Our 89 years of spring and pressworking experience enables us to offer washers that are different. We can make washers to special shape and our research department is at your disposal.

Send for war-time catalogue

FAMOUS
FOR SPRINGS
& PRESSWORK
SINCE
1855

Sole Makers:
HERBERT TERRY & SONS LTD., REDDITCH
LONDON MANCHESTER BIRMINGHAM



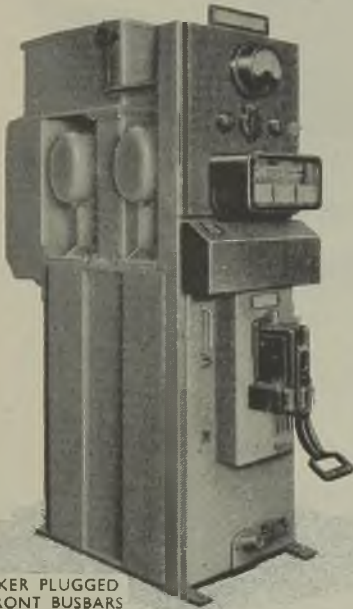
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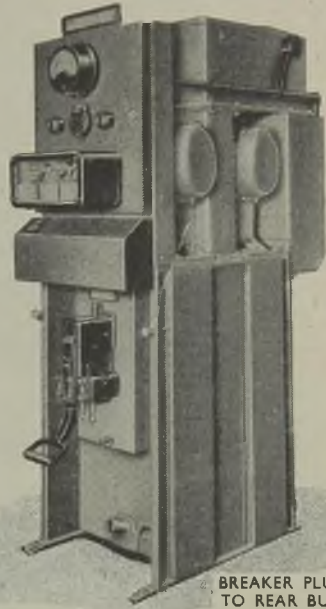
Class QF

DUPLICATE BUSBAR

(Compound Filled).



BREAKER PLUGGED
TO FRONT BUSBARS



BREAKER PLUGGED
TO REAR BUSBARS

Incorporating
Drop-traverse-raise
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**UP TO 11kV.,
250 MVA.**

**FULLY TESTED FOR
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WILLESDEN

THE BRITISH THOMSON HOUSTON COMPANY LIMITED, WILLESDEN, ENGLAND

A 3564





BRYANISING MEANS BETTER GALVANIZING

During the War years we have been frequently called upon to provide Wire and Wire Rope which would stand up to conditions without precedent.

We realised, in advance, that our products would, of necessity, receive the harshest possible treatment and, that they must not fail.

BRyanising survived all tests.

War with its exacting demands has proved beyond all doubt that BRyanising does satisfy the claims made for it.

BRyanising means better Galvanizing, for it provides the strongest possible resistance to corrosion.

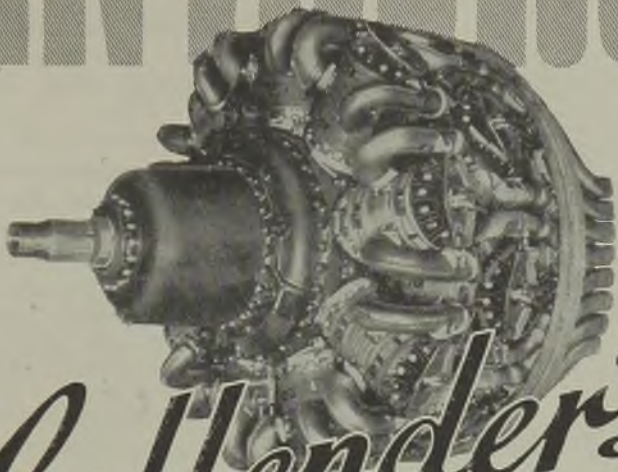
BRITISH ROPES *Limited*

HEAD OFFICE DONCASTER
OFFICES WORKS AND STORES
THROUGHOUT GREAT BRITAIN



MANUFACTURERS OF
WIRE ROPE · WIRE
HEMP CORDAGE & CANVAS

CENTAURUS



Callender's

HIGH TENSION IGNITION CABLES

*are installed in
this mighty "Bristol"
2,000 h.p. aero-engine*



BRITISH INSULATED CALLENDER'S CABLES LIMITED

MAIN WORKS: ERITH · HELSBY · LEIGH · PRESCOT



SCALE and FUR
on
KETTLES
WATER-HEATERS
ETC.

removed harmlessly
in a short period
SIMPLY ADD

"Fur-offit"

to the hot water in the utensil
and the mixture does the rest

QUANTITIES OF APPLIANCES
CAN BE TREATED IN A BATH
OF THE LIQUID

SAVE FUEL

by
using scalefree utensils

Send P.O. for 1 6 for sample bottle
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MANCHESTER—29 Piccadilly.
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Midland Representative:
W. T. BOWER, 184 Jockey Road, Sutton Coldfield

★ **Announcing**
Glass Seal
Terminals

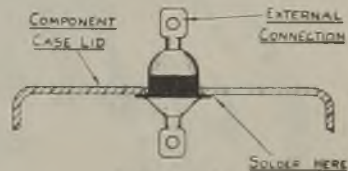
Process Patent applied for.

After rather more difficulties than we expected, we have developed a method of production in our factory at Enfield, where we are able to turn out many thousands per week . . . *NOW*.

Terminals at present available are illustrated about actual size; other sizes will follow.

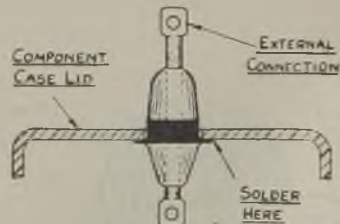
They withstand instantaneous and repeated thermal shocks of at least 250°C and will support at least 40 lbs. per square inch air pressure without leakage. These terminals are supplied tin-plated to permit soldering with modern resin cored solders or solder pastes.

Supplied packed in cartons containing 100.



List No. 576.

750 V. DC. Working at 40,000 feet.
1,500 V. DC. Working at sea level.



List No. 577.

1,500 V. DC. Working at 40,000 feet.
3,000 V. DC. Working at sea level.

BELLING & LEE LTD
CAMBRIDGE ARTERIAL ROAD, ENFIELD, MIDDX

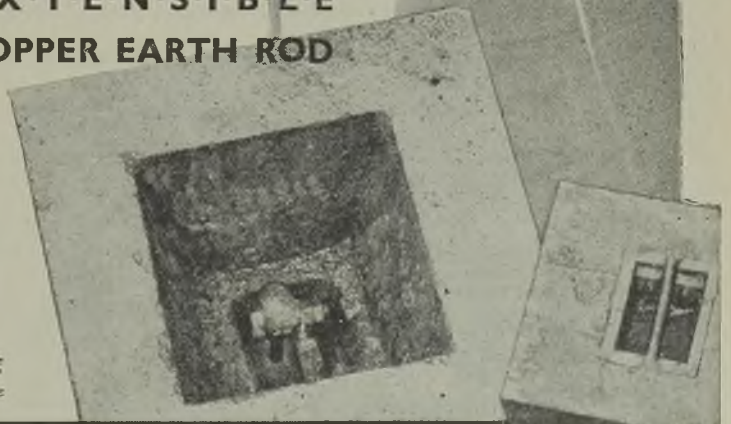
An earth rod which reaches for results

Embodying the known virtues of the earth rod electrode—ease and low cost of installation—here is a new type of rod with a wider field of application. Because it is Extensible it can be driven, in 4 ft. lengths, to great depths to take advantage of deep strata of low resistivity — inaccessible economically by other means. When sunk below ground level and fitted with an "Easy-Access" Inspection Cover, the bonding and conductor are protected from mechanical damage and undesirable surface potential gradients are minimised. B.I. Technical Advisory Service will gladly advise on specific applications for the

B.I. E·X·T·E·N·S·I·B·L·E COPPER EARTH ROD



For further details write for "EARTHING" — a new B.I. brochure



BRITISH INSULATED CALLENDER'S CABLES LTD.

PRESCOT, LANCS.

PRESCOT 6571



COINING MONEY? Tee! Hee!

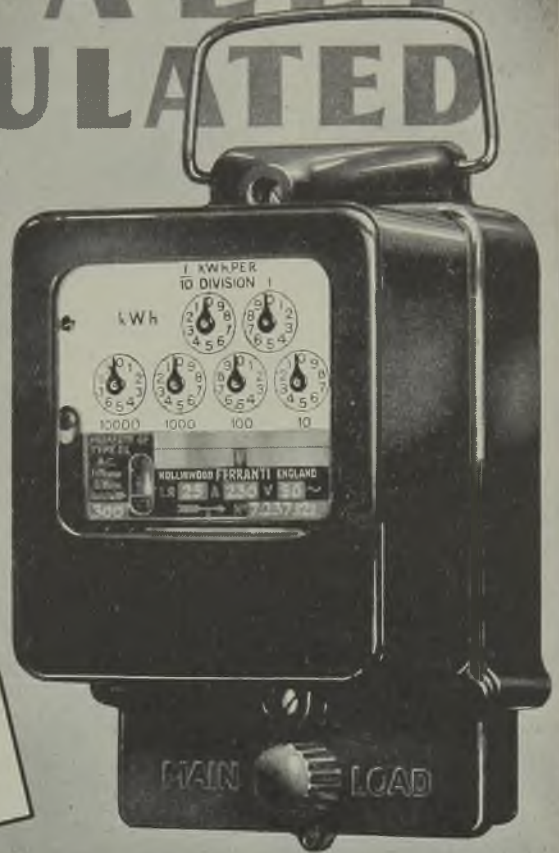
“Us has been coining money since we was little daddlers. Many’s the arf-a-bar wot’s come from our honest toil, and our brother Jasper can make a fiver look better than real. But us has got the finest way of making money now. We sell Ekco Lamps. There’s coining money for yer.”

There’s excellent profits and prestige in selling Ekco Lamps. Get full details about them and the extra discount they bring! We will send particulars, too, of Plastalux Light Fittings and the new simplified discount system.

Write at once to E. K. Cole Ltd., Lighting Division, Ekco Works, Southend-on-Sea.

EKCO LAMPS

TOTALLY INSULATED



APPROVED BY THE
ELECTRICITY
COMMISSIONERS
AND USERS ALIKE

TEMPERATURE COMPENSATED

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is In The Picture!



Wherever military operations are conducted, there unseen and unnoticed in the equipment of man and machine are Empire Rubber Products, protecting men against shock and discomfort, and machines against vibration, wear and the elements.

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THE FIGHTING FORCES**

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 Phone: DUNSTABLE 533
 Grams: SPANDIT, DUNSTABLE

For **POST-WAR HOUSING
INSTALLATIONS**

Tucker

**SWITCHES
AND
ELECTRICAL
ACCESSORIES**

**TUCKER
TELEACCESSORIES
PRICE LIST**

644

The advertisement features a dark background with white and light grey illustrations. On the left, a two-story house is shown. On the right, a silhouette of a person's head is shown in profile, with a large electrical switch mechanism inside. In the center, the word 'Tucker' is written in a large, stylized, gothic font. Below it, the words 'SWITCHES AND ELECTRICAL ACCESSORIES' are written in a bold, sans-serif font. At the bottom center, a book titled 'TUCKER TELEACCESSORIES PRICE LIST' is shown, with the number '644' on its cover. The book has a small logo on the front cover.

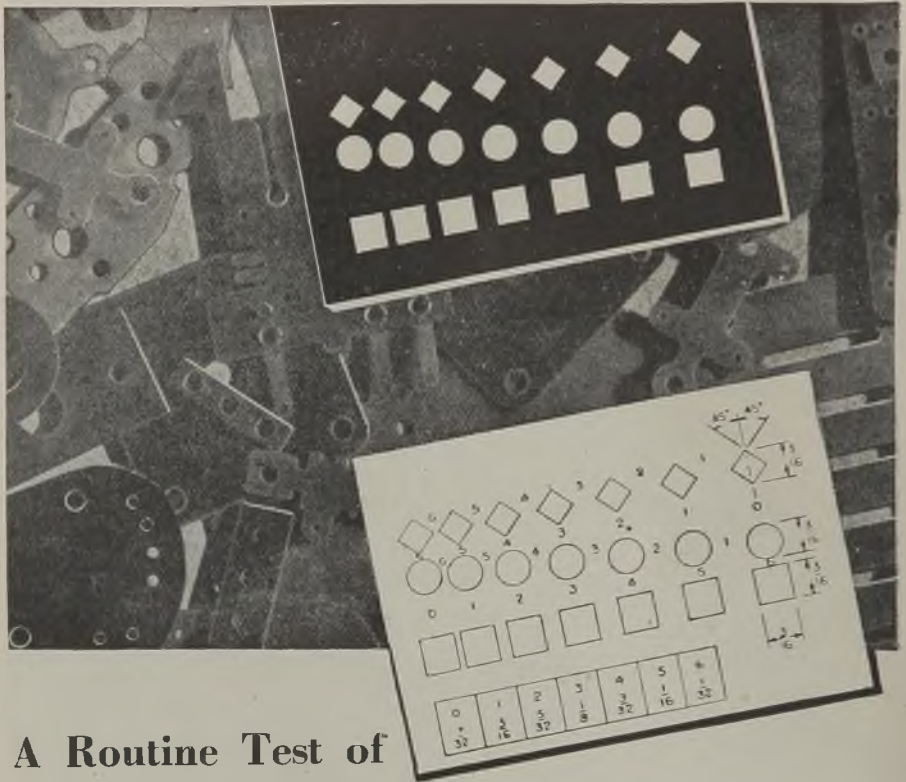
Tested under arduous

Service conditions the Tucker Titan 5 amp. Q.M.B. small base switches, shockproof Lampholders and Moulded Ceiling Roses form an ideal range of installation accessories for trouble-free Domestic circuits. Full details are given in Price List, Ref. G.44.

J. H. TUCKER & CO. LTD., Kings Rd., Tyseley, Birmingham 11

Makers of First Grade Electrical Accessories for over 50 Years





A Routine Test of BAKELITE LAMINATED

IT IS THE NORMAL PRACTICE FOR Bakelite Limited to test thoroughly its products before supplying them as the raw materials of industry.

Above is a piece of Bakelite Laminated which has been subjected to the routine punching test.

This test is made with a punching tool scientifically evolved and standardized for the purpose. Examine in the dia-

gram the various hole shapes, positions and clearances, which represent every reasonable condition that is likely to be encountered. This test has been in constant use since long before the war and provides valuable information on all punching materials.

Samples and data of special punching grades for a variety of purposes will be furnished upon request.

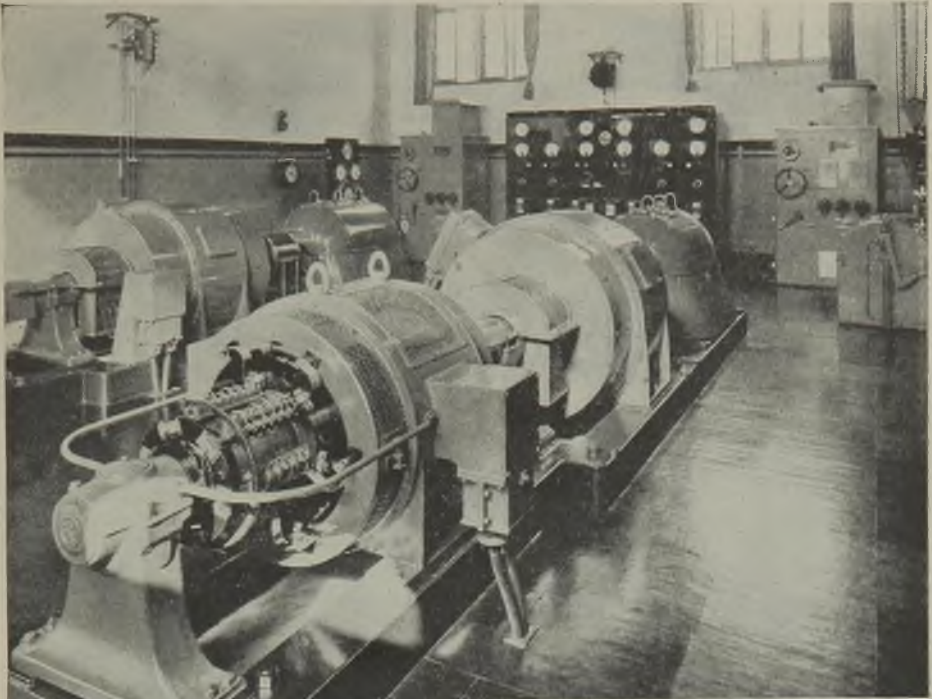
TREFOIL

BAKELITE PLASTICS

REGD. TRADE MARKS.

Pioneers in the Plastics World

BAKELITE LIMITED · 18 GROSVENOR GARDENS · LONDON S.W.1



ALLEN WATERWORKS PUMPING PLANT

THE photograph reproduced shows the Force Pump House at the Cosford Pumping Station of the Wolverhampton Corporation. Two motor-driven force pumps are installed, each designed to deliver a range of quantity of from 2.0 to 4.0 m.g.p.d. from a mixed water sump into the pipeline from Cosford to Tettenhall against pressure heads ranging from 285 feet above the top water level of the sump for the lower rate of discharge, up to 400 feet above this level at the maximum rate of pumping.

Each force pump is a three-stage double-suction pump arranged horizontally with a 14-in. suction branch and 12-in. discharge branch. The casing is split on the horizontal centre line so that the cover may be removed for inspection and/or withdrawal of working parts without breaking pipe joints. The use of double suction impellers eliminates heavy end thrust and simplifies the bearing arrangements.

Each pump is driven by a 455-h.p. B.T.H. slipring type induction motor, with direct coupled Scherbius regulator for giving the required speed variation of from 1,120 to 1,410 r.p.m.

The average guaranteed energy consumption for the river water pumps and well pumps (illustrated in previous issues), and the force pumps, is 1.140 K.V.A. per W.H.P. over a considerable range of duty. This guarantee includes losses in the transformer, cables and switchgear, and was fulfilled at official tests.

W. H. ALLEN, & SONS & CO. LTD.
BEDFORD ENGLAND



Talking about motors...

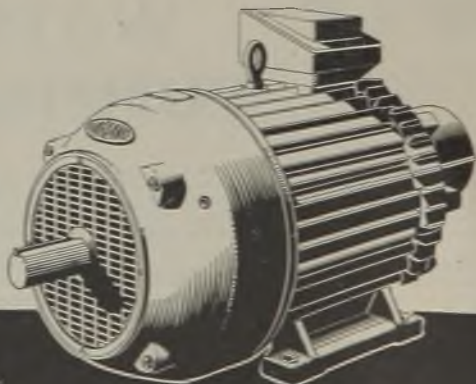
When you're talking about motors, it's well worth remembering that little spots of bother like this CAN be quite rare.

We are very proud of the history of our motors and generators working in all parts of the world with unflinching service

year after year. Many years' experience has been welded into their production—so that today a Harland Motor is a guarantee of efficiency, reliability and economy in operation. Details of our ranges are given below—may we send you descriptive matter?

- Standard A.C. and D.C. Motors from 10 to 2,000 H.P., rib-cooled
- and core-cooled Motors up to 1,500 H.P., Two-pole Machines in all enclosures—direct coupled drive, Alternators—engine-driven or geared steam turbine, plain and auto-synchronous Motors of all speeds, Motor-Generator Sets, Wide Speed Range shunt-controlled D.C. Motors, Submersible Motors.

The illustration shows one of our range of totally enclosed RIB-COOLED Motors—a design particularly well suited for working under wet or dusty conditions. It is economical in outlay, highly efficient and is available from 7½ to 150 h.p. (at approximately 1,450 r.p.m.). Motors of larger horse-power available in the Harland Core-cooled range.



S 321

THE HARLAND ENGINEERING CO. LTD., ALLOA, SCOTLAND
Manufacturers of Electric and Hydraulic Machinery



READY TO SERVE . . .



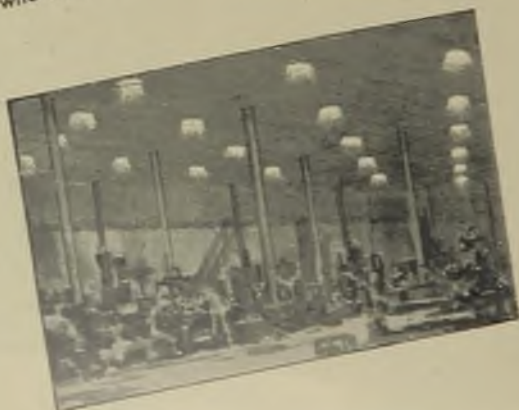
In many of Britain's great docks, J. & P. Plug Boxes are helping to load and unload, repair and re-victual—like these tandem pillars installed by the Clyde Navigation Trust. J. & P. too, are ready to serve . . . on any Plug Pillar problems.

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

Chapter Six INDUSTRIAL LIGHTING

Adolf Hitler at least did one good service to this country—he shook us out of that lethargy and complacency which a spell of "peace and plenty" is prone to produce. He taught us that the difference between a rut and a grave is only a matter of inches—that to progress in the world of production we must first progress in our own works.

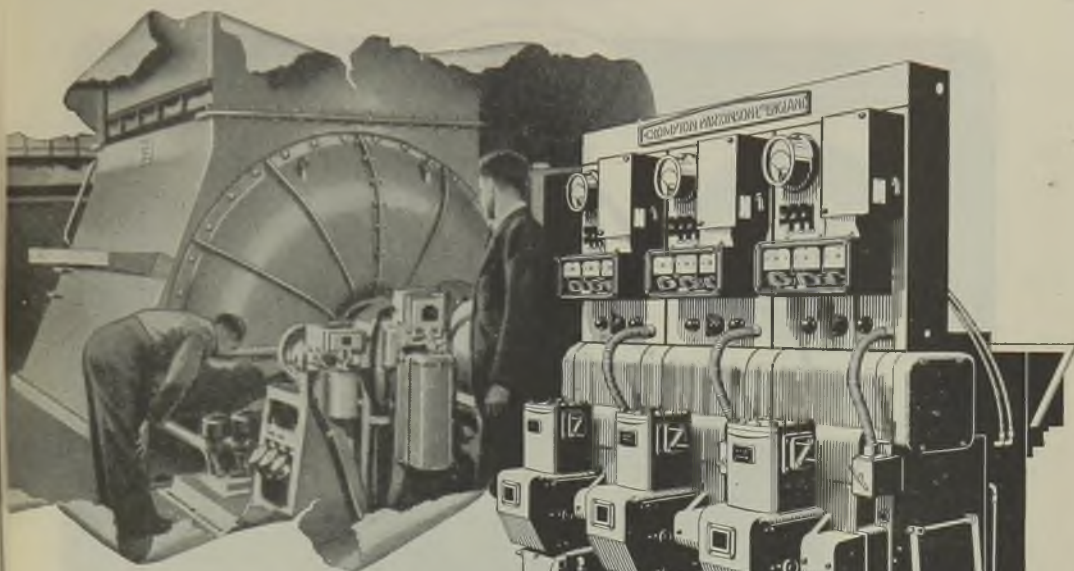
We can help you such a lot in your industrial lighting problems, if you will but tell us who and where you are!



R · E · A · L

September 21, 1945

All set for the next test



Proving Crompton Switchgear

New types of Crompton Switchgear are developed and tested for rating in the Crompton Short Circuit Testing Station—one of the recognised stations of the Association of Short Circuit Testing Authorities.

The experience which is incorporated in the design of Crompton Switchgear, coupled with A.S.T.A. Certificates of rating, are your guarantee of its safety in operation.

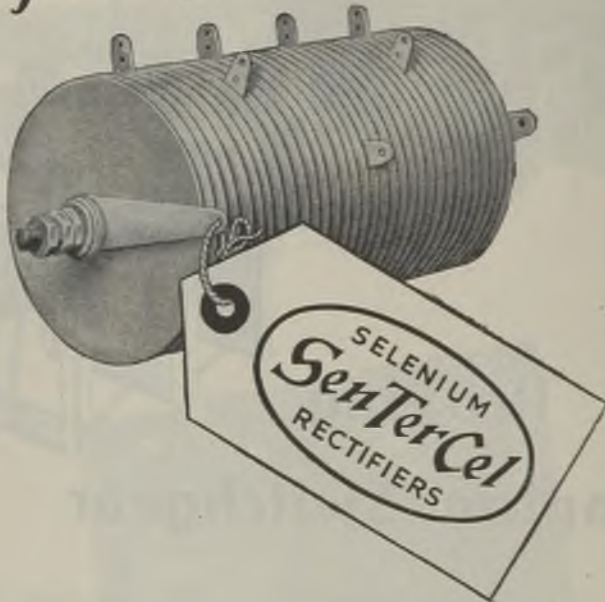


CROMPTON PARKINSON
LIMITED

ELECTRA HOUSE, VICTORIA EMBANKMENT, LONDON, W.C.2
TELEGRAMS: CROMPTON

SELENIUM
SenTerCel
RECTIFIERS

Your Guarantee



WHEN we were the only manufacturers of Selenium Rectifiers in this country there was no need to give a special name to our product.

The many advantages of the "Standard" Selenium Rectifier over other types has inevitably introduced competition, and we have therefore adopted the name of "SenTerCel" as our trade mark, so that our customers may know that rectifiers bearing this name will have the high standard of performance to which they have become accustomed.

The name "SenTerCel" combines the idea of centre-contact construction, which is an exclusive feature of our rectifiers, with the S.T.C. registered trade mark which is known all over the world as the symbol of the highest quality in tele-communication equipment.

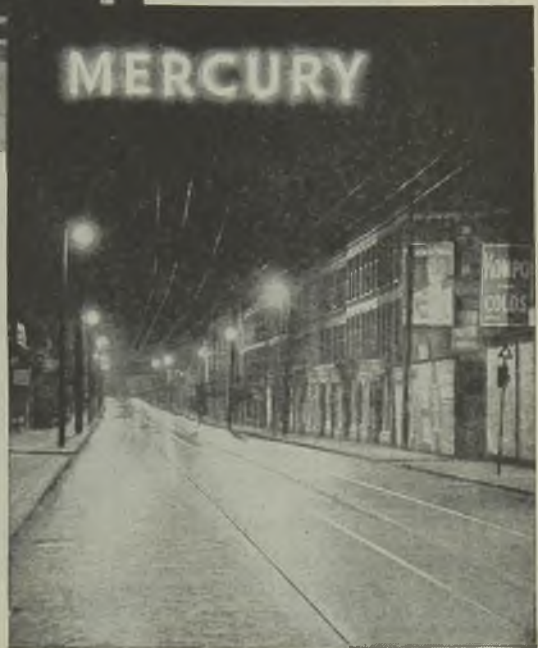
Standard Telephones and Cables Limited
NEW SOUTHGATE, LONDON, N.11



**PLANNED
Street Lighting**

**Fittings Proved
in Service**

Eleco's 40 years' experience is at your disposal and a complete range of Fittings proved in service for Tungsten, Mercury and Sodium Discharge Lamps will be available. Catalogue on request.



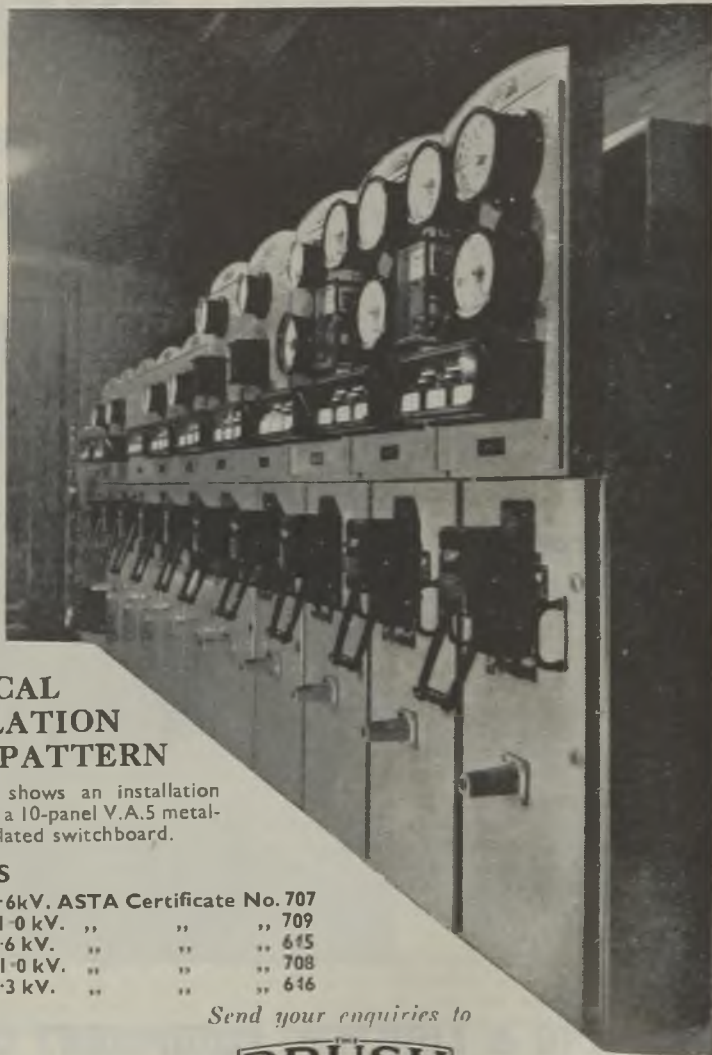
ENGINEERING & LIGHTING EQUIPMENT CO. LTD

DEPT. W.S., SPHERE WORKS, ST. ALBANS, HERTS.

BRUSH

METALCLAD AIR INSULATED

SWITCHGEAR



VERTICAL ISOLATION PATTERN

Photograph shows an installation consisting of a 10-panel V.A.5 metal-clad air insulated switchboard.

RATINGS

250 MVA. 6·6kV. ASTA Certificate No. 707			
250 MVA. 11·0 kV. " " " 709	"	"	" 709
150 MVA. 6·6 kV. " " " 615	"	"	" 615
150 MVA. 11·0 kV. " " " 708	"	"	" 708
100 MVA. 3·3 kV. " " " 616	"	"	" 616

Send your enquiries to

THE
BRUSH
ELECTRICAL ENGINEERING
LOUGHBOROUGH
ENGLAND

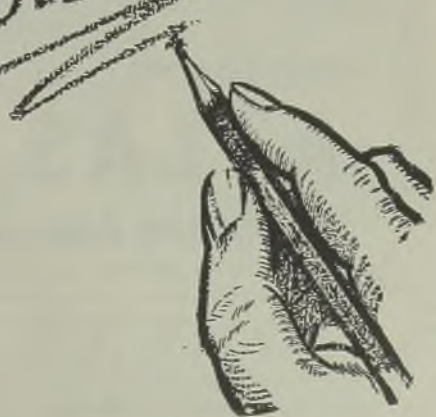
8-35c

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

Please send all your
enquiries for Paper
Insulated Cables to

The Liverpool Electric Cable Co., Ltd
Booth, Liverpool, 20.

They can give the
service you require



WHAT ARE YOUR LAMPS

Saving

~~COSTING~~ YOU?

There is the difference! All along the line Atlas Lamps show you a clear *saving*! Every Atlas Lamp is checked and tested at every stage of manufacture. Guaranteed to come up to the highest possible standard of efficiency. That is why Atlas Lamps last!

A still further saving is the extra discounts you get. To keep your standard of lighting high but your yearly lighting bills low—instal Atlas Lamps. Write today for terms.



WHY NOT USE THIS SERVICE ?

You do not need telling how important right lighting is for factory and office. But perhaps you will allow our Lighting Engineers to tell you how to get the best results for your particular premises. Send a line, and they will visit you.

ATLAS LAMPS

Nothing better has come to light

THORN ELECTRICAL INDUSTRIES LTD., 105-109 Judd St., London, W.C.1. Phone: Euston 1163

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REYROLLE EQUIPMENT IS PROTECTING
BUSBARS AND BUSBAR-ZONES STABLY
AND EFFECTIVELY THE WORLD OVER



Specify **REYROLLE**

HEBBURN-ON-TYNE

ENGLAND



*Just as efficient as when
first installed*

NFP

Essex
METHYL BROMIDE
TRANSFORMER PROTECTION
INSTALLED SOME YEARS AGO
BY
The NATIONAL FIRE PROTECTION COMPANY Ltd.
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LIGHTING FOR INDUSTRY



Many years ago Holophane Laboratories first began work on light distribution for industry. Recently all that work has been revised and recast in the light of the accumulated experience with the result that today's Holophane Industrial Glassware provides both high output efficiency and accurately controlled light distribution. Holophane Engineers can draft you a correctly planned, efficient lighting installation for your own plant. Ask for your local Holophane man to call.

HOLOPHANE

LIMITED

ELVERTON STREET, LONDON, S.W.1

Specialists
in Lighting
Research
and
Application
since 1898

VICTORIA 8062 (4 lines)

LOW TENSION CABLING...



No Risk



OF DAMAGE OR FIRE

THE distinctive characteristic of "Pyrotanax" M.I. Cables is the fact that they are made wholly and solely of copper and mineral insulant. Oil, water, condensation—nothing will affect them. They can be knocked about, trampled on and crushed without being any the worse for such treatment. Above all they are inherently fire-resisting and unaffected by accidental overload. Bend them as you will to any shape; they can be held snugly in position by any form of clip, saddle or clamping device. They do not require conduit or any other form of protection; and, once installed, they are virtually everlasting—efficient, economical and safe.

FIRE RESISTANT * UNAFFECTED
BY OIL, WATER, CONDENSATION,
ACCIDENTAL OVERLOAD OR CROSS
ILL-USAGE * EASY TO INSTAL *

For Lighting & Power



PYROTENAX LTD., HEBBURN, Co. DURHAM

Telephone: Hebburn 32244/5

LONDON OFFICE: 7 Victoria Street, S.W.1

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BIRMINGHAM OFFICE: 2 Moor Street, Birmingham 4

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CLOCKS Old & New No. 5

*The Inventions of
George Graham*

Have you noticed that slight reflex action of the large hands of certain big clocks? This is due to the engaging and disengaging of the escapement causing "recoil." Honest George Graham's invention in 1715, the amazingly simple dead beat escapement, practically eliminated this fault, proving so efficient that it is used for high class clocks to this day. He improved, too, the time-keeping of clocks by introducing mercury into the pendulum bob; when heat caused the pendulum to lengthen and slow the clock down, the mercury expanded and rose in its tube, so counteracting this effect.

SMITH ELECTRIC CLOCKS


PLUG IN TO GREENWICH TIME

*The
Last Word in Precision
Timekeeping, they will
be in Great Demand
after the War.* (VERB. SAG)

Conymel

COVERED WIRE (U.K. REG. TRADE MARK)



 A remarkable new type of Insulated Wire.

Extreme toughness and resistance to mechanical damage.

Perfect flexibility.

High space factor.

High dielectric strength.

Freedom from pinholes.

Excellent ageing properties.

High resistance to solvents and acids.

Non-hygroscopic.

Connollys

CONNOLLYS (BLACKLEY) LIMITED · MANCHESTER · 9

RP-267



The 50-range Model 7 Universal AvoMeter.

The AvoMeter is one of a useful range of "Avo" electrical testing instruments which are maintaining the "Avo" reputation for an unexcelled standard of accuracy and dependability—in fact, a standard by which other instruments are judged.

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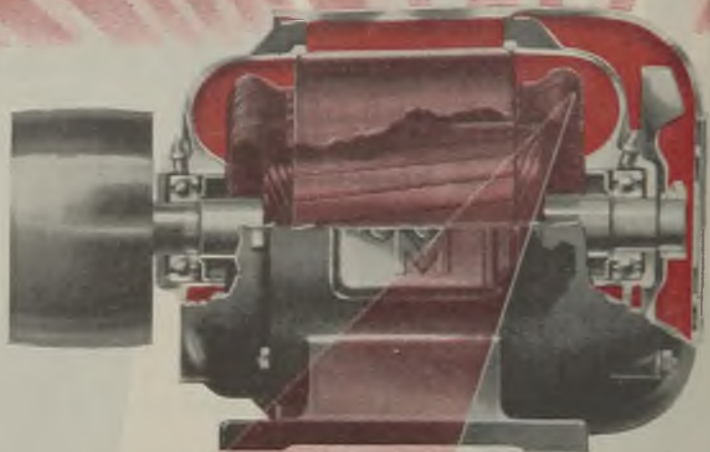
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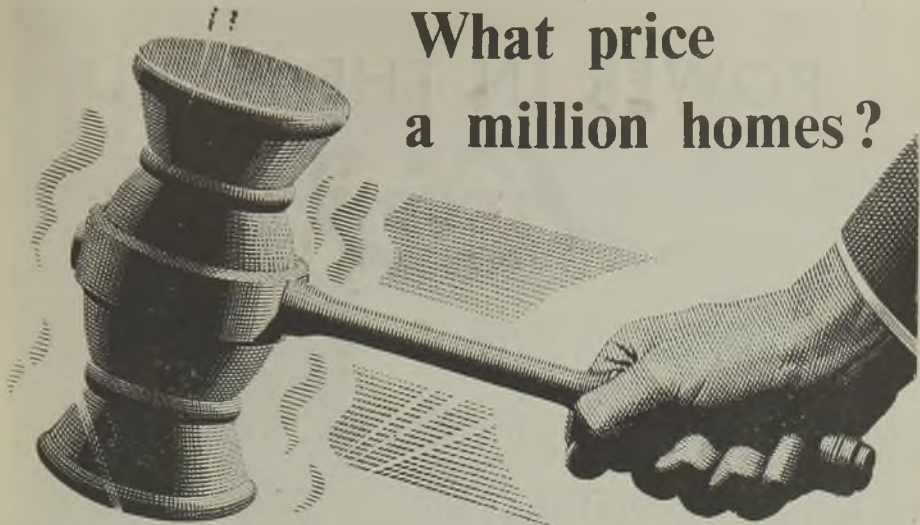
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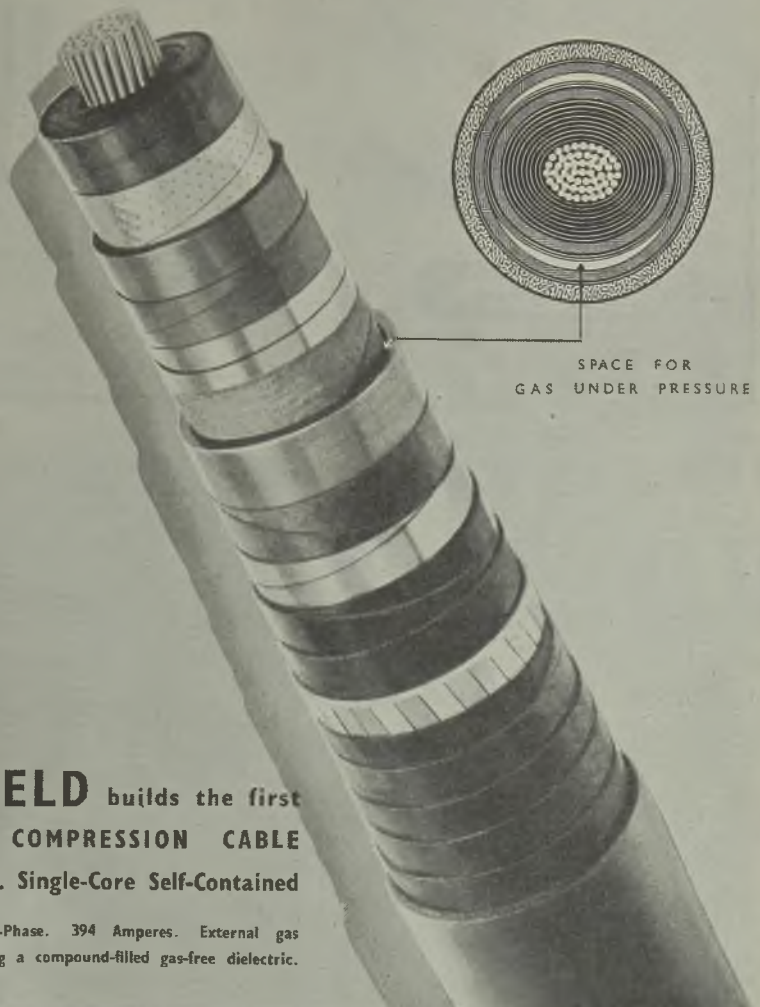
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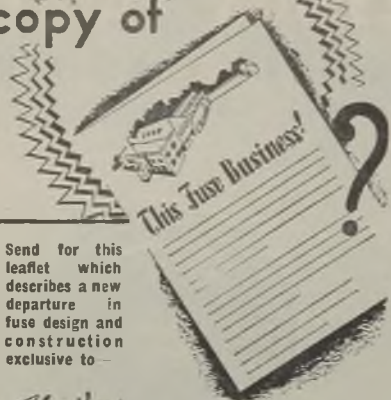
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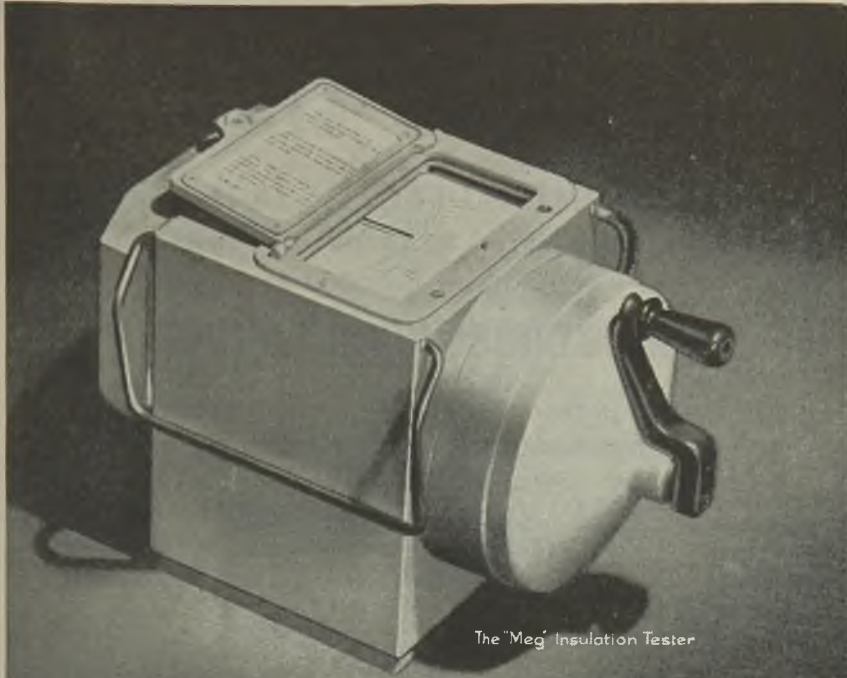
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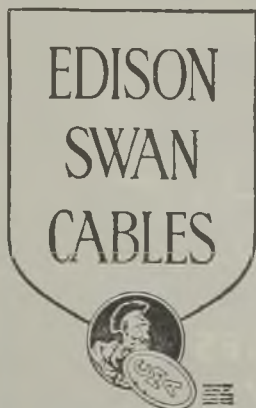
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ELECTRICAL REVIEW

September 21, 1945

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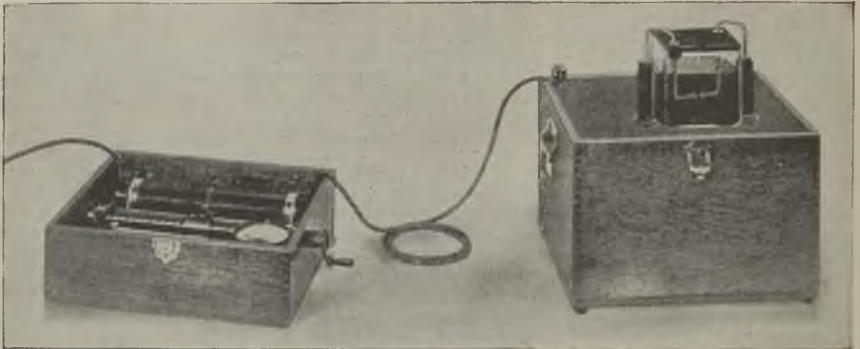
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ELECTRICAL REVIEW

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SEPTEMBER 21, 1945

9d. WEEKLY

Public Lighting

Impressions of Last Week's Conference

THE Association of Public Lighting Engineers is to be congratulated as being the first electrical professional organisation to be able to hold a major post-war conference; in the peculiar aptness of the expression of relief it represented—light after dark or street lighting after the black-out; and in putting up a really good show. We saw the conference sessions without a vacant seat, the luncheon tables manned in strength, and the exhibition hall crowded to "saturation point."

A measure of gloom tends to mask this happy picture, however, as the result of the threatened imposition of restrictions on public lighting on account of to-day's fuel shortage. Worse, many members talked about this shortage as if it must be a permanent feature of our national life. In asking whether these restrictions are really necessary, we would like to know something about the true economic value of lighting cuts, especially by way of comparison with possible economies in many other directions.

Lighting and Efficiency

The call to-day is for maximum post-war emergency production; and, as engineers, we know something of the value of the contribution of the best possible general lighting to improved production efficiency.

We heard many expressions of the necessity for taking the long view of public lighting development, particularly in relation to post-war reconstruction and the problems of road and town

planning. Of course; but we cannot subscribe to any view which supports the idea that major street-lighting development work, particularly with regard to siting, must await the actual establishment of the roads. The "architecture" of both road making and street lighting cannot be as impoverished as that. Further, street lighting engineers are preponderantly electrical engineers, and electrical engineers have had some lessons on how to bring about mutually profitable co-operation.

The Ideal

We liked the President's reiterated street-lighting ideal—that the drivers of vehicles shall see the streets independently of the lights carried by their vehicles. It presents a sound engineering problem. And if we may answer a presidential query, we certainly ought to light for something far more than mere safety visibility.

The conference did not bring forth any notable controversy on broad principles—and we are glad of it, for this is essentially a stocktaking time. All the same we cannot agree that, for instance, the 1938-9 question of sodium *versus* mercury vapour has been settled—far from it, and tungsten lighting still exerts a very big influence. But we do believe that the experience obtained in connection with discharge lighting has taught the electrical industry a good deal about directional lighting.

Certain comments were heard relating to public lighting centralised automatic control systems, which conveyed the

impression that the systems were designed precisely for to-day's peculiar conditions relating to economy, restrictions, etc. Early in the war we heard much the same sort of thing with regard to possible wartime lighting. We are not quite happy about this. Centralised automatic control is a logical development consequent upon lighting progress. It has little or nothing to do with retardation. It should be regarded in the light of the wider opportunities of to-morrow rather than be tied up with the limitations of to-day.

ALTHOUGH the magnetic "Degaussing" mine was one of the first of Hitler's "secret weapons," it is only during the past few days that the general particulars given in this issue have been officially released. Its menace was most obvious during the early months of the war, but its use on a large scale in various forms (*e.g.*, the reversed polarity type for catching "over-degaussed" ships and the intermittently actuated type) and with ever improving sensitivity was continued throughout. That it did not figure more largely in the news in the later stages was due to the ready ability of scientists to devise counter-measures as soon as, or even before, the need arose.

As in this country, people in France are asking whether electricity will again be curtailed next winter. There is a big difference, however. In Paris, instead of a shortage of kW on the peak on a few cold days, there was a lack of kWh at all times. At the time of the liberation only 200,000 kWh per day was available, so that flats could be lighted for only $1\frac{1}{2}$ hours. In January the amount rose to 13.5 million kWh. Since then both coal and transport conditions have improved and it is hoped, with the aid of interconnected hydro stations, to provide a more extensive service. Electricity in Paris is said to cost four times as much as it did before the war.

"SELF-SUFFICIENCY" is not the only factor likely to affect our future trade with the other countries of the Empire. For years past Great Britain has been viewed as the centre to and from which radiated Dominion trade routes, but gradually in addition to this "radial" traffic there has grown up

"circumferential" trade between the daughter countries themselves with Canada as a predominating factor. Recently the Indian Trade Commissioner in Montreal said that the total value of trade between India and Canada in 1944 reached the record figure of more than \$202 million, an increase of \$51 million over 1943 and nineteen times more than the figure for 1938. He considered that India could easily buy increasing quantities of consumers' goods from Canada, including electrical goods and appliances, as well as factory equipment.

REFERENCES are beginning to appear to ways in which surplus stores in the hands of Government Departments are to be released. For instance the setting-up of a Wool Industry Surplus Cloth Corporation is announced. Its function will be to take over from the Government stocks of cloth and dispose of them in an orderly way through trade channels for civilian use. We believe that some such plan is in hand for dealing with electrical equipment but it seems to be proceeding very slowly. It is not known how much there is, or of what nature, but it seems to us that its release would help to relieve to some extent the shortage of supplies which slow demobilisation of men from the Forces and "reconversion" difficulties are not remedying.

EMPIRICAL discoveries of uses for electricity are not uncommon. So far no scientific explanation has been given of the claim, as investigated by the U.S. National Bureau of Standards, that the cutting rate of diamonds can be materially increased by producing an electric arc at the contact between the diamond and the flat cast-iron lap charged with diamond powder, while even octahedron faces proved amenable. The lap was connected to one of the secondary terminals of a 5,000/100-V, 300-VA, transformer with a capacitance of 0.005 to 0.008 μ F across the secondary leads. If the primary current of 0.5 A and the capacitance were reduced the cutting rate was decreased, but so it was when the current was increased. By applying the arc to the diamond saw its rate was also greatly improved and cuts could be made under any orientation.

Public Lighting Engineers

Successful Conference at Glasgow

THE three-day conference of the Association of Public Lighting Engineers was held in Glasgow last week under the presidency of Mr. E. J. Stewart, inspector of lighting to the Glasgow Corporation. All arrangements had been made for a conference in Glasgow in September, 1939, but it had to be cancelled on account of the war. There was an attendance of about a thousand delegates and visitors from all parts of the British Isles.

On September 11th the LORD PROVOST (Mr. James Welch) gave the Association a civic welcome at the Royal Technical College and expressed his added pleasure in doing so as the conference celebrated the coming of age of the Association. Mr. E. C. LENNOX (Past-President) thanked the Lord Provost, and Mr. S. B. LANGLANDS, a previous inspector of lighting in Glasgow, and Captain A. J. LIBERTY, formerly inspector of lighting to the City of London Corporation, both founders of the Association, gave a brief account of the earlier conditions of street lighting and commented on subsequent developments.

At the annual general meeting which followed the hon. treasurer (Mr. H. C. BROWN) submitted the accounts and, drawing attention to the fact that the income had been well maintained, said that the slight falling off was accounted for by a number of members who had been called to the Forces and whose subscriptions had been suspended

Members of Council, J. F. Colquhoun (Sheffield), H. V. Emptage (Margate), N. Boydell (Eastbourne), E. C. Lennox (Newcastle-upon-Tyne), Robert Lee (St. Pancras), H. Pryce Jones (Brighton), A. S. Tapsfield (City of London), T. Wilkie (Leicester), and C. I. Winstone (Gas Light & Coke Co.); Hon. Treasurer, H. C. Brown (Gas Light & Coke Co.).

Proposals for altering the constitution were discussed. The points raised will be considered by the Council and a final draft will be sent to members before the calling of a general meeting. It was explained that the aim is to conduct the affairs of the Association in future on the lines of a professional body; it was proposed to alter the title to "The Institution of Public Lighting Engineers." Modifications were proposed in regard to qualification for membership. The Council did not propose to institute an examination scheme yet but suggested that full membership should only be granted to those who held the diploma of the Association, or were at least thirty years of age and held responsible positions as heads of public lighting departments which had control of not less than 1,000 lamps and, in addition, were associate members of the Association. Alternatively, corporate membership of the I.E.E., the Institution of Gas Engineers or the Institution of Mechanical Engineers might be deemed to be sufficient qualification. The Council



The Lord Provost of Glasgow receiving the delegates

by decision of the Council. The Association had been able to live within its income.

The result of the ballot for officers and Council for the coming year was as follows:—*President, E. J. Stewart; Vice-President, W. N. C. Clinch (Northmet Power Co.);*

might also admit to full membership other persons whom it considered had suitable qualifications.

Proposals were also made with regard to admission to associate membership of associates and students.

The President extended a cordial welcome to Monsieur Herzog, the Paris city engineer, and Monsieur Gaymard, of the Paris Electricity Company.

With regard to the Papers Competition, it was announced that four were sent in and



Mr. E. C. Lennox (N. E. Electric Supply Co.) at the microphone

that the following had been selected as first and second: "The Relation of Public Lighting to Safety on the Roads," by Norman Axford (Northmet Power Co.); and "Photometry in Relation to Street Lighting," by F. M. Hale (Technical Assistant, Glasgow Lighting Department). It had been intended that the winning papers should be presented at the conference but there was no time.

On the Tuesday afternoon the president delivered his address which was summarised in our last issue, and after a vote of thanks to the President, Mr. R. KELF COHEN (Director, Gas and Electricity Division, Ministry of Fuel and Power) referred to the circular issued to local authorities on August 22nd, urging them to shut off public lighting at midnight. The Minister regretted having to take this drastic step but economies were imperative. It was hoped that by the end of September every local authority would have taken steps to effect a substantial saving in fuel used for street lighting, but if by the end of September the reports of the Regional Controllers indicated that there were still a few authorities who did not realise the need for economy, he would have to consider whether he should not resort to the powers he possessed in this matter.

Mr. J. F. COLQUHOUN (Sheffield) commented on the small saving that would be effected and suggested that a sense of proportion would be necessary. In Sheffield the saving would be from 1 to 1½ per cent. of the domestic consumption. Mr. H. MIDGLEY (Plymouth) pointed out that if the lamps were turned off at midnight it would be generally impossible for practical reasons to put them on again in the morning. What did the Ministry propose should be done to avoid danger in the streets?

Alderman THRAVES (Sheffield) and Alderman R. BUSHBY (Burnley) supported the Minister's appeal, and Mr. KELF COHEN replying said the Minister would be greatly heartened by what had been said.

Mr. J. M. WARD then read his paper on "Glasgow's Street Lighting" (*vide* our last issue) and there was no discussion.

On Wednesday, September 12th, Mr. F. F. MIDDLETON read his paper on "Lighting of Bends, Junctions and Roundabouts." The discussion was opened by Mr. F. C. SMITH (Gas Light & Coke Co.) who said that while he agreed with most of the author's findings he felt that the paper so simplified the problem that if it were not interpreted correctly it might be misleading. The picture drawn by the author was on a static basis but anyone traversing a street whether as a motorist or a pedestrian did not find the conditions static.



Mr. F. F. Middleton presents his paper on the lighting of bends and road junctions

The road brightness from the point of view of a car driver, for instance, changed from time to time in consequence of the different reflection co-efficients according to the angle of approach. Moreover, the background against which a driver saw an object was misleading.

Mr. E. L. LEEMING (Urmiston) said that lighting would be very much improved if bends were super-elevated instead of cambered. In that case the lighting would be better if it were from the inside of the bend. If all cyclists were to be taken off the roads and put on cycle tracks, the lighting would have to be reconsidered. More economical lighting might be obtained as well as more uniform distribution with a greater use of super-elevation. Something might be done to improve road safety by using a different coloured light when a junction was being approached. On roundabouts the slope of the road should be inwards and this would again permit of level lighting on the inside of the bend instead of high level lighting outside.

Mr. R. GREAVES (St. Helens) expressed the view that high-level lighting, which could be seen at a distance, better enabled the traffic to get round a bend. A low mounting height pre-supposed a low intensity illumination but it was possible to have two low intensity sources at the lower mounting height and obtain greater uniformity at lower cost. Specifications for street lighting

should not be prepared solely from the electrical point of view and then applied to gas. Electric lamps were placed high because there was glare from them but gas did not need to go so high.

Mr. E. C. LENNOX (North Eastern Electric Supply Co.) said that glare was a matter of proportion. It was not a question of gas versus electricity but of contrast. The author was correct in not talking about roadway brightness but of background brightness, which included the road surface, background and everything within the line of vision; he did not know of any electrical firms who were designing lanterns for roadway brightness. Lighting engineers

were now convinced that they must create background brightness. There were two types of distribution. One was the cut-off type, which the author advocated, in which most of the illumination was cut-off over an angle of 75 deg, and the other was the non-cut-off type which gave maximum illumination between 75 and 85 deg. The reason for the higher angle was to create a brightness on the road surface and on the footpath, and to a certain extent on the



Mr. J. S. Smyth reading his and Mr. J. G. Christopher's paper on lantern design

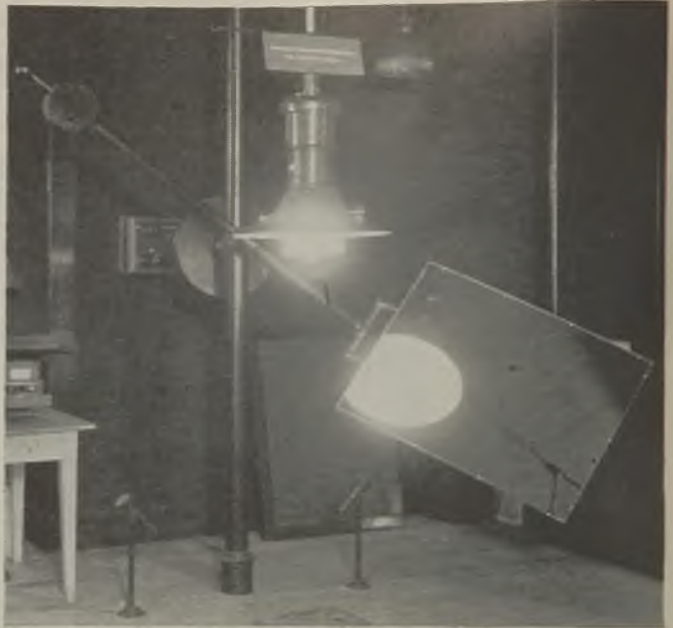


Part of the attentive audience

other surfaces of the background, and one important point which had not been brought out was that with the non-cut-off type of distribution the lamps could be 150 ft. apart with a consequential reduction in running costs.

Mr. MIDDLETON replying to the discussion, said that where the brightness varied the installation was badly designed. As to a different coloured light to indicate the approach to a bend or junction, there was the problem of eye adaptation. Super-elevation of the road surface at bends would not be necessary if there were good background lighting on the pavements. Motorists illuminated the roadway for themselves. There were many lanterns designed to scatter the light on the road. He was not advocating the cut-off type of illumination any more than

the Association, said that public lighting engineers were looking forward to giving a much better service than before the war, but conditions made it necessary for economies to be practised just at a time when the public had begun to have an appreciation of good street lighting. A great deal of excellent work was being done by the Association in con-



Apparatus for measuring light distribution characteristics



(Above) Messrs. W. Henly, G. T. Allcock, A. N. East and M. E. Pyser

(Right) Messrs. E. T. Pound, S. E. Hill, Dr. H. E. Gilibe and Mr. McGibbon



the other type, and as to the use of 150 ft. poles being an advantage, lower mounting heights and lower intensity sources with shorter spacing would, he contended, give just as cheap results.

After this session the conference luncheon was held at the Grosvenor Restaurant, the president being in the chair.

Mr. E. STROUD (president, Illuminating Engineering Society), proposing the toast of

junction with his Society, the British Standards Institution and other organisations.

The President, responding to the toast, said that the work of the Association and the Society was related and they would continue to co-operate to make public



Dr. Gillbe (Ministry of War Transport) with a group of members at the exhibition

lighting far better than it had ever been. He expressed the thanks of the Association to manufacturers of street lighting equipment for their contributions to the exhibition.

In the afternoon Dr. J. W. T. WALSH outlined the work of the drafting sub-committee of the main committee of the British Standards Institution dealing with the specification on street lighting, to implement

specification but others had thought that a Code of Practice would be the better method. This might be supplemented by a specification for a street lamp and other details. The main committee had decided by a substantial majority to proceed with a complete specification.

It was stressed, at the request of Dr. C. C. Paterson, chairman of the committee, that the re-draft which had been circulated to all organisations concerned was presented for comment and constructive criticism in order that a complete street lighting specification might be prepared. Dr. Walsh



(Above) Mr. E. Kelso (Harrogate) with his chairman (Councillor M. E. Mail) and Mr. Illingworth (Poplar)

(Right) Mr. W. J. Jones (E.L.M.A.), Mr. S. E. Britton (Chester) and Dr. J. W. T. Walsh (N.P.L.)



the Ministry of Transport Report of 1937. Dr. Walsh said that a re-draft of the B.S. No. 307, first issued in 1927 and revised in 1931, had been circulated for technical comment. Streets had been classified into eight groups—"A" to "H"—but the present proposals related only to traffic routes as defined in Group A. Views had been expressed in favour of a complete

then went through the many items in the re-draft and there was considerable discussion on the various points of detail. Comments in writing were also asked for.

Messrs. J. S. Smyth and J. G. Christopher (G.E.C.) read their paper on "Engineering

Principles in Street Lantern Design" on Thursday morning and the opener of the discussion, Dr. S. ENGLISH, spoke of the importance of the aesthetic outlook in regard to lantern design. He said that the corrosion of aluminium alloys was largely electrolytic, due to the contact of two dissimilar metals. It was possible to use pairs of metals which would not cause this form of corrosion.

Mr. W. J. JONES (E.L.M.A.) said in recent years the general life of the 400-W and 250-W mercury vapour lamps had been increased from about 1,500 to 3,000 hours. This halved lamp costs and greatly facilitated and reduced maintenance. Other improvements in lamps were also confidently to be expected.

Mr. J. F. COLQUHOUN (Sheffield) urged the need for the greatest possible co-operation between makers and designers and users to simplify installation and maintenance.

Mr. E. GARDINER THORPE (borough surveyor, Slough) asked whether it was likely that mercury vapour lamps in sizes below 80-W would be available in the near future, suitable for side street lighting. It would be an advantage if the control gear could be turned out as a complete unit ready to be fixed to a board in the base of the pole.

Mr. G. E. HILL (borough engineer, Gravesend) said that the electric lanterns in his area had remained in position throughout the war and when they were taken down last year less than 10 per cent. were found to have any serious defects, and these related almost exclusively to the anodised aluminium reflectors.

Mr. E. C. LENNOX expressed the hope that the tendency among the exhibits at the exhibition for the use of larger bolts and nuts would be continued. He was also pleased to see the side entrance of the wires to the lantern.

Mr. SMYTH, replying to the discussion, expressed agreement for the need of co-operation between the designer and users of fittings and suggested that the A.P.L.E. might inaugurate a "News Letter" in which comments and suggestions might be made which would be of the greatest value to the designer. He did not know whether a mercury vapour lamp below 80-W was on the stocks; the suggestion that the control gear should be in a separate unit was excellent and no doubt designers of auxiliaries would bear it in mind.

The conference closed with votes of thanks to the Lord Provost and Corporation of Glasgow for their hospitality and to the numerous officials who had assisted.

Monsieur GAYMARD expressed the hope that it might be possible to hold a conference of the Association in Paris in 1947 and promised to do all in his power to make it successful. The President said the suggestion would be considered by the Council.

Lighting Demonstrations

DEMONSTRATIONS by the Glasgow Electricity Department of various tests created great interest indeed at the conference. In apparatus for the measurement of light distribution from large lighting fittings the fitting is supported so that an angled mirror can be rotated about it in a vertical plane. A photometer is mounted at a suitable distance from the fitting, enabling the illumination, *via* the mirror, to be measured at all angles in the vertical plane. An angular divided scale enables readings to be taken in any place simply by turning the fitting.

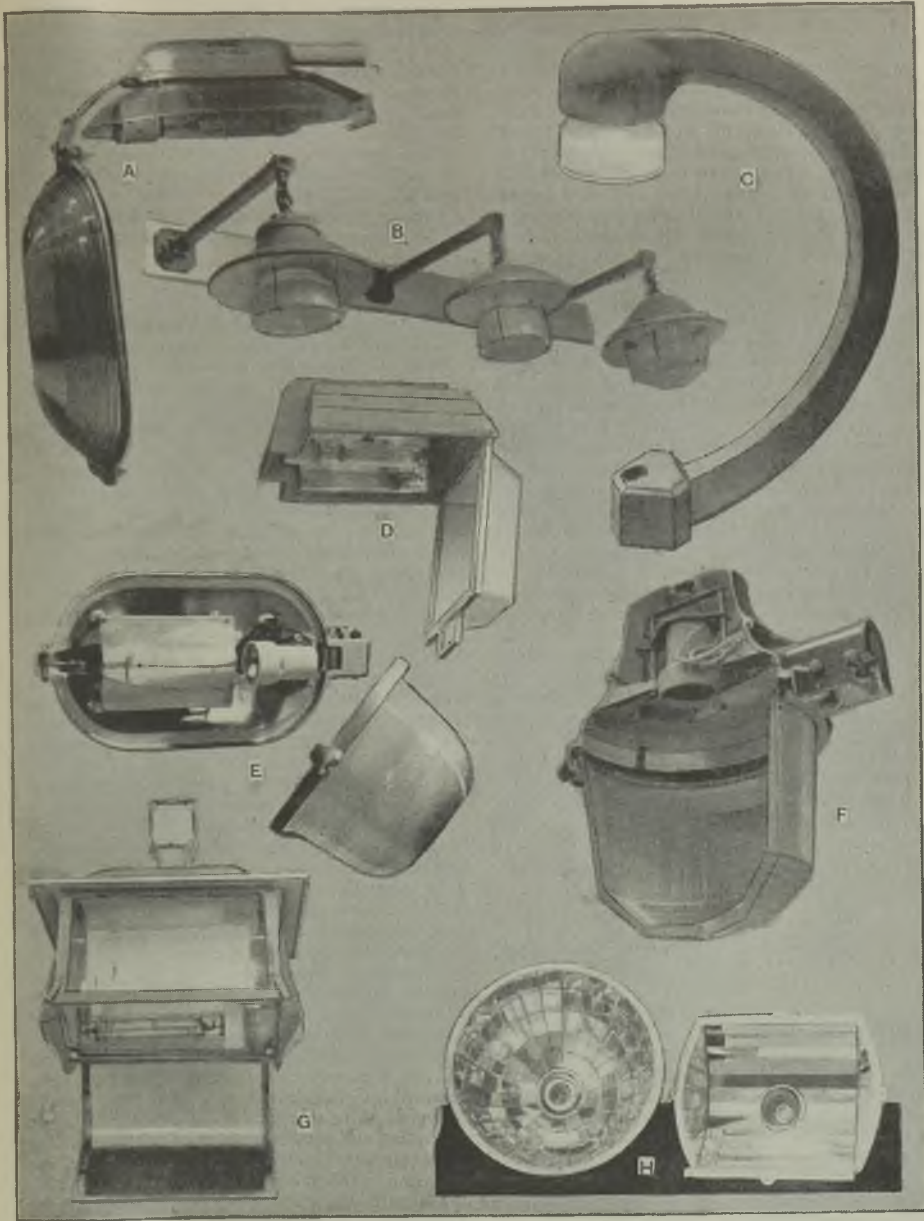
In connection with the life testing lamp racks shown samples are taken regularly for bulk deliveries of lamps and fully checked for conformity with the appropriate B.S.S. Another demonstration apparatus was a cube for the measurement of lumens output from large lamps and fittings. In this apparatus the total light outputs from street lighting fittings are measured. The fitting is suspended at the centre of the cube, which has sides measuring ten feet square, and the brightness of a small window in one side is measured by a photometer. Comparison of the brightness with that obtained when a standard lamp of known lumens output is substituted in the cube enables the output of the fitting under test to be measured.

The Exhibition

JUDGING alone from the good attendances at all times we must say that the exhibition of street lighting equipment was at least one of the "highlights" of the conference.

It seems to us that the aspects which both the manufacturers and the public lighting engineers are at the moment stressing are those relating to maintenance, the present interim period of unsettled conditions, certain objections to discharge lighting, light control, and the likely general acceptance of the horizontal lantern as the best for distribution and aesthetic consideration. We have selected for mention particular items of equipment, but the one aspect stressed in any case must not be taken to mean that it is the only or even the most important feature.

The concrete lighting fitting developed by Siemens Electric Lamps and Supplies, Ltd., in collaboration with Concrete Utilities, Ltd., is a good expression of the consideration given to maintenance. The pole bracket and the lantern head are a single concrete casting. In the head are insets to which a metal ring is screwed, and on the ring is a strap which carries the lamp-holder. The 7-in. "Duodome" refractor (a single-piece one may also be used) is held between external and internal spinnings, and projecting from these spinnings are three notched studs which enable the refractor to be put into position by a simple push motion which automatically effects locking. A quarter turn of the studs unlocks the refractor, while



Some of the exhibits seen at Glasgow

A.—The G.E.C. "Double-Dish" lantern. B.—Economical range by Falk, Stadelmann. C.—Siemens concrete fitting designed for easy maintenance. D.—Holophane horizontal (400-W lamp) fitting in which the bracket arm goes right through the lantern housing. E.—In the Metrovick "Trafford" fitting the bowl comes right away. F.—B.T.H. "Dilen" lantern. G.—The bottom hinged door of the Ediswan "Newland" facilitates maintenance. H.—The facet idea is employed in these fittings by the Electric Street Lighting Apparatus Co.

the studs are asymmetrically placed so that the refractor is always in the correct position in relation to the roadway. The fitting may be equipped with a 60-W to 200-W m.f. lamp or with an 80-W or a 125-W mercury-vapour lamp. The design for a later development on the same principle, but for larger lamps, 250 W and 400 W, employs a bowl refractor; air tubes in the lantern head carry off excess heat.

Another contribution to improved maintenance is the "Trafford" lantern developed by the Metropolitan-Vickers Electrical Co., Ltd., for "Group A" roadways. The bowl comes right away from the fitting, so that it can be cleaned at ground level. When the lantern is opened the bowl remains securely fixed to the ring, while the complete bowl and ring may be easily lifted from the hinge. The bowl is of special heat-resisting glass which remains unaffected even when chilled water is sprayed on it after it has been raised to a higher temperature than that attained in normal service. The lantern is designed for use with a 250-W or 400-W mercury-vapour lamp and incorporates a magnetic arc-controlling device.

Low maintenance cost has been the aim of the Engineering & Lighting Equipment Co. in producing the "Welwyn" which is suitable for a 60-W to 200-W tungsten lamp or an 80-W or a 125-W mercury-vapour lamp. It has a one-piece casting of special aluminium alloy and a new design of single-piece refractor which affords two-way distribution at 170 deg.

Simplicity of maintenance is a point stressed for a horizontal mercury-vapour lamp shown by Holophane, Ltd. It takes a 400-W lamp and is constructed for side-entry fixing, and the bracket arm goes right through the lantern housing, so that the weight is evenly distributed over the arm and the lantern. The housing is made of silicon-aluminium alloy and the base bowl is hinged, with simple captive wing-nut fixing for easy accessibility.

Simple Fixing Arrangements

Easy maintenance, fixing and wiring are features of the "Dilen" side-entry lantern developed by the British Thomson-Houston Co., Ltd., and our sectional illustration depicts the simple method of fixing it to the bracket arm, the easy wiring to the connector block, the quick-action catch for reducing the servicing time, the readily-removable top cap by means of one wing nut, rigid bowl retaining ring, and the lip to prevent the ingress of water.

Falk Stadelmann & Co., Ltd., have developed a wide range of lighting equipments which should serve not only for permanent-housing areas, but will be within the economic limits of temporary housing schemes and generally meet the necessities for damage replacements, etc., until the position is more stabilised.

Similarly the Electric Street Lighting Apparatus Co. emphasises that its facet principle of construction is particularly suited for general-purpose work. A bowl fitting gives circular

distribution for main-road lighting and takes up to a 1,000-W tungsten lamp. Another fitting was designed initially for covered market lighting but it should serve well for many street lighting schemes because of its directional capabilities. It will take up to a 200-W tungsten lamp.

The Revo Electric Co., Ltd., has introduced a "blended sodium" lantern. In addition to one 140-W horizontal sodium lamp it is equipped with two 100-W tungsten lamps. Over 12 000 lumens is obtained from the 340 W of lamps.

Three-Lamp Fitting

The Brighton Lighting & Electrical Engineering Co., Ltd., has also set out to meet such objections by the production of the "Triplite" lantern. But this is coupled essentially with another aspect, namely, a growing tendency to regard the horizontal discharge lamp as offering the correct method of lighting distribution for roads. The "Triplite," with its three tungsten lamps in line in one plain glass housing, each lamp having its own separate refractor, aims to get as near as possible to horizontal-lamp distribution. The three separate lamps also provide a means of switching off part of the lighting without creating blank spots.

The "Newland" lantern of the Edison Swan Electric Co., Ltd., which also accommodates horizontal discharge lamps, is designed to take advantage of the greater ease and efficiency with which the light can be controlled when the lamp is in the horizontal position. The optical system consists of a reflector in combination with prismatic glass refractors. The light emitted between 80 deg. and the horizontal is closely controlled in order to minimise glare.

The novelty of the exhibition, we should say, is the "Double Dish" lantern shown by the General Electric Co., Ltd. This breaks away from the conventional, mainly because, with its top and bottom bowls, it is nearly all glass. The metal work, which is almost confined to the small central mounting piece at the top, is of aluminium alloy and the optical system is smooth outside for easy cleaning. The lantern is designed for use with a 250-W or 400-W horizontal discharge lamp.

A feature of the exhibit by Philips Lamps, Ltd., is a number of lantern slides of public lighting installations using "Philora" lamps projected on to a screen.

Displays and demonstrations of control systems and equipment, included time switches by the Automatic Telephone & Electric Co., Ltd.; the Record Electrical Co., Ltd.; the General Electric Co., Ltd.; Sordoviso Switchgear, Ltd.; Sangamo Weston, Ltd.; Venner Time Switches, Ltd.; British, Foreign & Colonial Automatic Light Controlling Co.; and the Horstmann Gear Co. Standards were shown by the Stanton Ironworks Co. and Poles Ltd., and among brackets on view was a Siemens concrete model.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Minister of Fuel and Power has agreed to release Sir John Dalton from the position of Regional Controller, London and South-Eastern Region, and has appointed Mr. H. O'Halloran as Regional Controller for London and Mr. G. leB. Diamond to take charge of the South-Eastern Region.

Mr. A. J. Fippard, chairman of the Joint Committee of Electricity Supply Organisations, has been elected vice-chairman of the Council of the Conjoint Conference of Public Utility Associations, representing the electricity supply interests.

Mr. James P. Montgomery, sales manager to the Mersey Power Co., Runcorn, is relinquishing this position at the end of this month to take up the appointment of appliance sales manager with the West Gloucestershire Power Co. Mr. Montgomery's early training was with the Clyde Valley Electrical Power Co.

Mr. Ashley P. Pope, a very well-known figure in the electrical industry, is retiring at the end of the month from the position of contract manager to the Southern works of United Telephone Cables. Ltd. Mr. Pope is a Kentish man, born in 1875, and was educated at Denstone College,

near Uttoxeter, Staffs. His apprenticeship was served with W. R. Renshaw & Co., Stoke-on-Trent, and while with them he took part in a wide variety of contracts, including the electrical installation at Queen Anne's Mansions, London, in 1894. At the same time he gained a reputation as a runner. After a period with the Crosby Steam Gauge & Valve Co., he joined



Mr. A. P. Pope

Johnson & Phillips as sales manager (in 1906) but temporarily severed his connection with them in 1915 when he was appointed general manager of Robey & Co., Lincoln. Here he introduced aircraft manufacture and then went on to Hewlett & Blondeau, Ltd. Later he was with the Vickers-Spearing Boiler Co. and the Stirling Boiler Co., and then joined the Union Cable Co. to look after the company's research interests. In 1934 he was appointed to the post from which he is now retiring, since when he has laid many thousands of miles of trunk telephone cable. Mr. Pope's many friends will wish him many years of happy retirement.

Nearly 500 employees of Peto Scott Electrical Instruments, Ltd., had a very enjoyable outing to Brighton on September 10th, being enter-

tained by the directors of the company. Messrs. W. C. Boobyer and E. A. Stroud, on behalf of the employees, thanked the directors and Messrs. Campbell Jones (chairman) and C. N. Cooling (managing director) responded.

Mr. H. P. Wells, general manager of the General Electric Co.'s Telephone and Radio



Mr. R. E. Robinson

Works, Coventry, is retiring this month. He will be succeeded by Mr. R. E. Robinson, who has been deputy general manager of this important section of the G.E.C. organisation for the past two years. When, in 1908, the G.E.C. decided upon a considerable expansion in the manufacture of modern telephone equipment, Mr. Robinson joined the company as chief engineer of the telephone works, and has been connected with this and the sales side ever since.

Captain A. N. D. Kerr, A.M.J.E.E., R.E.M.E., now released from the Army, is joining the staff of the Electrical Power Engineering Co. (Birmingham), Ltd., in an executive capacity. For the past few years he has commanded a mobile repair workshop overseas, and has twice been mentioned in despatches for services in North Africa and Italy. Before the war, Capt. Kerr was Midland agent for E.P.E. flameproof motors.

Air Commodore Hugh Leedham, who took over the duties of managing director of Ericsson Telephones, Ltd., on September 1st, was born at Rowley Regis, Staffs, and was educated at Dudley Grammar School and Birmingham University, graduating in science and engineering. He became a lecturer in the Dudley Technical College but left there in 1915 to become a wireless operator in the Royal Navy. Later as special lecturer at the Royal Naval College, Greenwich, he shared in the pioneer research work which resulted in a practical radio valve. After service overseas he returned to England to supervise the planning and building of the Electrical and Wireless School at Cranwell and was awarded the O.B.E.



Air Cdre. H. Leedham

in 1929. From then to 1935 he was head of the Radio Division of the Royal Aircraft Establishment, Farnborough, Hants.

In 1935 he went to the Air Ministry as assistant director of research and development (aircraft instruments) and during the years 1937-9 when radiolocation was developed was deputy director of radio research and development. From 1940 to 1943 Air Commodore Leedham was director of radio production, M.A.P., and was responsible for the production of all radio and radar equipment for the R.A.F. and Fleet Air Arm and for all radar production for the Army. In 1942 he was awarded the C.B. for services in connection with radiolocation and from 1943 to 1945 he was director of radio research and development, M.A.P.

Mr. H. D. Parsons, M.I.A.M.A., has relinquished his position as publicity manager to Johnson & Phillips, Ltd., after nearly twenty-three years' service with the company. He has joined Enfield Cables, Ltd., in a similar capacity. Mr. Parsons commenced his engineering career with William Geipel & Co., Ltd., and after serving in the Honourable Artillery Company during the 1914-18 war, became a member of the drawing office of the I.R.G.P. Co. In 1923, he joined the sales staff of J. & P. as assistant to the late Mr. E. H. Reeves, and he was appointed publicity manager in 1930. During the war, he was responsible to the management for all



Mr. H. D. Parsons

Civil Defence affairs at Charlton, and was Officer Commanding the J. & P. "F" Company, 25th London Battalion, Home Guard. He commenced his new duties at Victoria House, Southampton Row, E.C.1, on September 3rd.

In a recent broadcast General Sir Frederick Pile made special reference to the able assistance rendered in scientific research on problems of A.A. gunnery by Mr. L. H. Bedford, director of research to A. C. Cossor, Ltd. Mr. Bedford has been associated with the development of radiolocation from its early days. He was awarded the O.B.E. for his work in 1943.

Lieut.-Col. H. H. Vost, who served with the R.E.M.E. throughout the war, has resumed his position of sales engineer with the Electric Construction Co., Ltd.

Mr. Harold Greaves has resigned his position as chief electrical engineer with Rolls-Royce, Ltd. (Crewe Division) to take up the appointment of technical assistant (industrial power) with the British Electrical Development Association. Before joining Rolls-Royce, Mr. Greaves was district sales engineer with the North Wales Power Co., at Nantwich, Cheshire. He was responsible for the formation of the Crewe

Branch of the A.S.E.E. and was branch secretary for two-and-a-half years.

Mr. F. G. H. Bedford is at his own request relinquishing his position as chairman and joint managing director of C. A. Parsons & Co., Ltd., at the end of this month after serving with the company continuously for nearly forty-five years. He will remain on the board of directors and will act in an advisory capacity. Sir Claude D. Gibb, C.B.E. joint managing director, who has been with the company for twenty-two years, has been appointed chairman and managing director.

Mr. A. J. Scaddon, assistant distribution engineer in the Portsmouth Electricity Department, has been promoted to the position of distribution engineer in succession to Mr. A. G. Hiscock, who has retired.

Mr. G. H. Rosam has returned to the "H.M.V." Household Appliances Division after wartime service with the Ministry of Aircraft Production where he was head of the branch for radio aids for navigating and landing aircraft. His principal contacts will be with electric power companies and service dealers.

Obituary

Mrs. F. H. Whysall.—We regret to report the death of Mrs. Frank H. Whysall which occurred very suddenly on August 6th at Southsea, where she was staying with her husband, the former city electrical engineer of Belfast, who has been with the Admiralty since his retirement. Mrs. Whysall's charming personality will be much missed by her many friends in the electrical world. She was a well-known and regular visitor at the I.M.E.A. Conventions before the war.

Mr. E. O. Walker.—Mr. Ernest Osborn Walker died at his home at Salford, on September 7th, at the age of seventy. Mr. Walker was formerly chief electrician at the Manchester Royal Exchange, and at the *Manchester Guardian* and *Evening News*. Later he founded the firm of E. O. Walker & Co., Ltd., of which he was managing director.

Mr. D. J. Sinclair.—We regret to report the death, on September 13th at the age of fifty-three, of Mr. D. Johnstone Sinclair, managing director of the St. Helens Cable & Rubber Co., Ltd., and a director of the Automatic Telephone & Electric Co., Ltd., the Midland Electric Corporation for Power Distribution, Ltd., and other companies.

Captain J. G. Hines.—We learn with regret of the death of Captain John Gerald Hines, at the age of sixty-eight. At the time of his retirement he had served in the telephone service for forty-three years and had reached the position of staff engineer. He was largely responsible for the conversion of London exchanges to automatic working.

CORRESPONDENCE

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

Plugs and Sockets

FIND that many people are confused as to what has been happening about plugs and sockets. This confusion has been increased by the B.S.I. statement, which may easily give the impression that the Study Committee recommended an up-rated 5-A plug. This is contrary to the facts.

The Study Committee, convened by the I.E.E. at the request of the Minister of Works, was asked to review existing practice and make recommendations for post-war building. Most of the members had first-hand knowledge of some aspect of the electrical equipment of buildings and the Committee was well balanced among the various interests. On many matters agreement was quickly reached, but plugs and sockets (as always) proved to be difficult. While the discussion on these was proceeding the Ministry was pressing for the report. A decision had to be made as to whether to accept the manufacturers' up-rating proposals without further discussion, or whether to await further information which had been requested, and leave this question for a supplementary report. The vote was on this issue and this issue alone. It was not a vote on the relative merits of a new fused plug or an up-rated 5-A plug. There was a small majority in favour of settling the matter without further delay. Paragraphs 92 and 93 of the Committee's report make this quite clear.

Two things then happened. The Electrical Contractors' Association protested against up-rating, on safety grounds, and the manufacturers produced their long-awaited designs of the up-rated fused socket. These proved to be bulkier and more costly than the majority had expected. The minority view, that more detailed examination was necessary, was fully justified, and accordingly further meetings were held. Contractors and manufacturers were given full opportunity of stating their views; designs and prices of fused sockets and fused plugs were examined and a number of wiring estimates prepared for the two systems.

Finally, a statement and questionnaire was prepared and sent to all supply undertakings. The results showed an overwhelming majority against up-rating and in favour of a new design with the fuse in the plug.

The facts which emerged from these further discussions were so convincing that the Committee, with the concurrence of the manufacturers' representatives, issued its final and unanimous report. In an appendix it said: "Having regard to all the evidence . . . we have reached the unanimous conclusion that a completely new type of 3-kW socket outlet and fused plug should be adopted," and added that B.E.A.M.A. had agreed as a matter of urgency to proceed with the preparation of a suitable design. Consequently to refer to paragraph 92 as the majority report of the Committee, and to try to discount the final unanimous report is misleading.

This recommendation was accepted by the Electrical Industries Committee of the B.S.I. and the next step should have been the issue of a Standard Specification. For nine months nothing happened. In the meantime the Codes of Practice Committee had, jointly with the Study Committee, considered and approved the recommendation for a new fused plug, but it had also become known that the B.S.I. Committee would not be averse from reconsidering its decision. The opportunity arose and it has now communicated the 3-kW fused plug and decided instead to up-rate the 5-A plug to 13 A and to put the fuse in the socket. It has been stated that before the second B.S.I. meeting, four additional B.E.A.M.A. members had been appointed to the Committee (making their number eight with only one from the E.C.A.).

The B.S.I. decision is contrary to the recommendations of the Study and the Codes of Practice Committees; it ignores the protests of the electrical contractors; and it is contrary to the wishes of 90 per cent. of the supply undertakings. How can this be defined as "standardisation by agreement"? Every experienced installation engineer has long since realised that a fused plug to be used in multiple on a single circuit would be a most valuable accessory. It is not generally known that the I.E.E. Wiring Rules Committee had on a previous occasion come to the same conclusion. The proposals had to be dropped because the manufacturers at that time could not produce a suitable fused plug. That reason is no longer valid, and as to the objection that the Committee's

proposal introduces a new standard, if we can never do so, as needs and methods change, then indeed we have come to a sorry pass.

Government Departments responsible for building quite properly insist on a reasonable quality of construction. To this end they include in their general specification a list of British Standards for various building materials. If they include B.S. 546 in this list, they will deny to themselves, and to the users of the premises, the benefits that the Study, Codes and Wiring Rules Committees have at different times tried to secure.

My interest in this matter is only that, as a user, I want the best the industry can give. On one side are a majority of the manufacturers and a very few users. On the other side are the majority of the users and two highly reputable manufacturers who are producing fused plugs as recommended by the Study Committee. I have no doubt that given a fair field other manufacturers will join them. The fused plug has come to stay and, if the B.S.I. will not at present give its support, we should at least take care that no artificial barriers are erected to prevent the use and development of so useful a device.

London, S.E.1.

FORBES JACKSON.

[We have received a letter from Major R. Amberton (Dorman & Smith, Ltd.) covering much the same ground. Major Amberton concludes as follows:—"No doubt the importance of the housing programme will be urged as a reason for adhering to B.S. 546 but it should be realised that the adoption of the B.S.I. decisions involves the complete re-design of the socket and plug with the sole exception of pin diameters and centres. Not only is this new design not available yet, but it will be many months before commercial quantities can be produced. On the other hand the 3-kW fused plug and socket asked for by the Study Committee has been on the market for over a year and large numbers are already in use."—Editors. *Electrical Review*.]

"Phasors"

THE term "electrical vector" implies a device so useful to the technician that surely it deserves a more accurate and precise designation.

A vector quantity is one which has both magnitude and direction, but the diagrams used to represent alternating quantities are concerned with magnitude and *time*.

It is specially desirable that a confusion of terms should be eliminated in this connection, for many electromagnetic problems involve the use of true directional space vectors as well as the time variety.

Since the word "phase" is already associated with periodic functions of time, would not a new word "phasor" be a good name for its diagrammatic representation? Diagrams using "phasors" might then be termed phase-diagrams which actually describes them correctly.

London, S.E.1.

J. A. COLLIER.

Date or Temperature?

WITHIN a few weeks the fuel economy drive will be intensified by the banning of industrial and domestic heating determined by dates published in the press or broadcast by radio; but this year and in future it seems that a much more efficient method could be employed by regulating the initiation of fuel economy with an observed temperature as the basis instead of the date.

After all, a great deal can in general be learned from those engaged in the branches of our industry specialising in the use of thermostats, time-switches, thoughtfully designed heating, cooling and air-conditioning equipment, and it is certain that the future offers enormous opportunities for the utilisation of automatic control gear both in industry and in domestic life.

It is opportune, therefore, that a new scheme for fuel economy operation, at least for heating, should be launched at the earliest possible moment, and it would be interesting to hear in this connection the opinion of others who have had specialised experience during the war years, coupled with their future outlook.

Wembley Park, Middlesex.

S. H. PARSONAGE.

Chief Engineers' Salaries

NOT being the head of a borough electricity department I may reply impartially to the letter of "M.I.E.E." in the *Electrical Review* of September 14th, and point out that there are aspects which he may not have considered.

In the first place, salary is unquestionably linked with status, and in order to raise and maintain the status of engineering, especially compared with that of merely secondary and parasitic but better-paid professions, it is necessary to keep up the rate of pay. The position of chief engineer is thoroughly representative, the pay may be regarded as a yardstick, and therefore his well-being is that of all of us, both those more and less fortunate, and should be our concern.

The reason why remuneration has to be discussed in wartime is because attacks are

made on it in wartime. Members of certain borough councils do not put first things first, but apparently have leisure to depress the pay and position of chief electrical engineers. That the latter have to resist in wartime is a situation not of their choosing.

I note that "M.I.E.E." is a master mariner. Two or three years ago, when public sympathy was with the Merchant Navy, if possible even more than with the Armed Forces, certain members of both Houses of Parliament wished to take steps to ameliorate the position and conditions of officers. Action, however, was cleverly side-tracked on the "first things first" excuse, and as a result, except in the case of a few very fine shipping companies, those improvements may never mature.

Banstead, Surrey.

W. C. KENNETT.

Concerning Trams

HAVING had twenty years' experience with both tramcar and trolley-bus operation, I support Mr. A. R. Grierson's view that the modern trolley-bus is a better vehicle than the old worn-out tramcar, and I am sure that Mr. Burrows and Mr. Kirkland would agree. Comparison is like that of an old paddle steamer with the *Queen Mary*.

Mr. Grierson asks the purpose of conversion from tramways to trolley-buses. It should be obvious that the capital expenditure incurred with conversion is much less than it would be for complete tramway reconstruction. Experience has not altogether proved the trolley-bus to be more adaptable to narrow streets than the tramcar. Also doubling the overhead copper and increasing the number of poles does not enhance the appearance of any street.

With regard to noise, a modern tramcar on a worn-out track is bound to offend the ear. I would emphasise the necessity of modifying the conventional cross-section of tram rails, and of bedding them on a resilient compound.

Whilst the economic aspect of a public transport undertaking is of considerable importance, good service with safety, comfort and cheap fares are what the public requires and, indeed, has a right to demand. With the prospect of all public service transport coming under unified regional control, a long view on matters affecting the general policy to be adopted is imperative.

We must plan to give the best possible service to the travelling public and must not allow vested interests to influence our decisions on our plans for the future.

In my view far greater importance should

be attached to road safety, and it must be admitted that the railbound vehicle has proved beyond all doubt the safest means of transport. Contrary to expectations the conversion from tramways to trolley-buses has resulted in a considerable increase in the number of fatal accidents, largely because the trolley-bus can be steered at will, and at speed, close to crowded footpaths. In 1943 the Belfast Transport Committee, confronted with this problem, decided to divert three trolley-bus routes in order to reduce congestion in the city.

A well-planned modern tramway system, whilst involving a large capital expenditure, has enormous advantages, and a modern tramcar on a modern track is no noisier than a modern bus. Although I am not a member of any association that champions the tramcar, I regard the efforts of the Light Railway Transport League as a matter for congratulation and also for serious consideration by transport committees throughout the country.

London, E.17.

"PUSETRA."

[In view of other claims on our space this correspondence is now closed.—Eds., *Electrical Review*.]

Re-employment of Civilians

YOUR correspondent "J.E.D." (*Electrical Review*, September 7th) is justified in feeling disgruntled over the present labour position and although there is no reason for anyone now being penalised, the Ministry of Labour and National Service still sticks to its red tape foolishness.

The war has proved that the majority of engineers of fifty and over have equalled if not excelled their younger compatriots. There never has been any justifiable reason for stipulating ages when applying for employees and it is to be hoped that employers will now look at this matter from a reasonable standpoint.

It is, of course, hopeless to expect the Ministry of Labour and National Service to alter its views and indeed it is hopeless to expect any Government Department to substitute common sense for red tape.

Glasgow.

ALEX. MILNE.

Contact with Overhead Lines.—A mechanical navy passing beneath some emergency cables at Blaenavon last week fouled the lines with its jib and a travelling ganger (John Dunkin) employed by Sir Robert McAlpine & Sons, who was walking beside the navy, received a fatal shock. The driver of the machine was unhurt but experienced a severe shock when he dismounted.

Views on the News

Reflections on Current Topics

THOSE who constantly point out that the public telephone, telegraph and postal services aren't what they were should guess the reason for this. But if they cannot then a foreword by the Engineer-in-Chief of the G.P.O. (Col. Sir A. Stanley Angwin) to the *July Post Office Electrical Engineers' Journal* may be referred to for their enlightenment. Sir Stanley mentions in the first place that during the war the Post Office lost about 16,000 men of its engineering staff to the Forces and 300 to other departments; its peacetime strength was about 50,000. With its depleted numbers the Post Office has been called upon to shoulder the heavy burden of providing and maintaining service for the numerous naval, military and R.A.F. establishments in this country and for key industries. On top of this, the Engineering Department has rendered great assistance to the Services in the design and production of all types of telecommunications equipment; the P.O. Research Station and factories have been almost entirely engaged in this work.

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There is something in the complaint of Post Office Engineering Department employees that the application of the term "skilled worker" is not in consonance with the importance of their work. They say that the immense strides made in telecommunications in the last few years have called into existence groups of highly-specialised workers required for the construction and maintenance of extremely intricate apparatus, such as automatic exchange plant, repeater stations, etc., on which modern telephony depends for its efficiency. They are almost entirely recruited from secondary schools and have to reach a high standard of general and technical education. It is feared that the term "skilled worker," which is not so very different from "skilled labourer," has unfortunate effects when pay and conditions are under review.

* * *

Opinions on the subject of the 40-hour working week are various. Broadly the trade unions favour the idea; it was approved at the Blackpool T.U.C. meeting last week. They say that far from reducing the production per worker, there would be improved results. Many employers (but by no means all) fear that any shortening of working hours (without cutting wages) would merely result in higher costs and a lowering of this country's ability to compete in overseas markets. These opposed views were aired

in a debate before the Manchester Engineering Council a short time ago when Mr. S. Ferguson, M.I.E.E., put the case against any immediate reduction and Mr. E. Jennison represented the trade unions.

* * *

On one point they were in agreement: that greater production per head could best be achieved by greater mechanisation, although this was regarded from different angles. Mr. Ferguson seemed to concede a point when he said that man-hours are one thing and machine-hours another. If workers' hours were cut down the machines must still be kept going, by an extension of shiftwork. Mr. Jennison regarded the shortening of the working week as the only means of avoiding displacement of workers by greater mechanisation. I doubt whether any soundly-based generalisation is possible in this matter for conditions vary widely from industry to industry and even in branches of the same industry. There have been attempts at scientific study of the subject but the results have not been conclusive.

* * *

A councillor at Swinton was apparently referring particularly to electricity departments when he said that local government officials moved "like grasshoppers" from one job to another. As a result of this, he averred, a 15-year-old boy was "in virtual control of the drawing office, which deals with post-war plans for the Electricity Department." Passing over this infant prodigy to consider the general question, how can a member of an electricity authority's staff advance without moving to another undertaking? Under the existing arrangements he reaches the maximum salary in four years and unless his station is "up-graded," a new post created, or somebody above him leaves, he "stays put." This may suit many men but those who are anxious to improve themselves and widen their experience have to move on. And, after all, the electricity supply industry, considered as a whole, gains a good deal from this system.

* * *

In last week's *Electrical Review* there was an inadvertent reference to the British Standards Association. The old name of the Institution dies hard and until the generation which knew it as the British Engineering Standards Association fades out, "Besa" will be its familiar style. Who but a native of one of the Balkan countries can properly pronounce "Bsi"?—REFLECTOR.

The Paris Fair

Domestic Appliance Ideas

(From Our Paris Correspondent)

THE most surprising thing about the first Paris Fair to be held since 1940, is the way in which manufacturers have managed to pick up the threads of the past. There are plenty of new ideas such as one always expects to find at a Paris Fair and much of great interest to the electrical industry. Unfortunately there is not a great deal of business to be done because of the lack of raw

materials. Exhibitors have pointed out that they will be ready to take orders as soon as they have the materials to produce their articles in quantity. Many told me that there is a slight improvement in supply and that it should not be very long before orders can be taken. At the moment one needs a permit to buy electrical apparatus, so the Fair is a grand window display and that is about all, but that is something considering what France has been through.

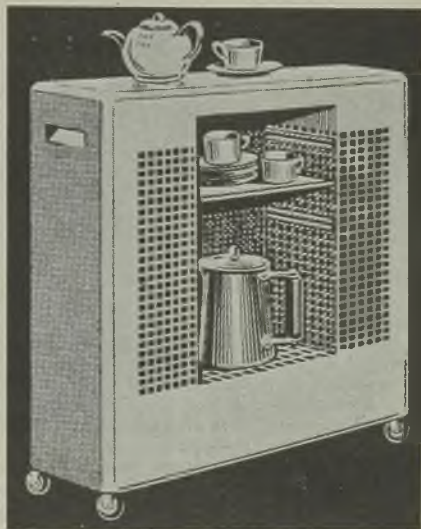
specially designed brick which holds the heat, so that during the day the radiator would give off its heat without consuming current. The Fair is filled with such radiators but a great many of them include new ideas such as the "Isroc" heat-storage cooker. Unlike most heat-storage apparatus the current is always "on," but as the loading is only 150 W, it is very economical. It takes twelve hours for the brick which holds the heat to reach 500 deg. C. at which temperature it remains with the current switched on. The heat can be regulated for cooking purposes other than roasting, and the oven is directly heated.

The design of the "Isroc" is simple; it comprises a series of bricks with resistances running through them, each brick being a separate unit so that the cooker does not have to be put out of commission if one of the resistances fails. Round the block is a small tank which is warmed by the heat loss



"Isroc" heat-storage cooker

Naturally most of the ideas are related to shortages and economy in materials, but nevertheless many of them will remain long after supply problems have been solved. One is struck, for example, by the number of heat storage radiators and cookers at the Fair. These heat storage appliances made great headway during the war. They enabled the public to warm their apartments at a time when there was no coal and precious little electricity during the day. At night, during the low-load hours, there was sufficient electricity available to heat up the cement or



Combined heater and radiator (Diamond)

which cannot be avoided in spite of the glass-silk insulation. This is sufficient to heat water in the tank up to 70 deg. C. The cooker

comprises one regulable hotplate and a directly-heated oven.

The same company has a storage-heat 2,700-W radiator. It, too, employs the special refractory which holds the heat. The system is more or less the same as that of the cooker.

G. Chanson is showing resistances enclosed in "Pyrex" glass. The advantages of these seems to be that one can have the resistances screwed into the walls without any other frame, thus providing a glass radiator. Further, the firm is turning out innumerable glass ornaments all of which have resistances running through them and thus are radiators. For example, in an ordinary fan, a series of resistances has been enclosed in glass in front of the blades so that in winter, the fan can be used to blow hot air into a room.

The Creations Emede include a "cuisinette" which is very ingenious. Again, it has been constructed to meet the problems of the hour. Very small in design, it is, in effect, an oven with a hotplate. The hotplate, however, can be turned over; thus when it is in one position, with the resistance on top, it can be used for

boiling; when it is turned over with the resistance below, that is, forming the top of the oven, it can be used for baking. The advantage is this, one starts boiling, then, when the food is sufficiently advanced, the hotplate and its resistance are reversed and used to heat the oven, the boiled foods remaining on top and being kept warm by the upward heat loss. The "cuisinette" weighs about 14 lb. and has a loading of only 980 W.

E. Diamond is showing a combined radiator and heater. It has the shape of an ordinary radiator with the 3,000-W resistances running round it while the centre is composed of shelves on which coffee or tea or toast can be kept warm. The lower shelf, being above the resistance can be used to boil water.

There is not much big material worth mentioning at the fair because people are particularly interested in their personal comforts, and for obvious reasons. Further, there are few foreign exhibitors. Great Britain is represented by a combined organisation called the Anglo-French Distributors which includes McCarthy Radio.

I.M.E.A. Activities

Celebration of Jubilee

THIS year the Incorporated Municipal Electrical Association reaches its fiftieth year and it is proposed to celebrate the jubilee in a fitting manner at next year's convention (the first since 1939) arrangements for which are now proceeding.

Meter Inaccuracy

It has been suggested to the Council that steps should be taken to secure an amendment of Section 3 of the Electricity Supply (Meters) Act, 1936, to provide that the meter examiner shall declare the degree of inaccuracy of a meter at the time of test and that this declared inaccuracy shall be taken as the inaccuracy during the period of dispute of an account, or, alternatively that the examiner shall declare the extent of the inaccuracy during that period. It is considered that the examiner's decision should be binding; this would obviate resort to the Courts. The Council has agreed that it might be advisable to secure this amendment and is considering the matter.

Power for Trolley-buses

The I.M.E.A. Council has been approached by the Public Transport Association and the Municipal Passenger Transport Association with regard to the supply of power to trolley-bus systems. The two associations state that in view of the possibility of an extension of trolley-

bus operation and of the experience gained in recent times with systems of modern type, their Joint Electricity Distribution and Collection Committee desires to discuss the question of formulating some recommendations regarding power supply for the assistance of the constituent undertakings of the two associations.

According to this request, the I.M.E.A. Council has appointed Messrs. J. Eccles (Liverpool), F. W. Lawton (Birmingham), W. A. Royle (Sunderland), R. A. S. Thwaites (Manchester) and J. W. J. Townley (West Ham) to serve on the sub-committee which is being set up.

Lighting Education

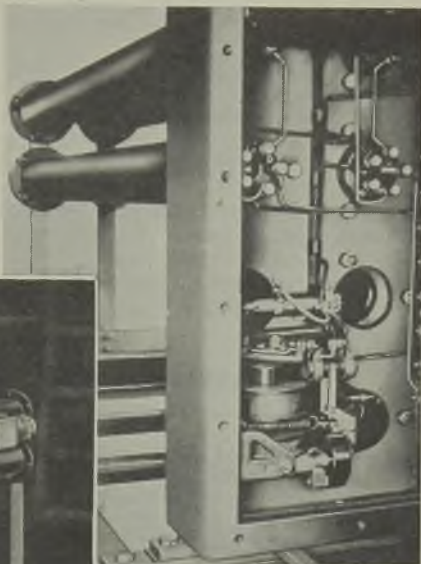
Co-operation between the Association and the Electric Lamp Manufacturers' Association is continuing through a joint committee and at a recent meeting the chairman referred to plans for lighting education which E.L.M.A. has in mind. It is proposed to revive the illumination courses for the electrical industry, one refresher course being projected for the autumn and one, for architects, in the spring. It is E.L.M.A.'s aim to make courses available in the principal provincial centres and to ensure that lighting and vision are dealt with in schools. E.L.M.A. has accepted a suggestion that it shall provide demonstrations and equipment for the purpose of lectures in supply authorities' showrooms.

DC Mining Equipment

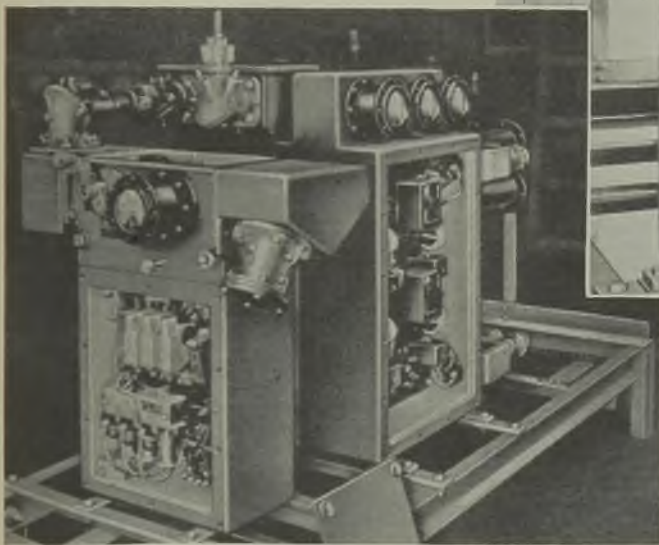
Flameproof Conversion Plant

COAL-FACE machinery received from the United States under lend-lease arrangements was arranged for DC operation and the Ministry of Fuel and Power instructed Metropolitan-Vickers Electrical Co., Ltd., to design at short notice automatically operated flameproof conversion plants of three sizes. Two of these were to be of 15 and 20 kW for charging the batteries of trackless vehicles used for transporting coal from the face to the loading points on the main trunk belts or haulages and the third of 75 kW for supplying the coal-face machinery. The motor generators were to be mounted on common fabricated bed-plates unsupported by foundation blocks and with adjustable pads to enable the user to fit his own wheels, axles and bearing blocks for track gauges of from 1 ft. 8 in. to 2 ft. 4 in.

The 15-kW motor-generator comprises a medium-voltage three-phase squirrel-cage motor driving, through flexible couplings, a fan-cooled shunt-wound generator. The motor is supplied by a flexible armoured t.r.s. cable connected to a 100-A bolted plug and socket and the generator (132 V at 2.75 V per cell) has an outgoing armoured cable con-



Control panel, with covers removed, for battery charging, and (right) flameproof resistances, resistance links and voltage regulators



Provision had to be made for charging in parallel two batteries, each composed of two series banks of twenty-four lead-acid cells, with capacities of 330, 385 and 440 A at a six-hour discharge rate. A modified constant-voltage control system was adopted as cost, weight and dimensions were more favourable with this arrangement than with current control.

ected to a sealing box with armoured clamps of the pin-disconnecting type. Overall dimensions of the 15-kW size are 6 ft. 10 in. by 2 ft. 8 in. by 3 ft. high. Control gear consists of a contactor direct-on starter with over-current and under-voltage protection housed in two compartments and a charging panel made up of four DC line contactors, overload and interlocking relays, two battery-charge timing relays and two ammeters and a voltmeter. A second compartment on the charging panel contains a

voltage regulator and the terminal board for the ballast resistances and change-over links for selecting the resistance sections appropriate to the three sizes of battery.

The voltage regulator includes a spring-loaded moving arm, pivoted on knife edges, which carries carbon contacts at one end and a moving coil at the other. Two fixed coils are connected in series with the moving coil and across the generator terminals is a swamping resistance to reduce the effect of the temperature coefficients of the three coils. At the regulated voltage the solenoid effect balances the spring pressure. The vibrating contacts are arranged to vary the shunt-field of the generator.

The timing relay consists of three parts, a voltage-measuring element, a mercury switch, and a small synchronous motor with graduated timing disc. The first is a hot-wire vacuum switch with its control circuit connected across each battery; it is not subject to contact bounce and a delay prevents response to momentary voltage surges. When the battery voltage reaches 2.35 per cell the hot-wire switch closes the circuit for the synchronous motor and sets the timing gear in motion. On

completion of charging a cam on the timing disc-shaft engages a peg on the mercury switch and tilts it, thus tripping the line contactor.

Glands fitted to the outgoing cable to the batteries take twin-core, circular, r.r.s. cable up to 1½ in., while interlock and auxiliary supply connections from the motor starter panel to the DC panel are carried in conduit fitted with sealing stopper boxes.

The 500-V generators of the 75-kW sets, which are driven by squirrel-cage motors, have slip rings for use with oil-immersed static balancers to give artificial mid-points which are connected through leakage relays to earth. Overall dimensions of each set are 9 ft. 7 in. by 3 ft. 6 in. by 4 ft. 3 in. high. The weight with bed-plate is 5½ tons.

Starters for the AC motors were already provided. The generator control apparatus consists of a DC contactor circuit-breaker housed in a flameproof enclosure and equipped with two over-current releases, earth-leakage relay and isolator. Under-voltage protection is derived from the operating coils of the contactor mounted on the same bed-plate as the static balancer.

Combating Magnetic Mines

Degaussing Methods for Protecting Ships

RIGHT up to the end of the European war, the enemy was using magnetic mines, and "degaussing technique" had to be modified continually to counter such fresh developments as increasing sensitivity. Examination of the first mines of this type in November, 1939, indicated a remedy in the demagnetisation of ships' hulls. Official information now released is to the effect that Admiralty work in this field dated from 1917, with the devising of methods for the detection and firing of mines.

Later investigations showed that the magnetic field of a steel ship at the relevant distance could be accurately calculated by assuming the hull to consist of a row of vertical dipoles, a row of horizontal (athwartship) dipoles and a longitudinal dipole of length rather less than that of the vessel. It was also shown that the longitudinal magnetism consisted of a "permanent" component, which did not vary with the ship's heading, and an induced component, which varied from zero on an east-west heading to a maximum that was roughly proportional to the earth's horizontal field on a north-south heading.

Before that time chief consideration was given to buoyant mines and it appeared unlikely that ships could be demagnetised sufficiently to protect them at the short ranges at which this

type operates. Mine-destruction ships were therefore magnetised strongly enough to cause mines to explode at a safe distance. When it was revealed that heavy damage could be caused by mines laid on the sea bed at considerable depths, experiments were undertaken which proved that the vertical field under a ship could be substantially reduced by demagnetising the hulls. Heavy copper strip was fastened round the outside of the ship in rubber channelling, but later the coils were fitted inside the hull. Changes of effective field proved to be proportional to the current in the coils, hysteresis was negligible and the permanent magnetism was not changed by prolonged running with the coils in circuit.

Wiping with current-carrying conductors to cancel induced vertical magnetisation over a wide area was tried successfully in 1940 and was used at Dunkirk. The magnetism, however, gradually decayed and the work of rewiping restricted the number of merchant vessels that could be so treated. By the end of that year 1,704 warships and 4,400 merchant ships had been fitted with degaussing coils. The current in the coils had to be adjusted to suit the value of the earth's magnetic field in different latitudes. Rapid developments in underwater magnetometers aided the work.

COMMERCE and INDUSTRY

Atomic Power Stations. E.D.A. Conference at Scarborough.

Coal Nationalisation

SPEAKING in Glasgow on Monday, Mr. E. Shinwell, Minister of Fuel and Power, said that the Government was "in deadly earnest" about the nationalisation of the coal-mining industry and meant to pass the necessary measure as soon as possible. He said that there were other forms of fuel and power, gas and electricity for instance, which should be re-organised.

Future of Atomic Power

A prediction that power stations employing atomic energy would be in operation within ten years was made this week by Professor M. E. Oliphant at a meeting of the Birmingham Rotary Club. Professor Oliphant is Poynting Professor of Physics at Birmingham University and a member of the technical committee responsible for the development of the atomic bomb.

Lochaber Rating Claim

A claim by the Lochaber Power Co. for a reduction in the rateable value of its undertaking was rejected last week by the Lochaber District Valuation Appeal Court. The company had proposed a rateable figure of £33,172 against the assessor's £51,204. It is appealing against the Court's findings and has asked for a case to be stated.

Contractors' Plant Decontrolled

After September 30th, all types of contractors' plant may be purchased without a "permit to purchase" from the Ministry of Works. Prospective purchasers should, therefore, place their orders direct with manufacturers.

Contract Price Adjustment Formula

The latest figures for the B.E.A.M.A. contract price adjustment formula are as follows:—
(a) The rate of pay for adult male labour at September 8th shall be deemed to be 95s.;
(b) Costs of material: the index figure for intermediate products last published by the Board of Trade on September 8th is 182.5 and is the figure for the month of August. Both figures are unaltered.

E.D.A. Area Conference

Three papers are to be presented at a two-day conference at Scarborough (September 26th and 27th), arranged by the Committee of the Mid-East England Area of the British Electrical Association (Area officer, Capt. A. W. Brown, M.B.E., Britannia House, 74, Wellington Street, Leeds, 1). They are:—"Post-War Problems of Domestic Electrical Development," by Mr. D. Bellamy, O.B.E. (general manager, Hull Electricity Dept.); "Publicity and Advertising," by Mr. W. K. Fleming, M.I.E.E. (borough electrical engineer, Scarborough); and "Large-Scale Cooking and Heating," by Mr. W. H. Dunkley, B.Sc. (deputy general

manager, Hull). On the first day there will be a reception by the Area chairman, Mr. A. G. Connell, M.I.E.E., and a civic welcome by the Mayor of Scarborough and on the second day the delegates will be entertained to lunch by the Scarborough Electricity Committee.

Lamp Price Reductions

The Electric Lamp Manufacturers' Association announces that it is prepared to make allowances direct to retailers without agreement for the difference between the old prices and the new prices instituted on July 16th. Claims should be made on a form available from the Association up to October 3rd.

Electrical Company's Fire

Extensive damage, including the destruction of a quantity of electric fans, was caused by a fire at the Tyseley (Birmingham) premises of Berkeley & Young, Ltd. It is reported that some of the equipment destroyed was designed for export and some was for Government Departments.

Lighting Restrictions

The Ministry of Fuel and Power has issued a reminder that all forms of floodlighting, decorative or display lighting are at present forbidden in view of the need for conserving fuel.

Miniature Meters

A range of indicating voltmeters, ammeters, milliammeters and microammeters which are only one inch in diameter and weigh 1.25 oz. are being produced by an American manufacturing concern. The instruments are hermetically sealed in anodised aluminium cases and are suitable for numerous applications to aircraft and portable equipment.

Shanghai Power Co.

The Washington correspondent of *The Times* reported on Monday that the Shanghai Power Company's property had been restored to its American owners. The future of the American-owned Shanghai Telephone Co. is still the subject of negotiations.

Bristol Exhibition

A number of electrical manufacturers participated in an exhibition arranged by the Bristol Engineering Manufacturers' Association at the Victoria Rooms. There were over 40,000 visitors; many of them came from potential markets for British engineering products.

E.A.W. Birmingham Branch

Presentation of a cheque for £100 to help towards the creation of a scholarship trust in electrical housecraft was the chief feature of the twenty-first birthday celebrations of the Electrical Association for Women held in Birmingham on September 13th. It was the Birmingham and District Branch's twentieth birthday. The

cheque was presented from the Branch to Miss Caroline Haslett, director of the Association. A luncheon preceding the afternoon meeting, which was addressed by Miss Haslett, was attended by the Deputy Mayor of Birmingham (Alderman L. G. H. Alldridge) who was presented with a cheque for £500 from the Branch as a gift to the Lord Mayor's Services Victory Fund. The money was raised from the sale of the Branch's mobile canteen.

Dissolutions of Partnership

Leather & Strong.—B. Leather & H. C. T. Strong, carrying on business as electrical engineers and contractors at 251, Fulham Road, Queen's Elm, Chelsea, S.W.3, have dissolved partnership as from August 31st. Debts due to and owing by the firm will be attended to by Friend-James, Sinclair & Yarnell, C.A., 31, Kingsway W.C.2, and the business will be carried on by Mr. Strong under the same style and at the same address.

S.P.L. Radio & Electrical Repairs.—W. E. Sullivan and J. P. Sanders-Parks, trading under this style as radio and electrical engineers at High Road, Laindon, Essex, have dissolved partnership. Debts will be attended to and the business continued by W. E. Sullivan.

Cable Laying by Plough

The inscription of Fig. 2 of the article on this subject in last week's *Electrical Review* was incorrect. Operation in hard ground was depicted in the left-hand illustration and in soft ground on the right.

Trade Announcements

As from October 1st the address of the Plymouth branch of the Simplex Electric Co., Ltd., will be 53, Southside Street, Plymouth (telephone: Plymouth 4095; telegrams: Simplex). Comprehensive stocks will be carried.

All communications to Eltron (London), Ltd., should in future be addressed to Accrington Works, Strathmore Road, Croydon, Surrey.

After this week the address of Alex Lawrie & Co., Ltd., will be 8-10, Brown's Buildings, St. Mary Axe, London, E.C.3.

The Battery Service Co. (Mitchell & Reid, Ltd.), Langton Road, Tunbridge Wells, informs us that it is extending its activities to electrical factoring and wishes to receive manufacturers' catalogues, etc.

Straight-Lite Reflectors, Ltd., have returned to their London address, 73, Canonbury Road, London, N.1 (telephone: Canonbury 5675).

The London office of McClure & Whitfield is now at City House, 158, City Road, E.C.1.

The head office joint works department of the Associated Portland Cement Manufacturers, Ltd., and the British Portland Cement Manufacturers, Ltd., is now at 192, Ashley Gardens, London, S.W.1 (telephone: Victoria 6677; telegrams: Portland, Sowest, London).

Change of Name

The Second Electric Supply Corporation, Ltd., Brook House, Park Lane, W.1, has changed its name to Electric Supply Corporation (Overseas), Ltd.

TRADE MARKS

THE following applications have been made for trade marks. Objections to any of these may be entered within a month from September 12th:—

ARMELEC. No. 635,079, Class 7. Electric washing machines.—Heating Construction, Ltd., 41, Walsgrove, Great Witley, Worcestershire.

HARMET. No. 634,921, Class 9. Electrodes for use in welding.—Padley & Venables, Ltd., Dominion Steel and Tool Works, Hill Street, Sheffield, 2.

ADMIRAL. No. 628,500, Class 11. Electric refrigerators, freezing apparatus, electrical waffle irons, electric toasters, electric heating pads, hotplates, stoves, electric air conditioning apparatus and installations, and electric lamps.—Admiral Corporation. Address for service is, c/o Stevens, Langner, Parry & Rollinson, 5 to 9, Quality Court, Chancery Lane, London, W.C.2. To be associated with No. 570,699 (3058) vii and others.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following:—

Makers of "I.R.L." switches and plugs.

Export Inquiries

WE have received the undermentioned inquiries from firms and individuals overseas who wish to secure agencies for British electrical equipment and appliances or to import them into their territories. We shall be glad to pass on to them replies received from readers which should be addressed to the Editors, quoting the number given in parentheses. We cannot vouch for the standing of inquirers and manufacturers replying to them will no doubt require the usual references:—

Southern Rhodesia.—Sole agencies wanted for domestic appliances, electrical accessories, industrial motors, switchgear, transformers, industrial lighting equipment and automatic water heaters. (X.115).

India.—Importers wish to get into touch with suppliers of a wide range of goods including refrigerators (domestic and commercial), fans, cooking equipment, radio apparatus, lamps, sterilisers, wires and cables. (X.116).

Syria, Lebanon, etc.—Agencies required for the sale of electrical goods in Syria, Lebanon, Transjordan and Palestine. (X.117.)

Industrial Equipment

THE British Electrical & Allied Manufacturers' Association has informed members that in consequence of the Control of Industrial Electrical Equipment (No. 4) (Revocation) Order, 1945, it is no longer necessary for an acquirer to obtain a licence before placing an order for any industrial electrical equipment.

A system of "selective control," similar to that now applying to metal-working machine tools, has been introduced to cover Service and other essential requirements for certain items where the supply position does not permit of complete relaxation of licensing. These items appear on a "nominated list" and orders for them can only be accepted by suppliers under the authority of a supply licence issued by the Machine Tool Control, except where the transaction is covered by one of the exemption clauses. The present nominated list comprises DC motors, DC and AC generators, static power-factor correction condensers and automatic voltage regulators.

Members of the Electrical Industry Export Groups have been notified of changes in procedure consequent upon the revocation of the Control of Industrial Electrical Equipment Orders. It will no longer be necessary for the official Group Form of Notification to be used to obtain D.I.E.E. authorisations to supply for export any industrial electrical equipment. Iron and steel authorisations will still be issued by the Electrical Industry Export Groups for industrial equipment for export which is not covered by the D.I.E.E. bulk allocation. In the case of equipment in the nominated list No. 1 the reference number of the D.I.E.E. supply licence must be quoted on the BT.4 application form.

In a letter to members of the Electrical Contractors' Association, the director (Mr. L. C. Penwill) emphasises that the restriction represented by the nominated list applies only to manufacturers: it is incumbent upon them to submit details to the Ministry of Supply for the issue of a permit. Contractors who are licensed by the Ministry to carry a stock of the equipment concerned should so inform manufacturers when desiring to replenish their stock.

Bonding Plastics

IN the fabrication of laminated or moulded phenolic or urea products the lack of a cement for permanent bonding without the necessity of using heat has now been overcome by a simple technique worked out by Bakelite, Ltd. The method consists, briefly, in abrading the surface to be bonded in the presence of a solution of a special phenolic resin before applying the appropriate cold-setting cement. This new process has simplified the fabrication by bonding of phenolic or urea laminated sheet, mouldings, cast resins and impregnated wood, either to similar materials or to wood. In general the nominal shear stress decreases with increase in overlap, and increases with increase in thickness.

The surfaces to be bonded are abraded in the presence of Bakelite activating solution, J. 11150, by means of a wire brush, scraper, or abrasive paper, or cloth, either by hand or mechanically. The surface film must be completely removed in the abrasion process and both

surfaces to be bonded must be treated, except when wood is one of the surfaces, abrasion being then unnecessary.

When the surface film has been removed the abrasive mixture should be wiped off and the prepared surfaces are then in an active condition, which will ensure a strong bond when they are finally cemented. Surfaces so treated will retain their activity for some weeks, but it is preferable to do the bonding within a week.

Trade Publications

E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, London, W.C.2.—Illustrated booklet recapitulating salient technicalities of street lighting and summarising the requirements for main traffic routes. Also technical supplement (No. 1) containing technical and design data with servicing notes on fluorescent lamps for industrial uses.

British Thomson-Houston Co., Ltd., Bridle Path, Watford Junction, Herts.—Folder L. 766 M containing illustrations, brief specifications and prices of "Mazdalux" lanterns for rural and urban street lighting. Five types are covered.

Reliance Telephone Co., Ltd., 39, Parker Street, Kingsway, London, W.C.2.—Leaflets on push-button and automatic dial intercommunicating telephones; also loud speakers and radio-gramophone amplifying equipment for industrial and commercial premises.

E. H. Jones (Machine Tools), Ltd., Edgware Road, The Hyde, Hendon, London, N.W.9.—Leaflet descriptive of the Newall model "O" boring head, which is smaller than the first model and adjustable while running in half-thousandths of an inch, with a travel equivalent to $\frac{1}{8}$ in. increase on the diameter of the "work" for bores ranging from $\frac{1}{8}$ to $1\frac{1}{4}$ in.

Rubber Bonders, Ltd., Flexilant Works, Dunstable, Beds.—Illustrated commentary on rubber bonded to metal in various ways for many different purposes, prepared with the object of linking wartime experience with peacetime applications to aid designers.

Hopkinsons, Ltd., Huddersfield.—Folder (No. 4503) illustrating typical examples of steel castings, which the firm produces in large quantities from about 20 lb. to 2 tons in weight.

Applicants for copies of the above should write on their firms' business notepaper.

News from Australia

THE Western Australian Minister for Works (Mr. Hawke) has announced that the main recommendations contained in the report of the Electricity Advisory Committee on the south-west national power scheme have been approved by the State Government. The proposals include the erection of two generating stations and interconnection with the Perth-South Fremantle system. The Government will introduce the necessary legislation during the coming session of Parliament.

The W.A. Industry Expansion Commission and the Perth Chamber of Manufactures recently met to discuss the possibility of expanding the manufacture of electrical goods. It was decided that members of the Commission should inspect local plants in order that they

might acquaint themselves with the character of existing equipment and needs for further expansion.

The Sydney County Council Electricity Department is conducting a comprehensive publicity campaign, advocating the installation of at least eleven power points in all new homes—three in the living room, two in each bedroom, one in the dining room, four in the kitchen and one in the laundry.

The Royal Commission which is investigating the affairs of the Adelaide Electric Supply Co. was recently told by the company's chairman

(Mr. J. S. Murray) that the company had sole right by Act of Parliament to control its share issue and dividends, and that in his considered opinion such right should not be taken away except for some good cause. No such cause had been proved, he contended; in fact, good reasons had been produced for allowing the company to continue.

Now that no permits for electric radiators are required these have been selling freely. Electric irons are still almost unprocurable, but a new line which has had much success is a baby's electric bottle-warmer offered at 63s.

Overseas Electrical Trade

Returns for First Half of 1945

THE accompanying table is compiled from figures published by the Board of Trade ("Accounts Relating to the Trade of the United Kingdom during January-June, 1945," Stationery Office, price 2s. 6d.). It will be seen that the total value of electrical exports (£12,206,472) was £1,988,731 less than in the corresponding period of last year. As a measure of comparison with pre-war trade, the value exceeds half of the total for the year 1938 by £1,321,778, but the rise in costs must

be taken into account in assessing the relative volume of equipment sent out. Goods for the relief and rehabilitation of liberated Europe are included in the figures and have a considerable bearing on the fluctuations. It is proposed to publish details of the destinations of exports in our next issue.

Imports of electrical equipment were largely expanded, the total for the first half of this year (£14,799,148) comparing with only £1,892,919 for half of 1938.

Class	Exports		Imports	
	Jan.-June, 1945	Inc. or Dec. on Jan.-June, 1944	Jan.-June 1945	Inc. or Dec. on Jan.-June, 1944
	£	£	£	£
Telegraph and telephone wires and cables (submarine)	198,674	+ 99,218		
Ditto (not submarine)	494,734	- 86,019		
Wires and cables other than telegraph and telephone (rubber-insulated)	598,289	- 303,441	983,315	- 811,341
Ditto, insulation other than rubber	625,377	- 113,274	*	*
Radio receivers (not radiograms)	45,952	- 24,456	249,672	- 591,868
Transmitting apparatus	202,018	- 398,815	589,342	- 128,235
Valves	471,811	- 349,810	7,470,298	- 3,455,924
Other radio parts and accessories	240,065	- 233,751		
Telegraph and telephone apparatus other than radio	1,112,459	+ 228,034	601,642	+ 241,614
Electric carbons	*	-	58,399	- 318,173
Lamps	375,982	+ 68,818	186,055	- 161,992
Other lighting apparatus	197,994	+ 548	147,846	+ 93,824
Primary batteries	63,906	- 12,784	219,310	+ 123,655
Accumulators (portable)	186,158	+ 59,652	*	*
Ditto, stationary	18,911	- 80,061	*	*
Ditto, parts and accessories	68,726	- 3,045	*	*
Electric cooking and heating apparatus	78,729	- 18,073	*	*
House service meters	47,469	+ 3,058	*	*
Other electrical instruments (not telegraph and telephone)	222,632	- 10,298	171,412	+ 75,724
Insulating materials n.e.s.	139,990	+ 16,481	*	*
Unclassified electrical goods and apparatus	681,265	- 121,612	2,149,259	+ 1,745,447
Generators up to 200 kW	312,242	- 133,334	*	*
Ditto, over 200 kW	436,679	- 637,251	*	*
Motors	904,905	+ 153,295	51,418†	+ 42,515
Converting machinery	9,085	- 6,542	*	*
Transformers for lighting, heating and power, including coils	663,166	- 207,722	*	*
Rectifiers for power-house use	29,796	- 17,571	*	*
Motor starting and controlling gear	180,467	+ 11,129	*	*
Switchgear and switchboards other than telegraph and telephone	1,228,480	- 436,329	*	*
Other electrical machinery	2,348,066	- 380,631	1,920,891	- 172,911
Electric vacuum cleaners	5,152	- 3,875	289	- 289
Other electrically operated portable appliances	17,293	- 4,950	*	*
Total	£12,206,472	-£1,988,731	£14,799,148	-£3,595,072

* Not separately classified. † Not railway and tramway motors.

Welding Supplies

Metering Phase-to-Phase Loads

By A. G. Beech, B.Eng., A.M.I.E.E.

THE war brought about a considerable increase in the number of 400-V welding plants installed in small workshops, garages and factories where the metering consists of single-phase meters connected in each line, and it is frequently observed and reported by meter readers that one meter is running backwards.

Consider the welder alone (Fig. 1a). It is clear from the vector diagram that the current in the "red" meter will have a negative component if ϕ is greater than 60 deg. (i.e., power factor of welder less than 0.5 lag). As this is very frequently the case with welders, the net registration of one meter over the whole quarter may be negative. This effect is most often noticed where the supply was previously single-phase at 230 V and an extra phase has been brought in solely to supply the welder.

In the case shown in the diagram it is the "red" meter which will reverse. The "blue" meter will register forwards for all possible values of ϕ which cannot exceed 90 deg. lagging.

Negative Recording

The view is sometimes expressed that the meter which records negatively should have its connections reversed so as to make it run forwards. This is not correct, and the true consumption is obtained by taking the algebraic sum of the readings with both meters connected normally; e.g., if one meter reads 100 kWh forwards and the other 25 backwards, the true consumption is 75 kWh, and not 125, the figure which would be obtained by reversing the negative meter.

This can be proved by reference to Fig. 1b. True power (assuming sinusoidal currents and voltages) = $V_{RB} I \cos \phi = \sqrt{3} V I \cos \phi$ (V = phase voltage). Power recorded on "red" meter = $V I \cos (30^\circ + \phi)$ (negative if $\phi > 60^\circ$). Power recorded on "blue" meter = $V I \cos (30^\circ - \phi)$. Total recorded power = $V I \{ \cos (30^\circ + \phi) + \cos (30^\circ - \phi) \} = \sqrt{3} V I \cos \phi$, which is the true power consumed for all values of ϕ .

If "red" meter is reversed, recorded power = $V I \{ -\cos (30^\circ + \phi) + \cos (30^\circ - \phi) \} = V I \sin \phi$, which is obviously incorrect.

Where three-phase supplies were already

installed the trouble will not usually be experienced, as the existing phase-to-neutral loads will probably swamp the superimposed welder load. Reports of backward running may, however, be received when the meter

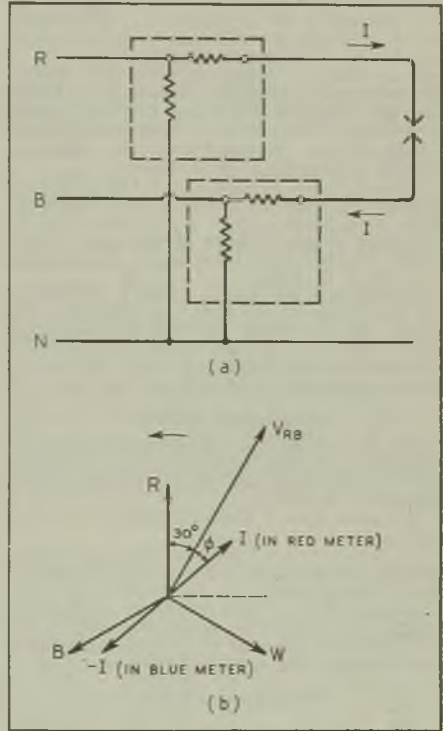


Fig. 1

reader's visit happens to coincide with a period of light load when only the welder is working.

Institute of Fuel

THE annual luncheon of the Institute of Fuel is to be held at the Connaught Rooms, Great Queen Street, W.C.2, on October 17th. Dr. E. W. Smith will preside and the principal guest will be Mr. E. Shinwell, Minister of Fuel and Power. The Melchett Medal for 1940 is to be presented to Monsieur Etienne Audibert and the 1945 Medal to Dr. C. H. Lander, C.B.E.

I.E.E. Programme

First Half of 1945-46 Session

DETAILS of the programme of papers, etc., for the first half of the new session have been received from the Institution of Electrical Engineers. At the first meeting, on October 4th, Dr. P. Dunsheath will deliver his presidential address, and the remainder of the ordinary meetings are as follows:—

October 18th.—Discussion on "Weather and Electric Power Systems," to be opened by J. S. Forrest, H. W. Grimmit, A. J. Drummond and Wing-Comdr. R. M. Poulter. (Joint meeting with the Royal Meteorological Society.)

November 1st.—Paper on "Practical Aspects of Telephone Interference Arising from Power Systems," by P. B. Frost and E. F. H. Gould.

November 15th.—Parsons Memorial Lecture, "High-Voltage Research at the National Physical Laboratory," by R. Davis.

December 6th.—Paper on "The Electrical Engineering Industry in After-War Economy," by G. L. E. Metz.

January 17th.—"Some Notes on Transformer Practice with reference to Standardisation," by A. G. Ellis.

Particulars of the further ordinary meetings of the Institution to be held on February 7th, March 7th and April 4th will be announced later. The thirty-seventh Kelvin Lecture will be delivered on April 25th and the annual general meeting is to be held on May 9th.

Installations Section

Mr. Forbes Jackson will deliver his inaugural address as chairman of this Section on October 11th and the following papers will be read at subsequent meetings:—

November 8th.—"Street Lighting," by E. C. Lennox.

December 13th.—"Mineral-Insulated Metal-Sheathed Conductors," by F. W. Tomlinson and H. M. Wright.

January 10th.—"The Control of Electrical Installation Work," by W. R. Watson.

Further meetings are to be held on February 14th, March 14th, April 11th and May 2nd.

Measurements Section

The inaugural address of the chairman, Mr. S. H. Richards, will be presented at the opening meeting on October 26th; subsequent meetings are as follows:—

November 23rd.—Paper on "The Influence of Irradiation on the Measurement of Impulse Voltages with Sphere-Gaps," by Dr. J. M. Meek.

December 14th.—"A Precision AC/DC Comparator for Power and Voltage Measurement," by G. F. Shoter and H. D. Hawkes.

January 25th.—Discussion on "Instruments for Special Purposes," to be opened by R. W. Griffin.

Further meetings:—February 22nd, March 22nd, April 24th and May 24th.

Radio Section

At the first meeting on October 10th, Mr. A. H. Mumford will deliver his address as

chairman; subjects for later meetings are as follows:—

November 7th.—"Radio Measurements in the Decimetre and Centimetre Wavebands," by R. J. Clayton, Dr. J. E. Houldin, Dr. H. R. L. Lamont and W. E. Willshaw.

November 21st.—"A Method of Increasing the Range of V.H.F. Communication Systems by Multi-Carrier Amplitude Modulation," by J. R. Brinkley.

November 27th.—Discussion meeting (particulars to be announced later).

December 5th.—"The Design and Use of Radio-Frequency, Open-Wire Transmission, Lines and Switchgear for Broadcasting Systems," by F. C. McLean and F. D. Bolt.

December 11th.—Discussion meeting (particulars to be announced later).

January 16th.—"A Standard of Frequency and its Applications," by C. F. Booth and F. J. M. Laver.

Other meetings on January 22nd, February 6th and 26th, April 3rd and 16th, and May 1st and 21st.

Transmission Section

Mr. E. T. Norris, the chairman, will deliver his address on October 17th and other meetings will take place as follows:—

November 14th.—"Recent Progress in the Design of the High-Voltage Lines of the British Grid System," by W. J. Nicholls.

December 12th.—"Mechanical Stresses in Transformer Windings," by Dr. Ing. E. Billig.

January 9th.—"Steel Tower Economics," by P. J. Ryle.

Other meetings are to be held on February 13th, March 13th, April 10th and May 8th.

Informal Meetings

October 29th.—Discussion on "Should Engineering Concerns be Managed by Engineers?" to be opened by the President. At later meetings the following subjects will be discussed:—

November 26th.—"Standardisation of Ripple Control," to be opened by T. R. Rayner.

January 14th.—"Country Road Lighting," to be opened by C. R. Bicknell.

January 28th.—"Electrical Aids to Coal Production," to be opened by R. Crawford.

Further meetings are to be held on February 25th, March 25th and April 29th.

International Bibliography

THE opening meeting of the session of the British Society for International Bibliography will take place on October 16th, at the I.E.E. Dr. S. C. Bradford will be inducted as president and will deliver his address on "Fifty Years of International Documentation," after which Eng. Cdr. D. Hastie Smith, R.N. (ret.) is to open a discussion on "The Technique of Making Abstracts of Scientific and Technical Papers."

The programme for the session includes a paper by Mr. A. E. Tooke, B.Sc., A.M.I.E.E., on "The Information Bureau of the Electrical Research Association" (December 4th).

ELECTRICITY SUPPLY

Ulster Extension Plans. New Croydon Station.

Altrincham.—EXTENSION OF TIME.—The Corporation is to make application for an Order extending the period within which it may exercise its rights of purchase of so much of the undertaking of the Altrincham Electric Supply, Ltd., as lies within the Corporation's jurisdiction.

Belfast.—DECISION ON EXTENSION.—In December last the city electrical engineer (Mr. W. J. McC. Girvan) submitted recommendations for the extension of the Harbour power station at a cost of approximately £1,079,000. Thereafter controversy arose between the Corporation and the Ministry of Commerce over whether new plant should be installed at the Harbour station or at Ballylumford, and the question was submitted for arbitration to Mr. F. W. Lawton, chief engineer and manager of the Birmingham Electric Supply Department. The Ministry has informed the Belfast Corporation that, having considered Mr. Lawton's report, it has decided that future requirements would best be served by the immediate initiation of simultaneous extensions at Ballylumford and the Harbour station. The Belfast Electricity Committee has expressed alarm at the suggestion with regard to Ballylumford, pointing out that it had already been agreed that the installation of more than one 30,000-kW extension would not be justified until it became clear that the rate of increase in load would be higher than estimated.

Bradford.—EQUIPMENT OF PERMANENT HOUSES.—The Housing Committee has decided that permanent houses built by the Corporation shall be equipped so that the tenant has a choice of gas or electricity for cooker, copper and refrigerator where provided, all lighting to be by electricity. If the Ministry will not agree to houses being served with both gas and electricity, then half of the houses will have gas appliances and half electrical, the houses being grouped in blocks to minimise the expense. A small gas appliance or an electric immersion heater is to be provided for hot water in the summer. In the case of houses for people with very low incomes, cooking is to be by solid fuel augmented by a gas ring or electric boiling point. All cookers, coppers and refrigerators installed are to be supplied by and remain the property of the Corporation. Electric points are to be provided in all houses for wireless, vacuum cleaner and iron.

SUPPLY TO HOUSING ESTATES.—The Electricity Committee is to provide a supply to the Eccleshill housing site at a cost of £13,000 and to the Clayton estate (£14,175).

Brierfield.—INCREASED "UNIT" CHARGE.—The U.D.C. has decided to raise the running charge under the rateable value tariff from $\frac{1}{2}$ to $\frac{3}{4}$ d. per kWh.

Camberwell.—REDUCED STREET LIGHTING.—The Works Committee reports that it has discussed various schemes with the lighting company's representative and has given instructions for a reduction of 50 per cent. in the present street lighting. The saving in energy will be in the region of 2,000,000 kWh per annum, and there will be a reduction in the annual cost of street lighting of £6,000.

Croydon.—COMMENCEMENT OF NEW STATION.—The Minister of Fuel and Power (Mr. E. Shinwell) is to cut the first sod on the site of the Corporation's new generating station to-morrow (Saturday) afternoon.

Dumbarton.—CLYDE VALLEY COMPANY TO OPERATE UNDERTAKING.—The Town Council decided at its last meeting that on the termination of the existing agreement with the Electric Supply Corporation, Ltd., at March 31st, 1946, an agreement shall be entered into with the Clyde Valley Electrical Power Co., Ltd., to operate the burgh's Electricity Order for a period of 40 years. An amendment that a further approach should be made to the Electricity Commissioners for borrowing the necessary money to finance the burgh's operating the Order as a municipal enterprise was defeated.

Durham.—PROTEST AGAINST ABANDONMENT OF KEPIER PROJECT.—The Rural District Council intends to protest against the decision not to allow the building of a power station at Kepier by the North-Eastern Electric Supply Co., Ltd. A sub-committee has been formed to draw up a statement on the matter.

Swindon.—SUPPLY TO RAILWAY WORKS.—The Electricity Committee has arranged to provide an additional supply to the Great Western Railway works at a cost of £12,000.

Worcester.—ANNUAL ACCOUNTS.—Presenting the accounts of the electricity undertaking to the City Council, Alderman Roberts said that they showed a deficit of £5,566, which was being met from the reserve fund. They had had to use the reserve fund during the past five years as a sort of equalisation account, but despite that the fund stood to-day at a few thousands more than at the outbreak of the war.

Overseas

Eire.—COMPLETION OF POULAPHOUCA.—The *Irish Press* reports that the last consignment of mechanical equipment for the Poulaphouca hydro-electric station is expected to be delivered on the site shortly. The station will probably be in full operation by the year's end. Plans for a third station on the Liffey at Leixlip are now complete for submission to the Minister for Industry and Commerce.

TRANSPORT

Glasgow.—PROPOSED NEW PLANT.—As a proposal of the Transport Committee to install a 25,000-kW turbo-alternator in place of two existing machines aggregating 22,250 kW at the Pinkston power station would mean an increase of 2,500 kW in the station's capacity, application was made to the Electricity Commissioners under Section II of the 1919 Act. The Commissioners replied suggesting that in the first instance the Corporation should arrange for the Electricity and Transport Departments to investigate the possibility of a supply being given by the Electricity Department at the Port Dundas station as an alternative to the proposed extension of the Pinkston generating station. It was pointed out that in view of the present very heavy demands on the manufacturing

capacity in the country for plant required in connection with the national grid system it was imperative that further demands should be kept to the absolute minimum. In the circumstances it would not appear that the Transport Department's proposal to install a 25,000-kW set to give an increase in the capacity of the station of only 2,500 kW would be in the national interest.

When the Commissioners' letter was considered by the Transport Committee it also had before it a report by the general manager (Mr. E. R. L. Fitzpayne) directing attention to the fact that the proposed new set was substantially a replacement of existing plant (which required no consent from the Electricity Commissioners) and only involved an extension of 2,500 kW; that the proposed set would be similar to the one installed in 1938 and would greatly assist the manufacturers, who had all particulars, drawings, patterns, etc.; and that, in any event, the

suggested supply from the Electricity Department at Port Dundas was neither a safe nor suitable arrangement.

The Committee, after discussion, agreed in the circumstances that no action should be taken on the question of obtaining a supply from the Electricity Department, and that the town clerk should be instructed to reply to the Electricity Commissioners on the lines of the report submitted by the general manager and to press for the granting of the application for permission to extend the station capacity by 2,500 kW.

WARTIME PRECAUTION TERMINATED.—The arrangement with the Central Electricity Board for the provision of an alternative power supply for the Corporation transport undertaking in view of the possibility of Pinkston power station being damaged by enemy action is to be terminated.

Municipal Reports

Salford

CRITICAL comments on the present system of assessing payments to the C.E.B. are made by Mr. L. Romero, chief engineer and manager of the Salford Electricity Department, in his report for the past year. Referring to the deficit of £17,865 on the year's working, he says that this would have been converted into a profit of over £18,000 but for the inclusion of a very large debit item to provide for increased payments to the C.E.B. for the purchase of electricity in the four years to March, 1944. The uncertainty of the amount is, he adds, only one of the several grave objections to the peculiar method of assessing these very large payments as equal to independent operation cost. He considers that every effort should be made to secure the abolition of this "thoroughly unsatisfactory" system.

The report shows that 134.6 million kWh was sold, an increase of 4 per cent. on the previous year and a record for any year so far. The increase was entirely due to greater use in domestic and shop premises. There is now a long waiting list for hired cookers and water heaters.

Income, including a final allocation of £9,300 from the second area grid pool, amounted to £623,200 (against £585,371) and working costs were £470,782 (£427,576), excluding £45,991 arrears on cost of energy purchased. From April, 1944, power and traction rates have included a coal clause, and since the close of the 1944-45 financial year consent has been obtained to advance all other tariffs by 0.1d. per kWh. The average cost per kWh sold was 1.121d. (1.046d.) and the price obtained 1.061d. (1.008d.). After meeting the loss on the year there remains a balance of £82,974 in the reserve fund. The last contribution to the rate fund was in 1940-41, the total amount contributed to that date being £341,284, in addition to the repayment of certain deficits in the early years of the undertaking.

A direction was received during the year to extend the Agecroft generating station by the installation of two 50,000-kW sets and four 300,000 lb. per hr. boilers. In 1944-45 a total of 82 million kWh was generated (against 89 million in 1943-44).

Sheffield

A decrease of 73.5 million kWh (8 per cent.) in total sales is recorded in the 1944-45 report of the Sheffield Electricity Department, of which Mr. J. R. Struthers is general manager and engineer. Total revenue from electricity supply fell from £2,139,353 to £2,113,452 while working costs rose from £1,640,716 to £1,760,507. In addition there was an income of £60,017 from the installation and motor section, with working costs of £61,309. The net deficit on the past year's working was £156,686 (against £29,567 in 1943-44), and including special expenditure there was an overall deficiency of £157,817 (£60,000) to be met from the reserve fund.

A total of 835 million kWh was sold (compared with 908.4 million), the average price obtained being 0.605d. (0.563d.) while the cost was 0.652d. (0.572d.). Power supplies were responsible for the fall in sales, decreasing from 687.6 million to 586.1 million kWh. Supplies for private lighting and heating increased from 179.2 million to 207.1 million kWh; public lighting consumption (0.7 million kWh) showed little change and traction supplies were slightly higher than in the previous year at 41.1 million kWh.

A total of 1,187.3 million kWh was generated at the Department's power stations compared with 1,264.1 million kWh in the previous year. The installed plant capacity in commission aggregated 292,000 kW and building and civil engineering work was in progress for a new 50,000-kW set and three boilers at Neepsend while the installation was commenced of two further boilers at Blackburn Meadows.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Vactic, Ltd.—Sir Frederick Whyte (chairman) stated at the annual meeting that production of vacuum cleaners had commenced at the factory which had been leased to the company in a former "distressed area" of Scotland. This production was expected to reach a substantial volume in the near future, and a large part of it would be available for export. In addition, another and larger factory would be built shortly on the same favourable terms and should be ready for occupation early next year. This would provide the company with one of the most modern and best-equipped factories for the manufacture of a complete range of domestic appliances. These arrangements had enabled them to dispose of their principal London factory at a very substantial capital profit, and negotiations were well advanced for the sale of other redundant properties, which in all probability would make unnecessary the capital issue foreshadowed at the last annual meeting.

Berry's Electric, Ltd.—The accounts for the year ended March 31st last show a net profit of £60,593 as compared with £56,338 for the previous year. After deducting directors' fees, contribution to staff pension and life assurance scheme, war risks commodity insurance, interest on $7\frac{1}{2}$ per cent. notes, income tax and N.D.C., and adding £4,673 brought forward, there is a disposable balance of £57,449. A sum of £25,500 (£23,000) is allocated to income tax reserve, £10,000 (£15,000) to note redemption reserve, £2,000 (same) to repairs reserve, and £5,000 (nil) for writing down freehold works. The dividend for the year is 10 per cent. as before and £7,402 is carried forward.

Pye, Ltd., report a net profit of £115,807 for the year ended March 31st last as compared with £108,910 for the previous year. It is proposed to pay a final dividend of 5 per cent. on the participating preferred ordinary stock, again making 10 per cent. for the year, and the deferred ordinary stock receives 25 per cent. (same). A sum of £33,766 brought in from subsidiary companies' reserve no longer required is transferred to general reserve, the employees' active service fund receives £2,000 (same), staff pension fund £5,000 (nil), taxation provision other than E.P.T. amounts to £65,000 (same) and war damage contributions £408 (£750), leaving £129,583 (£116,834) to be carried forward.

British Vacuum Cleaner & Engineering Co., Ltd.—The chairman, Mr. H. C. Booth, referred at the annual meeting to the wide range of the company's war products. These included gun mechanisms of many kinds: tank components: enormous quantities of fuses, shells and other kinds of ammunition: torpedo precision components: and detonating units for naval mines, including sensitive electric clock mechanisms. They had co-operated in important development work and had played no insignificant part in connection with radio-location equipment for the Navy, submarine

detection apparatus, etc., besides making a substantial contribution to the requirements of the Air Ministry for electric motors, rotary converters, generators, etc., involving new technical developments. They had also supplied a considerable amount of vacuum cleaner apparatus for ships and aircraft as well as B.V.C. boiler sooting plant for famous battleships. Through their subsidiary, the Magneta Time Co., they had maintained their position in the market for time recording and public address equipment, which had been installed in many of the largest works in the country.

Telephone Rentals, Ltd., states that the profit for the year to May 31st was £139,794, as compared with £138,851, and the net profit £44,387 (against £39,156). The ordinary dividend is unchanged at 10 per cent. (final 6 per cent.) and £5,000 is again transferred to reserve, leaving £32,929 (£33,537) to be carried forward. It has been decided to merge the main operating companies with the parent company as from the end of this year and in future accounts will be made up to December 31st each year.

The British Aluminium Co., Ltd., is reducing its interim ordinary dividend to 2 per cent.: in each of the past five years an interim dividend of 3 per cent. has been paid.

The Ransome & Marles Bearing Co., Ltd., is maintaining its final dividend at 11 per cent., making 20 per cent. for the year to June 30th. The net profit amounted to £123,227 (against 123,134).

The Woking Electric Supply Co., Ltd., has deferred consideration of an interim dividend. Last year 3 per cent. was paid, free of tax, the dividend for the full year being $7\frac{1}{2}$ per cent. tax free.

The Lancashire United Transport & Power Co., has declared an interim dividend of 4 per cent. (same).

The Automatic Telephone & Electric Co., Ltd., announces an interim ordinary dividend of 3 per cent., the same as in each of the past seven years.

Waite & Son, Ltd., have declared a first and final dividend of 5 per cent., the same as last year.

The Electric Supply Corporation, Ltd., is paying an interim ordinary dividend of $3\frac{1}{2}$ per cent. (same).

Stothert & Pitt, Ltd., are paying a first and final ordinary dividend of 10 per cent. and a bonus of 5 per cent., both the same as last year.

A. Revrolle & Co., Ltd., are repeating their interim dividend of 5 per cent.

Enfield Cables, Ltd., is paying an interim dividend of $6\frac{1}{2}$ per cent. on the ordinary stock (same).

The Scottish Power Co., Ltd., has declared an interim ordinary dividend of 3 per cent. (same).

British Ropes, Ltd., is again paying an interim ordinary dividend of 5 per cent.

New Companies

De La Rue Extrusions, Ltd.—Private company. Registered September 5th. Capital, £50,000. Objects: To carry on the business of manufacturers of, and dealers in, plastic articles and substances (whether produced by extrusion or otherwise), moulding materials, moulded goods, electrical and insulating goods and materials, etc. Directors: B. C. Westall, Tanyards, Sharpthorne, Sussex (director of Thos. De La Rue & Co., Ltd.), C. G. R. Ashton, Ludwell, Horsted Keynes, Sussex (director of Thos. De La Rue Plastics, Ltd.), and De La Rue Insulation, Ltd.), H. P. Bridge, 16, Thetford Road, New Malden (director of two last-named companies), J. Eerdmans (Dutch), 31, Highway, Sutton, Surrey (director of two last-named companies) and C. E. S. A. M. Stackhouse (U.S.A.), Norwalk, Connecticut, U.S.A. (president and secretary of Extruded Plastics, Inc.). Registered office: Imperial House, 86, Regent Street, W.1.

Switchcraft, Ltd.—Private company. Registered August 30th. Capital, £20,000. Objects: To carry on the business of manufacturers of, and dealers in, electrical, wireless, television, telephone and telegraph components, household appliances, electrical, motor and aero engineers, etc. Directors: W. Balleny, 61, Higher Drive, Banstead (director of H. Densham & Sons, Ltd.), K. Hedin (Swedish), Woodside, Knighton Lane, Buckhurst Hill, Essex (director of Hedin, Ltd.) and W. C. Pycroft, 123, Park Road, N.W.8 (director of Ferranti, Ltd.). Registered office: 129, Mount Street, W.1.

Belton & Hall, Ltd.—Private company. Registered August 31st. Capital, £5,000. Objects: To acquire the business of a radio and electrical dealer carried on by Belton & Hall at Bishops Waltham, Fareham and Waterloo, Hants. Directors: W. G. Belton, Broadlands, New Road, Bishops Waltham, Southampton and G. Hall, 5, Brookland Road, Bishops Waltham, Southampton. Secretary: G. B. Burr. Registered office: Radio House, High Street, Bishops Waltham, Southampton.

Short Wave (Great Britain), Ltd.—Private company. Registered August 25th. Capital, £500. Objects: To carry on the business of manufacturers of, and dealers in, short-wave and other wireless apparatus, electrical accumulators and batteries and accessories, gramophones, records, etc. Directors: G. E. Robson, 57, Dale Crescent, Patcham, Brighton and J. E. Hay, Tudor Cottage, Preston Road, Brighton. Registered office: 63, London Road, Brighton, 1.

Masteradio Electronics, Ltd.—Private company. Registered September 7th. Capital, £100. Objects: To carry on the business of manufacturers of, and dealers in, electronic devices, wireless and television sets and components, etc. Subscribers: R. Neild, Letchmore Heath, Watford, and C. G. Treacher, 155, Tudor Walk, Watford. Registered office: 19, Clarendon Road, Watford, Herts.

C. J. R. Electrical & Electronic Development, Ltd.—Private company. Registered September 5th. Capital, £500. Objects: To carry on the business of manufacturers of, and dealers in, electrical, radio and cinematograph apparatus, accessories and equipment, etc. Directors: J. Hickman, 26, Teddington Grove, Birmingham,

and A. Freeman, 13, Hall Walk, Coleshill, Warwick. Registered office: 118a, Hubert Street, Aston, Birmingham.

William White (Switchgear), Ltd.—Private company. Registered Sept. 6th. Capital, £5,000. Objects: To carry on the business of electrical, metallurgical, chemical and wireless engineers, etc. Directors: Daphne E. C. Foster and P. W. Foster, both of 62, Warwick Square, S.W.1; and C. J. Baker, 38, Palace Road, Streatham Hill, S.W.20. Registered office: 56, Buckingham Gate, S.W.1.

William White & Co. (London), Ltd.—Private company. Registered September 7th. Capital, £10,000. Objects: To carry on the business of wholesale dealers in electrical and other machinery and apparatus, etc. First directors: Daphne E. C. Foster and P. W. Foster, both of 62, Warwick Square, S.W.1. Registered office: 56, Buckingham Gate, S.W.1.

J. Carter & Sons (Bradford), Ltd.—Private company. Registered September 4th. Capital, £2,000. Objects: To acquire the business of an electrical engineer carried on by J. Carter, as "J. Carter & Sons," at 27, Wade Street, Bradford. First directors: J. Carter, 1138, Leeds Road, Thornbury, Bradford, and F. Carter, 11, Birklands Road, Shipley. Registered office: 27, Wade Street, Bradford.

Electrosol Co., Ltd.—Private company. Registered in Edinburgh August 31st. Capital, £4,000. Objects: To carry on the business of manufacturers of, and dealers in, electrical and other appliances, apparatus and instruments for giving therapeutic treatment, etc. Directors: J. F. Bruce, 192, Glasgow Road, and T. Hunter, 35, High Street, both Paisley. Registered office: 24, McDowall Street, Paisley.

Reb & Co. (Products), Ltd.—Private company. Registered September 4th. Capital, £100. Objects: To carry on the business of manufacturers of, and dealers in, electrical plant, appliances and supplies, motor vehicles, etc. Mrs. Betty Card, 74, Crombie Road, Sidcup, is the first director. Registered office: 9, Stratford Place, W.1.

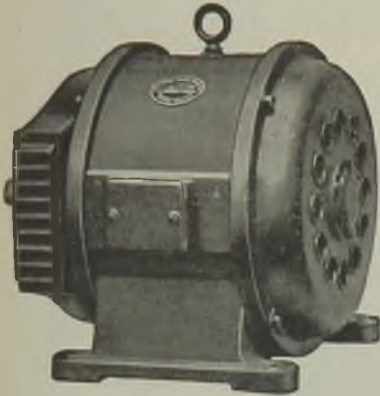
Evans Tele-Radio, Ltd.—Private company. Registered September 1st. Capital, £1,000. Objects: To carry on the business of radio engineers and contractors, etc. Directors: L. A. Evans, Georgina Evans and Vera M. Saunders, all of 12, Bolton Terrace, Coronation Road, Worle, Weston-super-Mare, and L. G. Barber, 3, Trewartha Park, Weston-super-Mare. Registered office: 19, Meadow Street, Weston-super-Mare.

Companies' Returns Statements of Capital

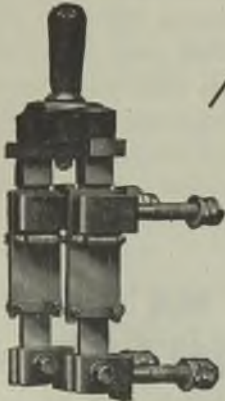
Metropolitan-Vickers Electrical Co., Ltd.—Capital, £250,000 in £1 shares. Return dated March 28th. 10,002 shares taken up. £10,002 paid. Mortgages and charges: Nil.

City of London Electric Lighting Co., Ltd.—Capital, £2,400,000 in £400,000 6 per cent. first preference stock, £300,000 8 per cent. second preference stock, £1,600,000 ordinary stock, all £1 units, and £100,000 undenominated. Return dated March 28th, 1945. £400,000 6 per cent. first preference stock, £300,000 8 per cent.

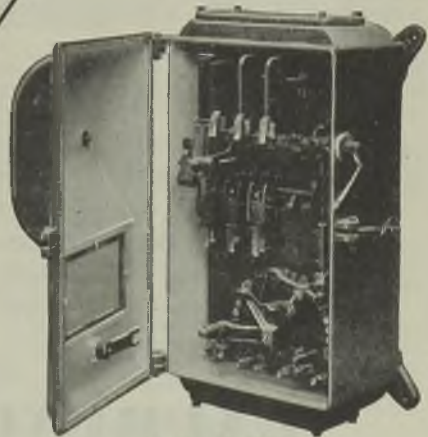
THE VERITY RANGE



MOTORS



SWITCHGEAR



STARTERS



VERITYS LTD. ASTON, BIRMINGHAM 6

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

The L.S.E. Range of Electric Motors

The L.S.E. RANGE includes :

Standard A.C. & D.C. Motors in all enclosures and ratings.

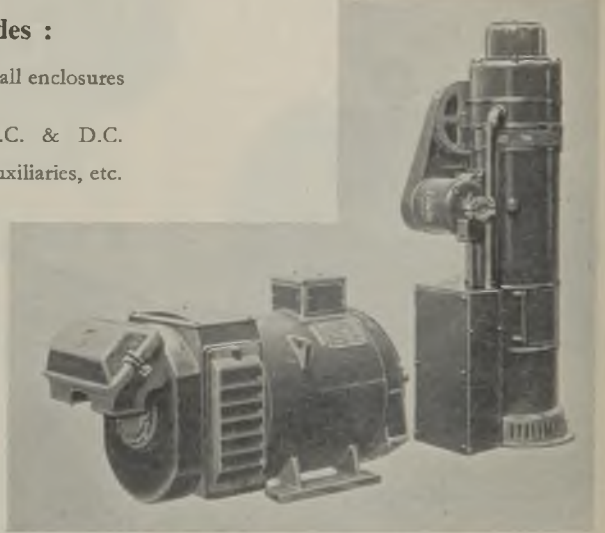
Variable speed equipments, A.C. & D.C.

Motors for mines, cranes, mill auxiliaries, etc.

Marine Motors, electric Cargo Winches, electrical equipment for steering gear.

Generators, Alternators, Welding generators, Control Gear. Precision electro-mechanical Instruments, etc.

Right : A medium-size N.S. motor with air-cooled regulator fitted with 'predictor' control.



VARIABLE SPEED A.C.

The N.S. variable speed A.C. commutator motor is an efficient, thoroughly reliable machine that costs little for maintenance because its commutation is excellent. It is a fixed brush machine and its speed regulator may be remote controlled by push-buttons or any form of automatic device. Pre-set 'predictor' control can be supplied for machine tool and similar drives.

LAURENCE, SCOTT & ELECTROMOTORS LIMITED

Electrical Engineers since 1883

NORWICH &  MANCHESTER

second preference stock and £1,600,000 ordinary stock taken up. £1,500,000 paid. £800,000 considered as paid. Mortgages and charges: £540,383.

Rheostatic Co., Ltd.—Capital, £120,000 in 100,000 preference stock units of 10s. and 350,000 ordinary stock units of 4s. (Capital increased to £250,000 on June 27th, 1945 by creation of 100,000 6 per cent. cumulative preference shares of 10s. each and 400,000 ordinary shares of 4s. each). 100,000 preference stock units and 350,000 ordinary stock units taken up. £25,100 paid. £94,900 considered as paid. Mortgages and charges: Nil.

R. T. S. Electronics, Ltd. (formerly Exeter Radio & Television Services, Ltd.)—Capital, £2,000 in 2,000 shares of £1 each. Return dated July 3rd. 1,736 shares taken up. £1,736 paid. Return of allotments dated February 24th, shows a further 264 shares allotted, and £264 paid or due and payable. Mortgage and charges: Nil.

Electric Reduction Co., Ltd.—Capital, £50,000 in £1 shares (16,200 preference and 33,800 ordinary). Return dated February 13th, 1945 (filed March 10th, 1945). 16,200 preference and 28,800 ordinary shares taken up. £18,000 paid. £27,000 considered as paid. Mortgages and charges: Nil.

Minehead Electric Supply Co., Ltd.—Capital, £130,000 in £1 shares (29,000 first preference and 101,000 ordinary). Return dated July 13th. All shares taken up. £115,027 paid. £14,973 considered as paid. Mortgages and charges: Nil.

Partridge Wilson & Co., Ltd.—Capital, £25,000 in 55,000 shares of 5s. each and 11,250 shares of £1 each. Return dated April 20th. 54,581 5s. and 11,201 £1 shares taken up. £19,701 5s. paid. £5,145 considered as paid. Mortgages and charges: Nil.

Hetton Relay Services, Ltd.—Capital, £8,000 in 8,000 shares of £1 each. Return dated February 14th. 7,250 shares taken up. £4,112 paid. £3,138 considered as paid. Mortgages and charges: Nil.

Forest City Electric Co., Ltd.—Capital, £5,000 in £1 shares. Return dated March 10th, 1945. All shares taken up. £2,210 paid. £2,790 considered as paid. Mortgages and charges: Nil.

Mechanical & Electrical Engineering Co. (Walsall), Ltd.—Capital, £5,000 in 5,000 shares of £1 each. Return dated March 22nd, 1945. 1,072 shares taken up. £1,072 paid. Mortgages and charges: Nil.

Beethoven Electric Equipment, Ltd.—Capital, £20,000 in £1 shares (10,000 ordinary and 10,000 preference). Return dated May 29th. 10,000 ordinary shares taken up. £9,002 paid. £998 considered as paid. Mortgages and charges: Nil.

Electrical Manufacturers' Finance Co., Ltd.—Capital, £150,000 in £1 shares. Return dated March 26th, 1945. All shares taken up. £150,000 paid. Mortgages and charges: Nil.

Llanely & District Electric Supply Co., Ltd.—Capital, £1,400,000 in 660,000 6 per cent. cumulative preference, 660,000 ordinary and 80,000 undenominated shares of £1 each. Return dated March 28th. 660,000 preference and 660,000

ordinary shares taken up. £1,314,000 paid. £6,000 considered as paid. Mortgages and charges: Nil.

Electricity Distribution of North Wales & District, Ltd.—Capital, £400,000 in £1 shares (all ordinary). Return dated April 4th. All shares taken up. £396,500 paid, plus £14,587 10s. premium (1s. 6d. per share on 194,500 shares). £3,500 considered as paid. Mortgages and charges: £16,230.

East Suffolk Electricity Distribution Co., Ltd.—Capital, £125,000 in £1 shares. Return dated April 2nd. All shares taken up. £125,000 paid, plus £10,000 in respect of premiums. Mortgages and charges: £6,300.

South Somerset & District Electricity Co., Ltd.—Capital, £200,000 in £1 shares. Return dated April 2nd. All shares taken up. £206,531 5s. paid (including premium of 2s. 4d. per share on 55,000 shares). Mortgages and charges: Nil.

West Hampshire Electricity Co., Ltd.—Capital, £250,000 in £1 shares (all ordinary). Return dated April 2nd. All shares taken up. £250,000 paid. Mortgages and charges: Nil.

Johnson & Co. (Bradford), Ltd.—Capital, £1,000 in £1 shares (500 ordinary and 500 preference). Return dated March 22nd, 1945. 500 ordinary shares taken up. £500 paid. Mortgages and charges: Nil.

British Automatic Conveyor & Equipment Co., Ltd.—Capital, £1,000 in £1 shares. Return dated January 3rd (filed March 8th). 303 shares taken up. £303 paid. Mortgages and charges: Nil.

J. G. Snaith, Ltd.—Capital, £6,000 in £1 shares. Return dated April 4th. (Increased to £10,000 on April 27th.) 6,000 shares taken up. £4,969 paid. £1,031 considered as paid. Mortgages and charges: Nil.

Liverpool Electric Cable Co., Ltd.—Capital, £300,000 in £1 shares. Return dated June 20th. 150,000 shares taken up. £127,833 paid. £22,167 considered as paid. Mortgages and charges: Nil.

Macintosh Cable Co., Ltd.—Capital, £250,000 in £1 shares. Return dated March 28th. 500 shares taken up. £500 paid. Mortgages and charges: Nil.

A. H. Webb (London), Ltd.—Capital, £500 in £1 shares. Return dated August 14th, 1944 (filed March 15th, 1945). All shares taken up. £500 paid. Mortgages and charges: Nil.

Bankruptcies

W. G. Head, lately carrying on business as an electrical engineer at 30a, High Street, Ashford, Kent.—Discharge suspended for seven days. Date of discharge August 14th.

Liquidations

British Solenoids, Ltd.—Meeting at 15, Cromwell Road, London, S.W.7, on October 18th to receive an account of the winding-up by the liquidator, Mr. N. S. Hunt.

Princely Radio & Television Cpn. (of Great Britain), Ltd.—Liquidator, Mr. T. J. M. Mcleod, 4, Bucklersbury, London, E.C.4, appointed August 24th.

STOCKS AND SHARES

TUESDAY EVENING.

STOCK EXCHANGE markets remain under conflicting influences. On the one hand, the amount of money available for investment shows no material diminution, in spite of the opening of the Thanksgiving Campaigns. From the slightly depressing effect that this factor exercised at first, markets and prices have recovered, and the search goes on continually for good class industrials, ordinary and preference alike. The Lease-Lend negotiations have introduced an element of uncertainty into the international position and this, in its turn, reacts closely upon Home industrial conditions.

Electricity Supply

The steadiness of prices of ordinary shares in Home electricity supply companies, affords the best evidence of the calmness with which shareholders view the outlook. Prices have not yet recovered the full extent of the loss suffered at the time of the General Election result, but from the lowest prices reached there has been a notable reaction upwards. A question constantly debated is: How will the Government nationalise the electric lighting industry in accordance with its declared policy?

Superficially, the obvious answer is that the Government will take over the companies at a valuation, and issue to the proprietors stock in lieu of present holdings. But the translation of this into practical politics, creates a different state of affairs. People who have studied the subject maintain that to nationalise the industry would take at least three or four years, and would call for a vast expenditure of expert counsel and labour. Prices accordingly keep steady as a whole, the few alterations being mostly due to ex dividend markings.

Movements in Prices

Amongst the improvements, Johnson & Phillips have risen 4s. to 79s., Telegraph Constructions 1s. 6d. to 57s., Tube Investments $\frac{1}{2}$ to $5\frac{1}{8}$ and Burco 1s. to 16s. Radio shares are again in the ascendant, Cossors being the most active. The shares at 42s. 6d. are up 1s. 6d. Philco have shown a little animation, and, on the eve of the accounts being published, rose to 14s. 6d. The new shares stand at 13s. 6d. E. K. Cole are unchanged at 35s.; E.M.I. at 33s. 9d. show a gain of 6d. Metal Industries "B" put on $\frac{1}{2}$, at 50s. and Murex 2s. to 102s.

Dollar stocks are good, on American support. The price of Brazilian Tractions rose on four consecutive days in New York, without there being a corresponding movement here, but on a sudden, if tardy, recognition of the American buying, the shares advanced to 31 $\frac{1}{2}$. International "Tel. & Tel." improved to 32. The gamble in Tokyo Electric sixes has quietened down, and the price fell back a point to 56 $\frac{1}{2}$.

Pye, Ltd.

Figures published by Pye, Ltd., show that the company increased its net profit by nearly £7,000 in respect of the year ended March 31st last. The company has paid a 25 per cent. dividend in each of the last seven years. In 1936 and 1937, the payment was 125 per cent. plus a capital bonus. The present issued capital is £150,000 in 8 per cent. cumulative preferred ordinary stock and £185,200 in deferred ordinary stock in 5s. units. The price of the latter is about 31s. 3d. which compares with 6s. 3d. as the lowest over the past ten years, reached in the black days of 1940.

Dividend Announcements

British Aluminium shares fell back on the announcement of an interim dividend of 2 per cent. as against 3 per cent. last year, when a final of 7 per cent. making 10 per cent. for the year was declared. The present cut is thought likely to herald a possible reduction in the final; speculation talks of 8 per cent. for the year. Shares changed hands at 41s. before a rally to 42s. took place. The interim dividends announced by the Automatic Telephone & Electric Co. of 3 per cent. and Enfield Cables of 6 $\frac{1}{2}$ per cent. are the same as those of a year ago. The prices are unchanged at 67s. 6d. and 63s. 6d. respectively.

Brush Electrical

A reader in the Royal Navy draws courteous attention to an error in our monthly price tables relating to the dividend on the Brush Electrical Engineering Co.'s shares. This was given as 9 per cent. whereas the company, for the year ended December 31st, 1944, paid 10 per cent., out of earnings of 14 per cent. on the ordinary shares. The dividend for 1941 was 6 per cent. raised to 9 per cent. for 1943, following which came the 10 per cent. just mentioned. Prior to 1941, the three previous years produced no dividend. The company is controlled by the Associated British Engineering Co., Ltd. Early in 1939, it acquired from the controlling undertaking the Diesel and oil engine business of Petters, Ltd.

Veritys

Veritys, Ltd., the well-known manufacturers of electric fans, switchgear, etc., present their accounts for 1943 and 1944, stating that full provision has been made for any liabilities, including taxation. The figures for the past year show a decline, owing to the fact that negotiations with Government Departments, relating to price fixing, have not yet been finally determined. It is assumed that the directors have adopted an austere view in regard to taxation liabilities, and that there will be marked improvement in the figures for the current year. At the present price of 7s. 9d. the yield on the money is £4 16s. 9d. per cent. on the dividend of 7 $\frac{1}{2}$ per cent. which the company is paying on the ordinary shares.

Lamp Publicity

Preparations for the 1945-46 Season

General Electric Co., Ltd.

THE first post-war "Osram" lamp scheme will follow closely on the lines of its immediate predecessors. The scarcity of materials and labour preclude the issue of display material of the kind and variety to which dealers were accustomed before the war, but during the next few months the "Osram" lamp dealers will be assisted by a comprehensive advertising programme. This will embrace all the national



"Osram" window display

and provincial newspapers with a supplementary scheme of advertising in the popular magazines, the press of all religious denominations and in the technical press of every industry.

More direct help for dealers consists of two window displays, the installation of which will again be in the hands of the G.E.C. dealer service. Each is carried out in bright colours, carefully chosen and blended to form a most attractive display.

The lighting "motif" is also strong in the new series of pictures now decorating the "blitzed" windows of Magnet House, Kingsway. These portray four of the London railway termini and convey the atmosphere of these stations (in a metaphorical sense) extremely well.

Siemens Electric Lamps & Supplies, Ltd.

In the interests of national economy the publicity scheme of Siemens Electric Lamps & Supplies Ltd. is of necessity curtailed, but the company intends to keep the name "Siemens" well in the public eye. Subject to limitations on space, display advertisements will appear from time to time in the national and provincial newspapers, the *Radio Times*, *Picture Post*, etc. In view of the urgent necessity for speeding up output in all essential industries, special attention will be devoted to improved lighting in factories with Siemens lamps and lighting equipment, and to this end display advertise-

ments will appear in the principal trade journals which will stress the economy of good lighting in making possible increased production, and at the same time offering without obligation the skilled advice of the company's lighting engineers on all matters appertaining to scientific factory lighting.

An attractive hanging display of Big Ben is available in four colours with the slogan "Siemens Lamps used for Lighting Big Ben and Just as Reliable," size 20 in. by 30 in. with metal rims the 20 in. way. In order to comply with the paper control regulations these display bills are printed on linen. The company is prepared to dress dealers' windows with a Siemens lamp display using the above as the central feature.



Siemens "Big Ben" display

No general distribution of price-lists will be made but price-lists are available for the trade on request, showing the new reduced prices.

Philips Lamps, Ltd.

The psychological impulse to break something open just to see "the works" is the idea which lies behind the presentation of the new

advertising of Philips Lamps, Ltd. A lamp is shown with a doorway cut into it. The door is padlocked and the "copy" tells the public that, locked away inside, is the secret behind the economical consumption "for a maximum of clear, bright light." Other advertisements show a knife cutting a lamp in two; two people walking into a lamp through a doorway, and so on. They will appear in all



One of the Philips advertisements

the national dailies and a wide range of provincial papers. This presentation is in keeping with

previous Philips campaigns. To-day, the war link is dropped but the theme of the workmanship of the Philips lamp remains an essential part of the latest campaign.

British Thomson-Houston Co., Ltd.

"Mazda" lamp advertising during the coming autumn and winter will exploit to the full the most effective of the permissible avenues of propaganda. In the matter of "literature," a "Mazda" lamp broadsheet (L. 780) containing reduced prices of general service, sign and traction lamps, together with the full range of other lamps available, has been produced. In addition, a number of B.T.H. lighting bulletins dealing with street lighting, infra-red processes, fluorescent lighting, etc., are available, together with a leaflet explanatory of the new "Mazda" warm-white fluorescent lamp. School lighting, to accord with the new Education Act, has occupied the attention of B.T.H. lighting engineers and appropriate matter in the form of reprints of papers read by members of the company's organisation and descriptive lists of lighting fittings for this wide field is published.

Display pieces to form part of general window displays have also been produced, but these are, of necessity, in limited supply. There are three different displays made of linen with silk screened designs. The displays, measuring 3 ft. by 2 ft., are colourful and attractive.

The advertising scheme for national newspapers and periodicals and the electrical and

punched with three holes for binding in a folder. Among leaflets already published are those dealing with general lighting service lamps (102/1-1), miners' bulbs (102/36-1), electric-discharge lamps (103/1-1) and control gear (103/2-1), as well as leaflets numbered



Some of the "Metrovick" publications

124 1-1 and 124 2-1, which describe flameproof and gastight fittings for use in mines and industrial establishments. Other similar leaflets cover a wide range of industrial lighting fittings.

The ending of the black-out is marked by the publication of a number of descriptive leaflets on "Metrovick" street lighting lanterns suitable for Class "A" and Class "B" roads giving candle-power distribution curves and other characteristics. Leaflet 122 21-1 of this series describes the "Trafford" lantern for Class "A" roads: all are in similar form to those described above.

A new abridged edition of the price list (E.S. 4102 27) in orange and white giving reduced "Cosmos" lamp prices has been prepared and will be distributed as far as regulations will allow. A price-card is also being distributed with the abridged price list. The "Metrovick"

in its "daylight" and "warm-white" forms is described (together with fittings) in a small folder (7103/26) printed in two colours, and another folder (S.P. 7108/1) deals with infra-red equipment for industrial heating, including lamps and fittings.

Small numbers of folding window display units made before the war are still available. The well-known Metrovick Cosmos "Girl" calendar will again be available.



"Mazda" window arrangement

technical journals is, the company says, more ambitious than in the war years.

Metropolitan-Vickers Electrical Co., Ltd.

A notable feature of the publicity of the Metropolitan-Vickers Electrical Co., Ltd., for the new season is the publication of the first leaflets of a series dealing with "Cosmos" and "Metrovick" lamps and lighting equipment. They are in quarto size,

NEW PATENTS

Electrical Specifications Recently Published

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

E. ALLEY.—"Superheater headers for boilers." 1199. January 21st, 1944. (571523.)

Allmänna Svenska Elektriska Aktiebolaget.—"Heavy machinery driving arrangements, supported by the driven shaft." 16682/43. October 12th, 1942. (571614.)

Belling & Lee, Ltd., and E. M. Lee.—"Mountings for thermionic valve bases and other electrical components." 9876. June 18th, 1943. (571599.)

Bennis Combustion, Ltd., and A. W. Bennis.—"Automatic stokers for steam generators." 4763. March 24th, 1943. (571594.)

F. Bradbury.—"Starting mechanism for electric clocks and the like." 15041. September 14th, 1943. (571611.)

British N.S.F. Co., Ltd. (Oak Manufacturing Co.).—"Electrical interrupters of vibrators." 20693. December 10th, 1943. (571516.)

British Thomson-Houston Co., Ltd.—"Resinous compositions." 2455 42. February 26th, 1941. (571496.) "Dielectric and insulating compositions." 4900 43. March 31st, 1942. (571498.)

British Thomson-Houston Co., Ltd.—"Electric resistance heaters." 442 44. January 11th, 1943. (571519.) "Electric toasters." 21398 43. December 24th, 1942. (571634.)

A. F. Burgess (Wincharger Corporation).—"Wind-driven power plants." 2317. February 8th, 1944. (571644.)

Callender's Cable & Construction Co., Ltd., P. V. Hunter and G. M. Hamilton.—"Manufacture of enamelled copper wire." 102. January 4th, 1944. (571638.)

R. Clarke and Laurence, Scott & Electromotors, Ltd.—"Lockout means for electric contactors and the like electric circuit-breaking devices." 21223. December 17th, 1943. (571569.)

Claude-General Neon Lights, Ltd., and A. C. Lewis.—"Multiple burettes." 17091. October 18th, 1943. (571504.)

Enfield Rolling Mills, Ltd., and R. L. Stubbs.—"Building." 20791. December 11th, 1943. (571545.)

G. R. Fountain, Ltd., and P. D. R. Marks.—"Telephone systems." 3720. March 20th, 1942. (571547.)

General Electric Co., Ltd., and S. K. Lewer.—"Piezo-electric oscillators." 3027. February 24th, 1943. (571623.)

General Electric Co., Ltd., F. G. Quance and W. Manchester.—"Electric coupling elements." 19767. November 26th, 1943. (571576.)

W. T. Henley's Telegraph Works Co., Ltd., and H. Hubbard.—"Electric distribution boards." 1235. January 22nd, 1944. (571640.)

Hoover, Ltd.—"Suction cleaners." 3508-11-13-14 44. April 26th, 1943. (571583-6.)

Marconi's Wireless Telegraph Co., Ltd.—"Cathode assembly." 16415/43. September

29th, 1942. (571503.) "Frequency modulation detector." 21000/43. December 15th, 1942. (571580.) "Electric transmission lines." 3615 44. February 27th, 1943. (571652.)

Mavor & Coulson, Ltd., and J. B. Mavor.—"Mining machines." 12328. July 29th, 1943. (571624.)

F. G. Mitchell.—"Cooling towers." 19273. November 18th, 1943. (571510.)

Parole Electrical Plant Co., Ltd., and J. H. L. Tucker.—"Barometrically compensated gauges for low pressures and vacuum." 14891. September 10th, 1943. (571561.)

Pyrene Co., Ltd., W. L. Baker and H. E. T. Day.—"Electrodeposition of tin copper alloys." 1868. February 1st, 1944. (571641.)

Revo Electric Co., Ltd., A. E. Felton and A. N. Harding.—"Adjustable mounting for an electric hotplate or like unit." 19053. November 16th, 1943. (571509.)

A. Reyrolle & Co., Ltd., I. W. A. Kirkwood, J. S. Gillhespy and F. Jeffrey.—"Electric insulators." 2768. February 15th, 1944. (571648.)

G. R. Shepherd (Westinghouse Electric International Co.).—"Electric connectors." 21935. December 31st, 1943. (571581.)

Siemens Bros. & Co., Ltd., and D. A. Christian.—"Electric selective signalling systems." 612. January 12th, 1944. (571520.)

Standard Telephones & Cables, Ltd., and E. C. Lee.—"Terminations for electric power cables." 3520. February 25th, 1944. (571587.)

Standard Telephones & Cables, Ltd., and A. J. Maddock.—"Cutting glass." 21196. December 17th, 1943. (571633.)

H. Ward.—"Means for operating an electric switch at a predetermined time." 10853. September 5th, 1943. (571541.)

Westinghouse Electric International Co.—"Carrier current telephone transmitter circuits." 1737 43. October 22nd, 1942. (571627.)

J. S. White & Co., Ltd., and O. Hurst.—"Electric welding." 18509. November 8th, 1943. (571618.)

New Mexican Factory

A \$10 million plant is to be built near Mexico City for manufacturing refrigerators, home radio sets and other types of electrical equipment. It will be financed by American and Mexican capital and will operate under licence arrangements with the Westinghouse Electric International Company, a subsidiary of the Westinghouse Corporation. The plant will be managed by a new company, Industrial Electrica de Mexico, it was stated by the American banking firm of Kuhn, Loeb & Company, who will head the American group which will take over 49 per cent. of the share capital of the company. The remainder will be in the hands of a Mexican group headed by the Banco Nacional de Mexico. An additional \$5 million capital will be subscribed in the form of bonds by Nacional Financiera S.A. of Mexico, an agency of the Mexican Government.

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.

Birmingham.—October 4th. Electric Supply Department. 132-kV overhead lines. (September 7th.)

Bristol.—September 28th. Mental Hospital. Installation of a private automatic telephone and fire alarm system. (August 31st.)

Eire.—December 14th. Electricity Supply Board. Civil construction work in connection with the hydro-electric development of the Erne, including dam, power station, etc., at Cathaleen's Falls (40,000 kW) and Cliff (10,000 kW). Specification, etc., from the Board's secretary, Mr. P. J. Dempsey, 60-62, Upper Mount Street, Dublin.

Grimby.—October 3rd. Electricity Department. Transformers, switchgear and cables. (See this issue.)

Manchester.—October 1st. Electricity Committee. Main gas duct between boiler and chimney, Stuart Street Station. (September 14th.)

Redcar.—October 6th. Town Council. Cable laying, etc. (See this issue.)

Salford.—October 3rd. Electricity Department. Power transformers. (See this issue.)

Scotland.—October 15th. North of Scotland Hydro-Electric Board. 132-kV transmission lines. (August 10th.)

Walsall.—October 5th. Electricity Department. Supply of materials and apparatus of British manufacture. (September 14th.)

Warrington.—October 1st. Electricity Department. Twelve months' supply of cables. (September 14th.)

Woolwich.—October 9th. Electricity Department. One 750-kW Diesel alternator and four 30-MVA outdoor reactors. (August 31st.)

Orders Placed

Bradford.—Electricity Committee. Accepted. Extension of ash plant system.—International Combustion.

Paisley.—Corporation Electricity Committee. Recommended. Cable for housing scheme (£6,969).—Scottish Cables.

Swindon.—Electricity Committee. Accepted. L.v. switchgear (£691).—English Electric Co. H.v. switchgear (£1,359).—Ferguson Pailin.

Contracts in Prospect

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

Aberdeen.—Rebuilding of Palace Hotel after fire (£500,000); architects, L.N.E.R., Edinburgh.

Barnsley.—Houses (115), Park House estate; borough engineer.

Bootle.—Works additions, Irlam Road; Littlewoods, Ltd.

Bradford.—Additions to Bradford Cathedral (£150,000); cathedral council.

Houses (75); city architect, Town Hall.

Crook (Co. Durham).—Greyhound stadium; Simpson & Fortune, West Road, Crook.

Dumbarton.—Houses (122); W. Wilson, burgh engineer, Municipal Buildings.

Durham.—Additions to Stockton Junior Technical School; F. Willey, architect, 34, Old Elvet, Durham.

Leith.—Flour mills, quays, storage warehouses (plant for discharging grain cargoes) and other ancillary works to cost over £750,000; Joseph Rank, Ltd., flour millers, London.

Manchester.—Works extensions, Skerton Road; W. J. Brookes & Sons, Ltd., bakers, Skerton Road, Old Trafford, Manchester, 16.

Reconstruction of works and machinery, Erskine Street; R. Gibson & Sons, Ltd., medical lozenge makers, Carlton Works, Erskine Street, Hulme, Manchester, 15.

Middlesbrough.—Temporary junior and infants' school; education architect.

Saltcoats (Ayrshire).—Houses (26); Black & Shapley, architects, 15, Barr Street, Ardrossan.

Scarborough.—Houses (46), Barrowcliff estate; H. V. Overfield, borough engineer.

Stafford.—Pumping station and equipment Milford (£16,000); T. H. Higson, borough engineer and surveyor.

Stockport.—Rebuilding works after fire, Upper Brook Street; Batley & Co., manufacturing chemists, Gorse Works, Upper Brook Street, Stockport.

Stockton-on-Tees.—New factories for Gorrill, Ltd., A. Kennedy & Co., Ltd., Middlesbrough, G. Hope (Builders), Ltd., Stockton, and Stockton Stone & Concrete Co., Ltd.

Swindon.—Community centre, Tiverton Road (£1,968); borough engineer.

Thirsk.—Houses for R.D.C.; Needham & Thorp, architects, 3, Duncombe Place, York.

Tyldesley.—Extensions to Boothstown Mills for William Yates & Son, Ltd.; B. Pendleton, 16, Brazenose Street, Albert Square, Manchester, 2.

Warrington.—Cubicle block at Isolation Hospital (£8,000); J. Y. Hughes, Municipal Buildings, Bank Park, Warrington.

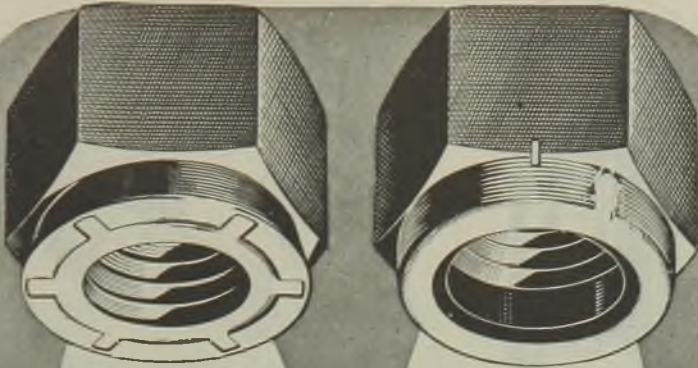
West Hartlepool.—Houses (106), Dyke House estate; borough engineer.

Wigton.—Houses (63); North-Eastern Housing Association, Metrovick House, Northumberland Road, Newcastle-on-Tyne.

York.—Additions, Boroughbridge Road; British Sugar Corporation, Ltd.

Flats (32), Beech Avenue; Ainsty Building Estates, Ltd.

Rebuilding Poppleton Road school; city architect.



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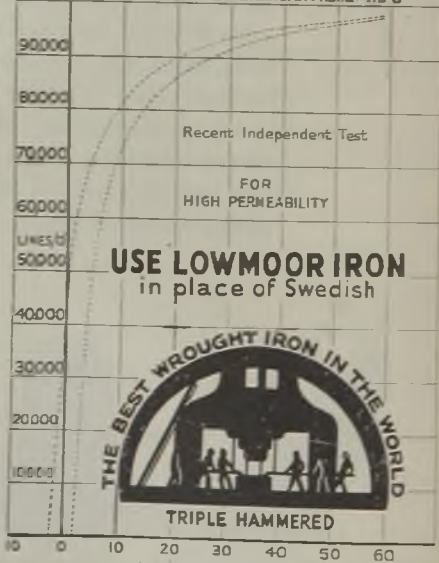
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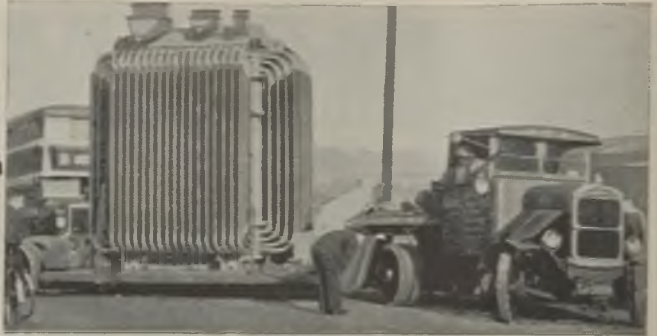
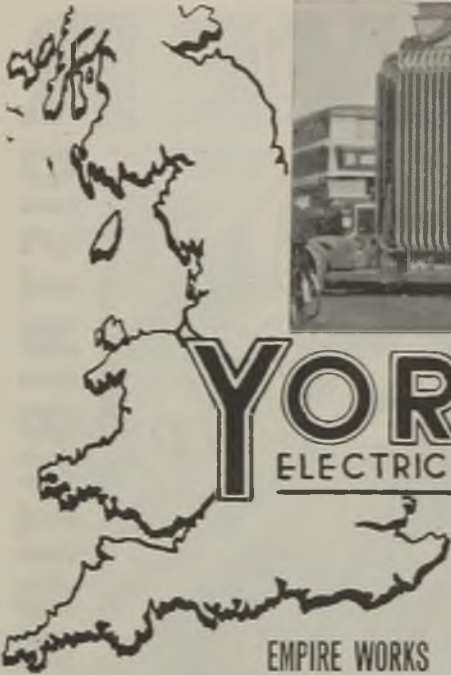
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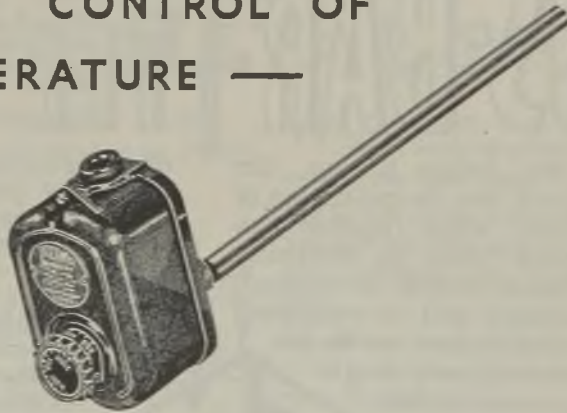
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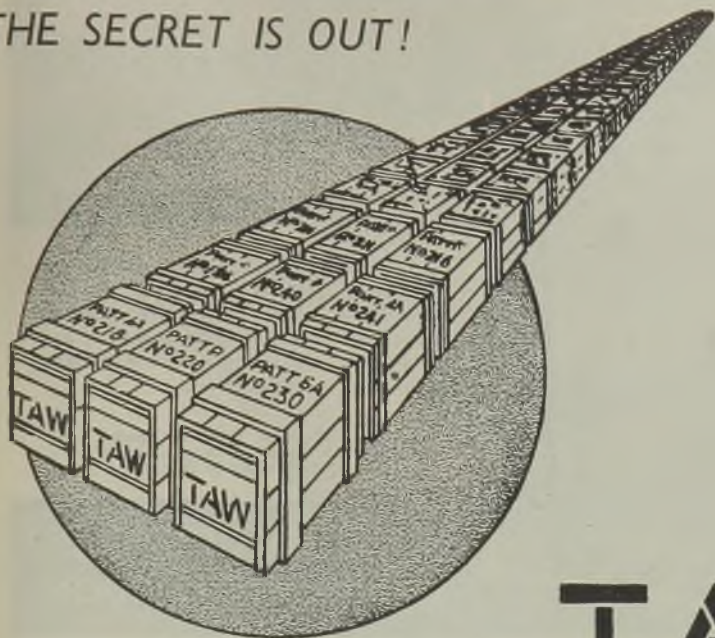
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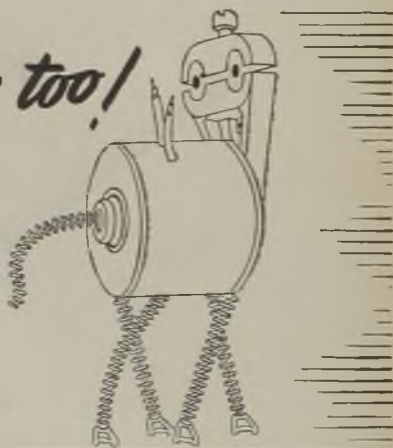
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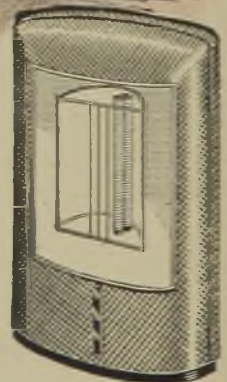
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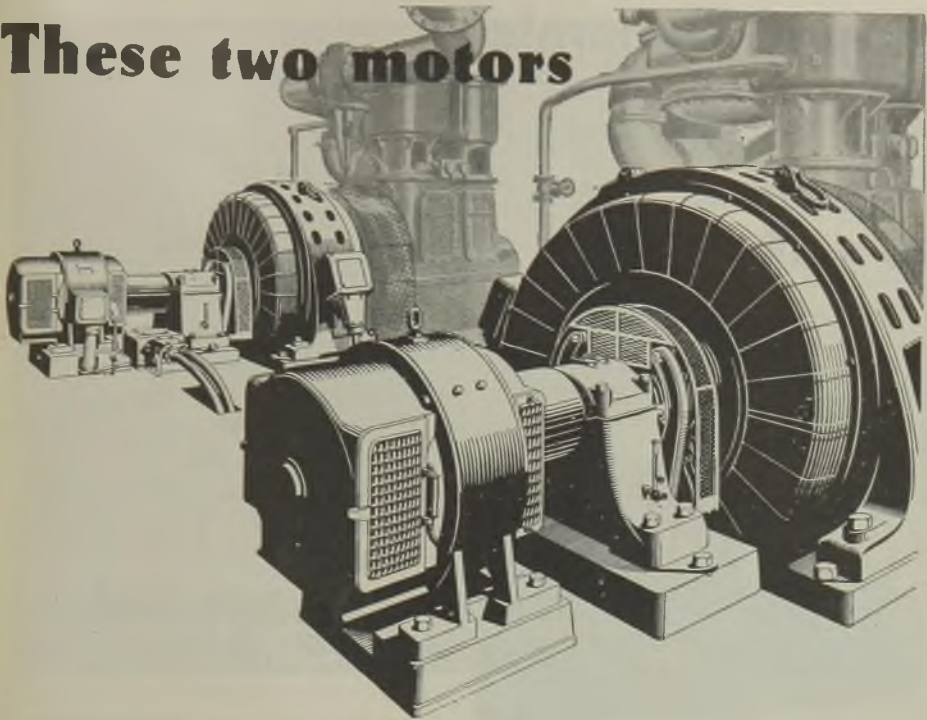
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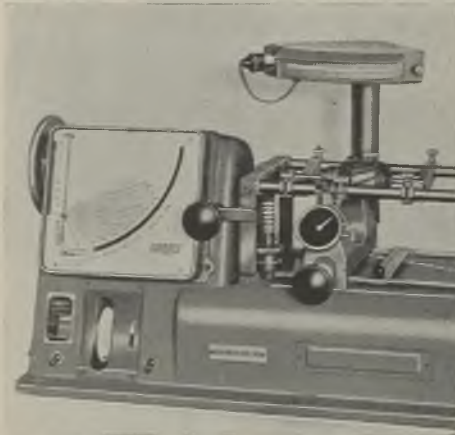
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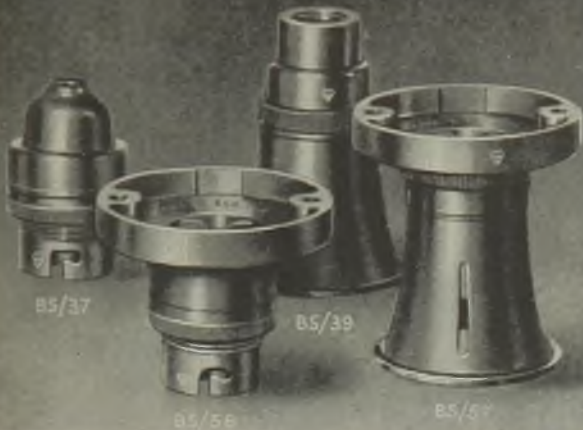
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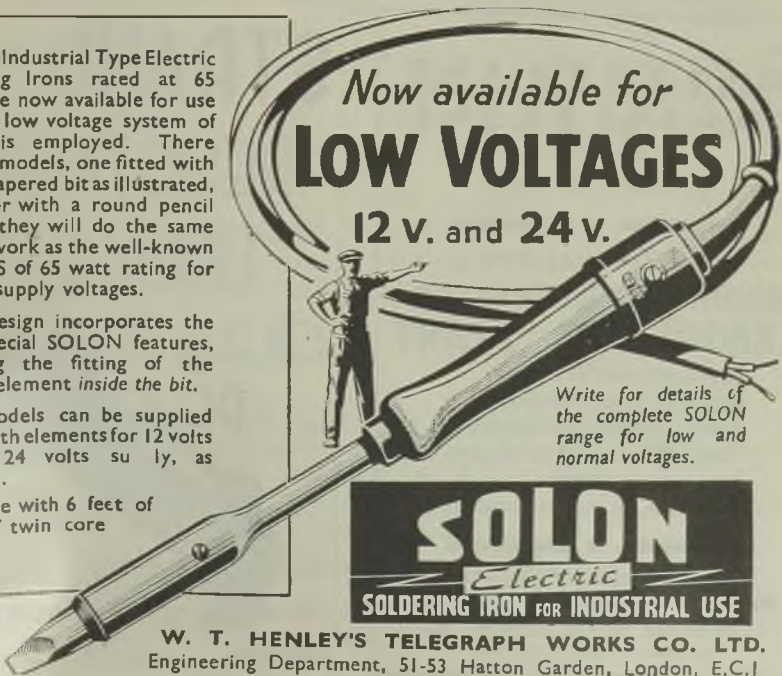
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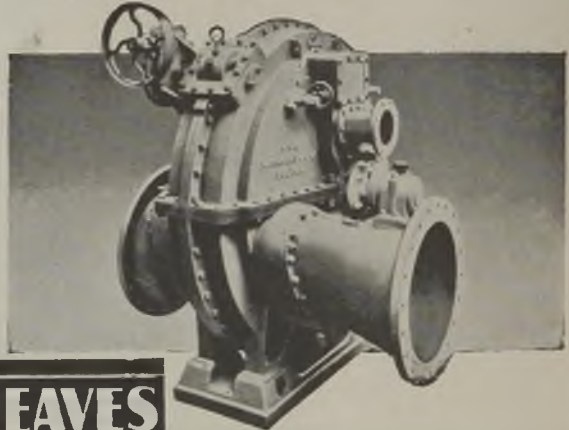
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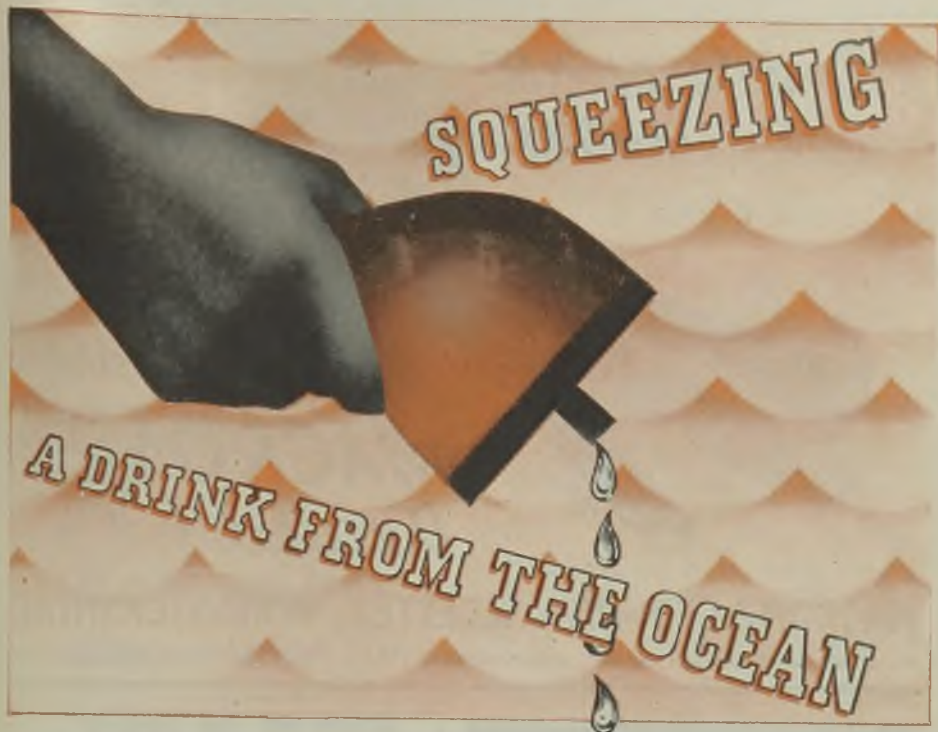
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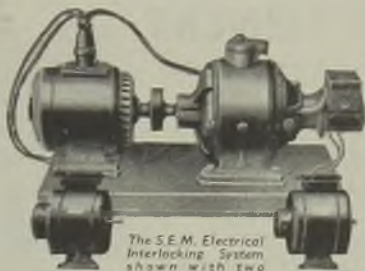


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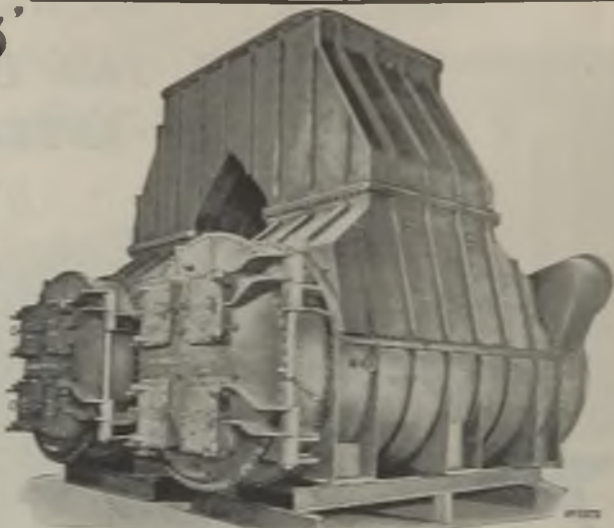
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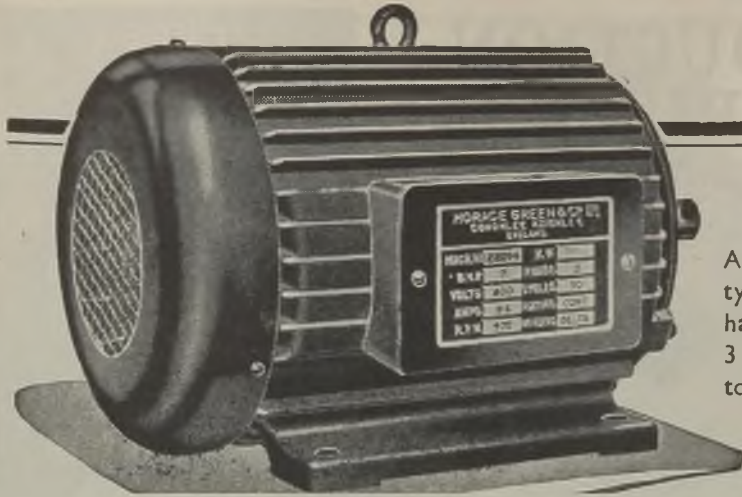
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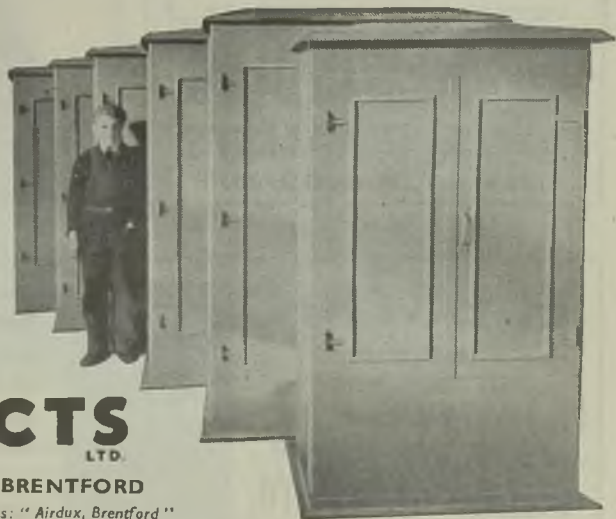



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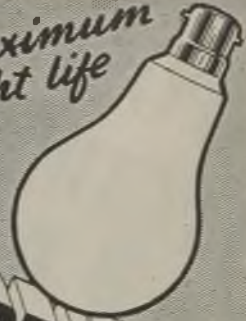
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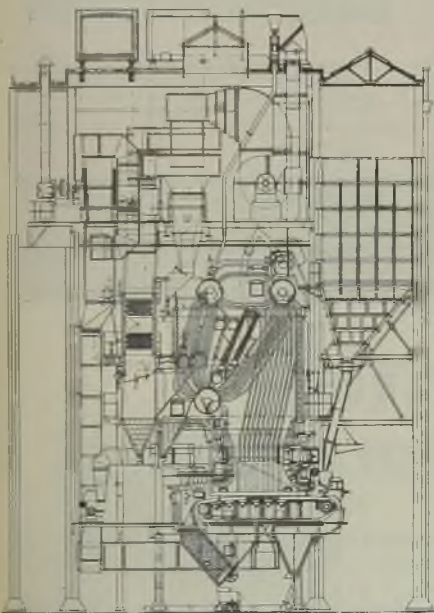
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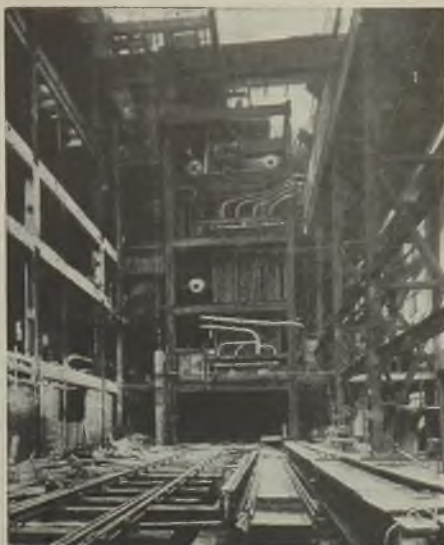
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300,000 lbs/hr.
- 1935-8 6 boilers of 300,000 lbs/hr. evap.
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fuel firing throughout.
6 boilers giving 320,000 lbs/hr. evap.
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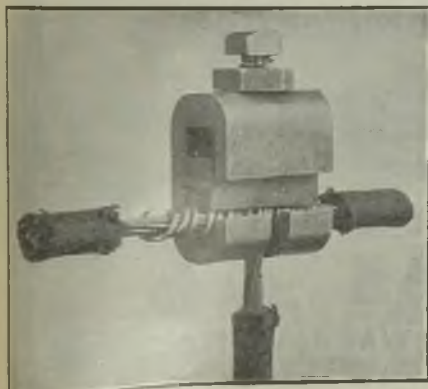
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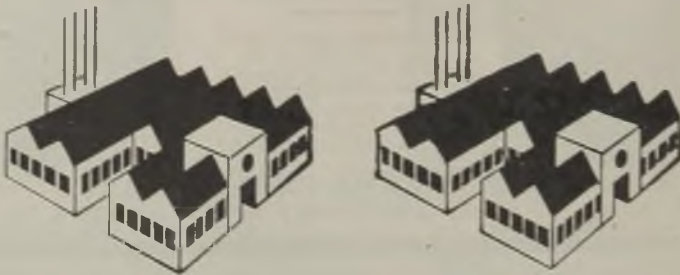
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ITS PLANT IS first-class, its workers skilled and willing, its management capable—but its lighting is wrong. All the good work, the new machinery, the careful executive control, operate in extremes of light and shadow, trying to the eyes and nerves, slowing up output . . . In the other factory, OSRAM Fluorescent Lamps provide a cool, shadowless light that is the next best thing to daylight itself—restful, diffused, evenly distributed. And economical, too! The 80-watt OSRAM Fluorescent Lamp gives three times as much light as a tungsten lamp for the same amount of current. No wonder records are broken in Factory No. 2 while it is always a struggle to keep abreast in Factory No. 1.

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CLASSIFIED ADVERTISEMENTS

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

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

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

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

Original testimonials should not be sent with applications for employment.

OFFICIAL NOTICES, TENDERS, ETC.

COUNTY BOROUGH OF GRIMSBY

Electricity Department

TENDERS are invited for the supply of:—

Transformers for Substations (two)	Specification No. 431
L.P. Switchgear for Substation (one 14-unit board)	No. 432
E.H.P. Switchgear for Substation (4-unit, metal-clad)	No. 433
E.H.P. and L.P. Cable (28,000 yds.)	No. 434

Specifications and Forms of Tender may be obtained from Mr. G. W. Parker, Engineer and Manager, Electricity Works, Moss Road, Grimsby.

Tenders are to be received by the undersigned not later than first post Wednesday, 3rd October.

Municipal Offices, Grimsby. L. W. HEELER, Town Clerk.
15th September, 1945. 2834

CITY OF MANCHESTER

THE Electricity Committee invites tenders for the supply and delivery at BARTON GENERATING STATION of CAST IRON COAL CHUTES FOR **BOLLERS Nos. 1 to 9** (Specification No. B.148).

Specification, etc., may be obtained from Mr. R. A. S. Thwaites, Chief Engineer and Manager, Electricity Department, Town Hall, Manchester, 2, on payment of a fee of one guinea, which amount will be refunded on receipt of a bona fide tender.

Tenders, addressed to the Chairman of the Electricity Committee, to be delivered not later than 10 o'clock a.m. on Monday, 1st October, 1945.

PHILIP B. DINGLE, Town Clerk.

Town Hall, Manchester, 2. 2802
10th September, 1945.

BOROUGH OF REDCAR

Cable Laying, Etc.

THE Council invites Tenders for the supply, laying and jointing of E.H.T. and Associated Pilot Cables.

Forms of Tender and General Conditions may be obtained from the Borough Electrical Engineer, Electricity Offices, 112, High Street, Redcar.

Tenders should be enclosed in a plain sealed envelope endorsed "Tenders for Cables" and should be delivered to the undersigned not later than the 6th October, 1945. The Council does not bind itself to accept the lowest or any Tender.

Municipal Buildings, Redcar. H. Caldwell, Town Clerk.
15th September, 1945. 2848

CITY OF SALFORD

TENDERS are invited by noon on Wednesday, the 3rd October, 1945, for the supply of 6500/400 volts, 3 phase, 50 cycle, oil immersed Power Transformers.

Specifications may be obtained on application to the City Electrical Engineer, Electricity Department, Frederick Road, Salford, 6.

H. H. Tomson, Town Clerk. 2843

SITUATIONS VACANT

None of the vacancies for women advertised in these columns relates to a woman between 18 and 40 unless such woman (a) has living with her a child of hers under the age of 14, or (b) is registered under the Blind Persons Acts, or (c) has a Ministry of Labour permit to allow her to obtain employment by individual effort.

BOROUGH OF SWINTON AND PENDBLEBURY

Electricity Department

Appointment of Distribution Superintendent

A APPLICATIONS are invited for the position of Distribution Superintendent at a commencing salary of £523 per annum, in accordance with Class D, Grade 3, of the N.J.B. Salary Schedule.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and candidates must have previous Local Authority Service or otherwise be not more than 40 years of age.

The selected candidate will be required to pass a medical examination.

Candidates should be Corporate Members of the Institution of Electrical Engineers, and have specialised knowledge and experience in the erection and maintenance of Substation Plant and Switchgear, Layout Operation and Maintenance of L.T. and E.H.T. Distribution Systems, Public Lighting Schemes and Meter Testing Stations.

Forms of application, together with conditions relating to the appointment, may be obtained on application to the Borough Electrical Engineer, Electric House, Swinton, Lancs.

The Ministry of Labour and National Service have given permission under the Control of Engagement Order, 1945, for the advertisement of this vacancy.

Applications to be forwarded in sealed envelopes endorsed "Distribution Superintendent," and delivered to the undersigned not later than noon on 8th October, 1945.

VINCENT COLLINGS,

Town Hall, Swinton, Lancs. Town Clerk.
3rd September, 1945. 2746

THE BRITISH PRODUCTION ENGINEERING RESEARCH ASSOCIATION

A APPLICATIONS are invited for the appointment of a Director-General of the above Association which has been formed to conduct research on a national scale in production engineering.

The Director-General will be responsible for implementing the policy of the Association Council. He should have an adequate knowledge of engineering in addition to the necessary commercial qualifications. Corporate membership of one of the major professional institutions would be an advantage.

His responsibilities will include, in particular, administration, organisation, and the control of the finances of the Association; and he will represent the Association in contacts with Industry and Government Departments.

The detailed research work will be conducted by the Director of Research.

A salary is envisaged in the order of £1,500 to £2,000 a year, according to qualifications.

Applications, which will be treated in strict confidence, and must be received within a month of the date of this announcement, should be sent in the first instance to The British Production Engineering Research Association, Box 2828, c/o The Electrical Review.

COUNTY BOROUGH OF WALLASEY

Electricity Department

Appointment of Senior Demonstrator (Female)

A PPLICATIONS are invited for the above appointment at a salary of £250 per annum plus war bonus (at present £48 4s. 8d.).

Candidates must have had a good general education and hold a recognised diploma in Domestic Science, and possess a thorough knowledge of the use of electrical domestic appliances; possession of the E.A.W. Electrical Housecraft Diploma will be an advantage. They must be competent to arrange and conduct Lecture Demonstrations, and advise consumers on Kitchen Planning and the selection and use of electrical apparatus.

The salary offered is subject to the candidate possessing the personality and ability to co-operate with architects and builders on the planning and construction of fitted all-electric kitchens, and offers opportunities for rapid promotion in the industry to one able to show positive results in the development of the domestic electric field.

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.

Application forms may be obtained from the Borough Electrical Engineer, Electricity Offices, Wallasey Road, Wallasey, to whom applications should be submitted, accompanied by copies of not more than three testimonials, not later than the first post on 5th October, 1945.

EMRYS EVANS.

Town Hall, Wallasey,
7th September, 1945.Town Clerk,
2844

CORPORATION OF GREENOCK

Electricity Department

Assistant Mains Engineer

A PPLICATIONS are invited for the above appointment from Electrical Engineers who are Corporate or Graduate Members of the Institution of Electrical Engineers, or hold equivalent qualifications. Experience in the control of workmen and the general operation of high and low voltage distribution systems is essential. Salary and conditions of service will be in accordance with the National Joint Board Schedule, the present salary being £445 (Class C, Grade 2).

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

Applications, stating age and giving full particulars of training and experience, together with copies of testimonials, should be forwarded to the undersigned not later than Saturday, 29th September, 1945.

The Ministry of Labour and National Service (Technical and Scientific Register) have given permission under the Control of Engagement Order, 1945, for the advertising of this vacancy.

W. A. WOODROW, A.M.I.E.E.,
Chief Engineer and Manager.Electricity Dept.,
Dellingburn Street,
Greenock.

2770

COUNTY COUNCIL OF DURHAM

Education Department

Stockton-on-Tees Technical School and Evening Institute

R EQUIRED as soon as possible: Full-time Graduate Assistant to teach Electrical Engineering Subjects in connection with Preparatory Day Engineering Courses and Senior Engineering Courses (part-time Day and Evening) up to National Certificate standard. Candidates must have had good practical engineering experience. The appointment will be of a temporary character in the first instance.

Salary will be paid in accordance with the Burnham Scale for Teachers in Technical Schools.

For forms of application (which must be returned, duly completed, not later than Wednesday, 10th October, 1945) apply, enclosing stamped addressed foolscap envelope, to the Director of Education, Shire Hall, Durham.

THOS. B. TILLEY.

Shire Hall, Durham,
15th September, 1945.Director of Education,
2830

MECHANICAL ENGINEER

A PPLICATIONS are invited from Class "A" ex-Servicemen and others excepted from the provisions of the Control of Engagement Order, 1945, for the position of Mechanical Engineer in the Power Department of a large industrial concern.

Applicants, who should not be less than 35, or more than 45 years of age, should hold a British University Degree in Mechanical Engineering, or its equivalent, and must have had a sound mechanical Engineering training, and good experience of the operation and maintenance of the mechanical equipment (turbo generators, feed and circulating water pumps, coal and ash handling plant, etc.) of modern steam power stations of not less than 50,000 kW installed capacity. In addition, they must be able to assist with the preparation of designs and specifications for new plant, and to carry out investigations and tests in connection therewith. Corporate membership of the Institution of Mechanical Engineers is also desirable.

The commencing salary is £700 per annum, plus Supplement, and the selected candidate will be required to pass a medical examination.—Box S.982, Lee & Nightingale, Liverpool. 2775

COUNTY BOROUGH OF BOLTON

Electricity Department

Appointment of Power Station Chemist

A PPLICATIONS are invited for the position of a Power Station Chemist from suitably qualified persons conversant with and having experience in the analysis of fuel, oil and water and being conversant with Boiler Feed Treatment and Metallurgy and other chemical work normal to Power Station practice.

The salary and conditions of service will be in accordance with the National Joint Board Schedule, Class H, Grade 8a (at present £409/£429 per annum).

The selected candidate will be required to pass a medical examination and contribute to the Council's Superannuation Scheme under the Local Government Superannuation Acts, 1937 and 1939.

Applications, giving age and particulars of experience, must be endorsed "Power Station Chemist" and delivered to the Borough Electrical Engineer and Manager, Back o' th' Bank Generating Station, Bolton, not later than noon, 11th October, 1945.

The Ministry of Labour and National Service have given permission under the Control of Engagement Order, 1945, for the advertisement of this vacancy.

PHILIP S. RENNITSKY, Town Clerk.

Town Hall, Bolton,

2801

EAST GRINSTEAD URBAN DISTRICT COUNCIL

Substation Attendant

T HE above-named Council invite applications from qualified persons for appointment to the above permanent position at their Electricity Undertaking. Wages in accordance with D.J.I.C. Schedule, No. 11 Area, at present £4 11s. 10d. for a 48-hour week.

Applicants must have good experience and knowledge of glass bulb rectifiers and switching operations up to 11,000 volts.

Applications, stating age, present appointment and experience, with copies of two recent testimonials, to be forwarded to the Deputy Clerk to the Council, Norton House, London Road, East Grinstead, Sussex, not later than the 2nd day of October, 1945, and endorsed "Substation Attendant."

The Ministry of Labour and National Service have given permission, under the Control of Engagement Order, 1945, for the advertisement of this vacancy.

20th September, 1945.

2840

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

A PPLICATIONS are invited for the posts of (1) Contract Engineer for Civil and Hydraulic Works, and (2) Contract Engineer for Electrical and Mechanical Works. The duties include all routine administration for the respective types of contract. Salaries will be in accordance with qualifications and experience, and the successful applicants will be required to join the Board's Staff Superannuation Fund.

Applications in writing, with full particulars of experience and qualifications and copy of testimonials or references, should be received by October 1st, 1945, by the Secretary of the Board, 16, Rothesay Terrace, Edinburgh, 3. 2806

EAST GRINSTEAD URBAN DISTRICT COUNCIL

Meter Tester and Repairer

THE above-named Council invite applications from qualified persons for appointment to the above permanent position at their Electricity Undertaking, the Testing Station being Class B. Wages in accordance with D.J.I.C. Schedule, No. 11 Area, at present 2s. 1½d. per hour for a 47-hour week.

Applicants must have a thorough practical and technical training in A.C. and D.C. Meters, Indicators and Instruments.

Applications, stating age, present appointment and experience, with copies of two recent testimonials, to be forwarded to the Deputy Clerk to the Council, Norton House, London Road, East Grinstead, Sussex, not later than the 2nd day of October, 1945, and endorsed "Meter Tester and Repairer."

The Ministry of Labour and National Service have given permission, under the Control of Engagement Order, 1945, for the advertisement of this vacancy.

20th September, 1945.

2839

PENMAENMAWR URBAN DISTRICT COUNCIL
NORTH WALES

THE above Council invite applications for the post of Electrical Engineer at a commencing salary of £300 per annum, rising to £360 per annum by annual increments of £20 per annum, plus War Bonus, in accordance with the Whitley Council Scale, which is at present £59 16s. per annum.

Terms and conditions of appointment with form of application (which must be returned by the 28th September, 1945) may be obtained from the undersigned on receipt of a stamped addressed foolscap envelope.

R. M. L. BEVAN,

Clerk of the Council.

Council Offices,

Penmaenmawr,
North Wales.

2773

ASSOCIATED MUNICIPAL ELECTRICAL ENGINEERS
(Great Britain and Ireland) and the
ELECTRICAL POWER ENGINEERS' ASSOCIATION

NOTICE

Bath Corporation—Appointment of City Electrical Engineer

THE Standing Joint Committee of the above Associations requests all the 48 applicants for the above recently advertised post, that, as the salary and conditions of employment are not in accord with the Agreement of the National Joint Committee of Local Authorities and Chief Electrical Engineers, all such applications should be immediately withdrawn.

W. ARTHUR JONES, A.M.I.E.E.,

Secretary.

Standing Joint Committee,

A.M.E.E.—E.P.E.A.

2814

APPLICATIONS are invited for the position of Chief Draughtsman of a cable works drawing office situated at South London. Applications from those over 51 or Class A ex-Servicemen only should be made in strictest confidence, giving details of age, previous experience and salary required, to—Box 2763, c/o The Electrical Review.

REATURE Winder for S.W. London, all classes A.C. and D.C. jobs. Good conditions of employment and permanency for experienced man. Vacancy open to Class A ex-Servicemen only. Immediate appointment preferred, but we are prepared to wait. Write—Box 7564, c/o The Electrical Review.

REATURE Winders required for Midlands, used to all classes repairs, large and small. Class A ex-Servicemen or over 51.—Box 2709, c/o The Electrical Review.

REATURE Winders over 51 or under 18 or Class A ex-Servicemen required for medium-sized repair shop. Write or call—Marrat & Place, Ltd., 40, Hatton Garden, London, E.C.1. 2817

ASSISTANT Production Controller required by engineering establishment in South-East London. Previous experience with factory manufacturing electro-mechanical devices and radio preferred. Should be capable of undertaking all production control functions. Write, giving full details of experience, qualifications and salary read, to—Box 7551, A.K. Advg., 212a, Shaftesbury Av. W.C.2. 2693

ASSISTANT Sales Engineer required to cover part of London territory for manufacturers of high-class components used in electronic engineering. Age 22 to 30. Commencing salary and commission combined will amount to £300/£350 per annum. Candidates should be preferably of National Certificate standard in electrical engineering. Previous selling experience not essential. Duties will be to call on manufacturers of all classes of electrical equipment to advise on the use of suitable components. Permanency with good prospects for man with initiative. —Box 2797, c/o The Electrical Review.

CLERICAL Assistant, Class A ex-Serviceman, for Stores Office. Must have thorough knowledge of all electrical material. Apply—London Electrical Company, 92, Blackfriars Road, S.E.1. 2324

COSTING and Invoice Clerk, male or female wanted, by a progressive firm of electrical installation engineers in the Midlands. Permanent and progressive position for a person able to act on own initiative. Also Junior to train for above. Men must be over 51, Class A ex-Servicemen or under 18. Full details in confidence to Box 2824, c/o The Electrical Review.

DEVELOPMENT Engineers. One Electrical and one Mechanical wanted by Development Organisation to undertake technical development work connected with the use of copper and copper alloys in engineering. Candidates must have good practical experience and first class technical qualifications, preferably with a University Honours Degree or equivalent; be corporate members of a professional Institution; be capable of preparing technical literature and have good personality and exceptional initiative. Salary £700 per annum, upwards according to qualifications. Permanent posts with generous super-annuation. London area. Write quoting D. 1388XA for Electrical and C. 2736XA for Mechanical to—Ministry of Labour and National Service, Appointments Department, Technical and Scientific Register, Room 670, York House, Kingsway, London, W.C.2 for application form which must be returned completed by 19th October, 1945. 2820

DRAUGHTSMAN required for Electrical Machines. North Kent district. State experience and salary required. Applicants should be over 51 years of age, Class "A" ex-Servicemen, or otherwise exempt from M.O.L. control.—Box 2786, c/o The Electrical Review.

ELECTRICAL Department of big stores requires first-class buyer. Lamp shades and all kinds of equipment. Good salary.—Box 2849, c/o The Electrical Review.

ELECTRICAL Engineer wanted (Class A ex-Servicemen or otherwise exempt from Ministry of Labour Control) for engineering and development work on a light electro-chemical process. At present in the London area but may move to Provinces. Must have some light power electrical engineering background, preferably with a knowledge of physics and chemistry. Some experience in a manufacturing concern essential. Good prospects for advancement in an important electrical engineering firm for young man with initiative and ability. Applicants should write stating age, training, experience and salary required to—Box 7719, A.K. Advg., 212a, Shaftesbury Avenue, W.C.2. 2826

ELECTRICAL Engineering Firm in West of Scotland require an Assistant Buyer with knowledge of light engineering. Applicants should state age, salary required and full details of past experience in chronological order. Address—"1097" Wm. Porteous & Co., Advertising Agents, Glasgow. 7673

ELECTRICAL firm in the West of Scotland require first-class Chief of Progress Manager with complete knowledge of light engineering. Experience of this type of work essential. Salary £600 per annum and upwards according to ability. Applicants to submit in writing list of posts held in chronological order and date of birth. Address—"119" Wm. Porteous & Co., Advertising Agents, Glasgow. 7672

ELECTRICAL Testers, Male and Female, required for high-class electrical machines, S.E. London. Men must be under 18 or over 51 or Class A ex-Servicemen. Apply—Box 2821, c/o The Electrical Review.

ELECTRICIAN required immediately by Electrical Contractors, London, permanency to suitable man. Class "A" ex-Serviceman or man over 51. Apply, giving full particulars, to—Box 2742, c/o The Electrical Review.

ELECTRICIANS and Assistants wanted, Class A ex-Servicemen or over 51; permanency to right men. Please write or call—J. H. Plant Ltd., 99, St. Martin's Lane, W.C.2. 7642

ELECTRICIANS and Assistants required for London housing programme. Best conditions, permanency for right men. Class "A" ex-Servicemen, or otherwise free.—Box 44, c/o The Electrical Review.

ELECTRICIANS and Assistants required, permanent work for suitable men in London and Provinces. Class A ex-Servicemen or over 51. apply—W. J. Furse & Co. (London) Ltd., 9, Carteret Street, Westminster, London, S.W.1. 2777

ELECTRICIANS for general wiring installation work also Electricians for plant maintenance. Permanent positions for suitable applicants. Class "A" ex-Servicemen or otherwise exempt from Ministry of Labour control.—Dicks Ltd., 149, High Street, Winchester. 2838

ENGINEER required by well-known radio company to take charge of their drawing office and mechanical design. Must have academic qualifications and previous experience. Write, giving full details of experience, qualifications and salary required, to—Box 7658, A.K. Adv., 212a, Shaftesbury Avenue, W.C.2. 2690

ENGINEER with experience of works and production organisation, and control of personnel, required by important company in the electrical industry in the London area, in the capacity of Assistant Works Manager. Good prospects, salary and pension for man with the required qualifications.—Box 2708, c/o The Electrical Review

ESTIMATING and Correspondence Clerk, Class A ex-Serviceman or not restricted by Control of Engagement Order, 1945, for well-known electrical manufacturers. Experienced in lighting, cables and electrical products. Write stating age, experience and salary required.—Box 392, c/o Dorland, 18, Regent Street, S.W.1. 2799

EXPERIENCED Costing Engineer required, with practical knowledge of all types of electrical power and lighting installations. Apply, by letter only, giving details of age, training, experience and remuneration, to—F. H. Wheeler & Co. Ltd., Imperial Buildings, Oxford Road, Manchester, 1. Immediately the present employment restrictions are removed, applicants will be considered. 2756

FIRST-class Sales Representative required for the London area. It is desirable that the applicant should have a knowledge of Mica and Bakelite Insulation and possess a motor car. This is a progressive position and applicants should have a good education and be capable of conducting negotiations with firms of the highest repute. State in confidence age, salary and experience to—The Managing Director, H. Clarke & Co. (M/cr.) Ltd., Atlas Works, George Street, Patricroft. 2827

FOREMAN for paper insulated power cable shop in London area. Cable making experience desirable, but anyone with good practical experience of similar work such as power transformer making would be considered, fair education and a good understanding of the principles of modern foremanship essential, salary depending on qualifications but about £450 per annum, including cost of living allowance. Please give full details when applying.—Box 2847, c/o The Electrical Review.

GENERAL Manager. Immediate appointment leading in near future to promotion to General Manager of electric cable works. Applicants, age 35-45, must possess sound electrical engineering training followed by some years' experience in the manufacture of paper, rubber and synthetic insulated cable. Consideration will be given to suitable applicants who, while not having held a position of the rank of general manager, have exercised responsibility in an assistant managerial capacity. The appointment is permanent and progressive and is eligible for superannuation. Commencing salary will be between £1,250 and £2,000 per annum, depending on previous experience. Applications, which will be treated in confidence, should give full details of age, education, practical training and experience and be addressed to—Box 2768, c/o The Electrical Review.

HEAD Foreman required for shop producing medical and X-ray equipment in the London area. Mechanical and electrical experience essential, X-ray experience desirable. Full details age, experience, present salary and salary required to—Box 7601, c/o The Electrical Review.

INVOICING and Costing Clerk required by large firm of electrical contractors in N.W. London area. Must be able to act on own initiative. Progressive and well-paid position to capable male applicant who is not restricted by Control of Engagement Order, 1945. Applications also considered from Class A members of forces. Apply, stating age, experience and salary required, to—Box 2603, c/o The Electrical Review.

METHODS Engineer or Cable Estimator to prepare operation schedules and route sheets and estimate times for each operation. Knowledge of cable making desirable, but anyone having good general education with a varied experience of methods and operation layout work will be considered. Some knowledge of time study highly desirable. Permanent position London. Fair salary to be agreed depending on age and qualifications. Reply, giving age and full details of education and experience, to—Box 2798, c/o The Electrical Review.

MAINTENANCE Electrician required. Class A ex-Servicemen, or over 51 years of age, must be used to A.C. Plant; shift work. Write, stating age, experience etc., to the Secretary, The Polytechnic, 309 Regent Street, London, W.1. 2829

MANAGER required for wiring department of London electrical and mechanical engineers specialising in industrial installations. Applicants should be experienced in handling enquiries, estimating and the control of labour. Replies, giving full details of experience, age and salary required to—Box 3459, Frost-Smith Adv., 64, Finbury Pavement, E.C.2. 2815

OVERSEAS Employment. Senior Accountant required by the Government of Nigeria for the Electricity Branch of the Public Works Department for one tour of 12 to 24 months with possible permanency. Salary £750 rising to £920 a year. On salary of £750 separation allowance for married men is between £60 and £180 according to number of children. Free quarters and passage. Candidates should be Members or Associates of the Institute of Municipal Treasurers and Accountants or the Institute of Cost and Works Accountants, or hold an equivalent qualification; have had wide experience in electricity finance and accounts; and be capable of assuming responsibility, management and organisation of the accounting staff of a group of electricity undertakings. Applications, which must be in writing, stating date of birth, full details of qualifications and experience, including present employment; also Identity and National Service or other registration particulars, and quoting reference number O.S.871, should be addressed to the Ministry of Labour and National Service, Appointments Department, Sardinia Street, Kingsway, London, W.C.2. 6.9.A.9. 2841

REFRIGERATION Mechanic required, also Electrician for new business. Excellent opportunity, permanency for suitable applicants, Class A ex-Servicemen or otherwise exempt from M.O.L. control.—Jackson, 1, Cavendish Avenue, Eastbourne. 7657

REPRESENTATIVES required in Midlands by makers of electric wires and cables. Must have live connection. Apply, with full particulars of experience, etc., to—Box 2703, c/o The Electrical Review.

SALES Engineers required for A.C. and D.C. Motors and Control Gear; areas London, Birmingham, Glasgow, South Wales. Apply in writing, giving full details of experience, etc.—Veritys Ltd., 66, Quay Street, Manchester, 3. 2778

SALESMAN required for Glasgow branch of well-known large British Electrical Manufacturing concern. State technical qualifications, education, experience, age, salary required.—Box 2845, c/o The Electrical Review.

SUPERVISING Engineer required with practical knowledge of all types of first-class electrical power and lighting installations. Apply, by letter only, giving details of age, training, experience and remuneration, to—F. H. Wheeler & Co. Ltd., Imperial Buildings, Oxford Road, Manchester, 1. Immediately the present employment restrictions are removed, applicants will be considered. 2755

TIME Study Engineer, preferably under 40 years of age, required by firm of electrical appliance manufacturers in Midlands area. Good modern knowledge and experience of time study methods, particularly as applied to hand and power presses, capstans, drillers, millers, spraying processes, assembly, etc. Minimum salary £400 per annum. Applications in writing, stating date of birth, full details of qualifications and experience (including a list in chronological order of posts held), and quoting Reference No. 1822, should be addressed to the Ministry of Labour and National Service, Regional Appointments Office, 237, Broad Street, Birmingham, 1. 5.9.A.11. 2800

TRANSFORMER Winder required, Class "A" ex-Serviceman, to take charge of small winding shop, winding Transformers of all types up to 100 kVA. Write, giving all details, age, experience, salary required, etc., to—Box 2836, c/o The Electrical Review.

TWO Electrical Inspectors (Class A ex-Servicemen or otherwise exempt from Ministry of Labour Control), single men preferred, to carry out routine tests and inspections of and to prepare reports on complete A.C. and D.C. electrical installations at large and small factories and depots in London, Scotland and the Provinces. Must be prepared to travel and to work night or day as required. Reply, by letter only, giving details of experience and salary required, to—U. D. Engineering Co. Ltd., Cumberland Avenue, Park Royal, N.W.10. 2825

WANTED, Works Manager for electrical engineering company. Must be good administrator and capable of controlling labour. Knowledge of switchgear an advantage but not essential. Write for particulars to—Box 2702, c/o The Electrical Review.

WAREHOUSEMAN-Packer and Storekeeper-Counter-hand required. Permanent positions, past experience preferred. Over 51 or Class A ex-Servicemen only. Write stating wages, etc., to—Box 2818, c/o The Electrical Review.

WELL-known company marketing necessary insulating materials has vacancy for technically qualified Representative to contact principal users for sales research and development. Must be conversant with design, manufacture and operation of transformers, switchgear, condensers and cables. Permanent and progressive post for energetic man. Salary, expenses and car. Full particulars career and salary required to—Box 2682, c/o The Electrical Review.

WORKING Manager required by small company employing 60-70 hands in electrical department. Must have first-class knowledge of small induction coil winding and test gear, also light assembly work. Good salary and percentage of profits. N.W. London.—Box 2704, 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.

SVALBYRIDGE, Hyde, Mossley & Dukinfield Transport Board—Assistant Maintenance Engineer and a Switchboard Attendant.

SITUATIONS WANTED

A Mechanist Q.M.S. recently released from the Engineer Services in Class "A," 39, Grad.I.E.E., Mem.A.I.E.E., U.C.L. Diploma in Electrical Engineering, 12 years' experience civilian and military covering electric motor, D.O. and test, material test and instrument calibration, switchgear research, engineering estimating, electrical installation supervision, design and installation of overhead lines and small power stations, design of transformers to 125 kVA, supervision of labour (British and Native), desires post with supply authority in mains dept. Midlands area preferred. Salary £400 p.a.—Castellan, "Burnside," Rolleston, Burton-on-Trent. 7631

ADMIRALTY appointment ceasing, six years South Wales factories, sales, administration and transport experience, seeks post as Branch Manager, would consider good agency.—Box 7656, c/o The Electrical Review.

ADVERTISER, Accountant aged 35, for many years in a well-known contractor's office, desires change. Thoroughly experienced in preparation of tenders and administration of large contracts in all stages including final accounts. Responsible position with prospects of further advancement required by man with drive and initiative.—Box 7666, c/o The Electrical Review.

A.M.I.E.E. (31), released end September, desires permanent and progressive post with consulting or manufacturing engineers, 5 years' apprenticeship. Good executive and organising abilities. Extensive experience in ship's installation, design, production and manufacture of machinery and associated equipment.—Box 7660, c/o The Electrical Review.

A.M.I.E.E. D.F.H. (30), Public School, 8 years' experience Babcock & Wilcox High Pressure Boilers and Parsons Turbo Alternators in power stations in India, desires change preferably Far East. Existing post involving administration, claims and power station operation, including erection and commissioning all types above plant. Hindustani spoken fluently. Free for re-engagement within six months.—Box 2822, c/o The Electrical Review.

AN Electrical Engineer, B.Sc., 31, good all-round practical experience of rheostatic controls, rotating machinery, multi-range electrical instruments, etc., desires progressive position.—Box 7653, c/o The Electrical Review.

CHARTERED Electrical Engineer (35), nineteen years' experience heavy electrical manufacturing industry—works, D.O., estimating, sales, administration—wide knowledge home and export markets, extensive connections Home Counties, offers services to firm requiring efficient Technical Sales Administrator, home or abroad.—Box 7608, c/o The Electrical Review.

CLASS A ex-Officer R.E., A.M.I.E.E., 25 years' civilian experience Supervising Engineer with first class contractors. Grid, H.T. and L.T. O/H lines, H.T. cables, substations and ancillary gear. Seeks position of progressive responsibility, North preferred but any fixed area suitable. Present salary £650.—Box 7646, c/o The Electrical Review.

CONTRACT Engineer, Assoc. Brit. I.R.E., Patentee (27), seeks appointment, Radio or Electrical, preferably export trade. Good workshop, D.O., sales and export experience.—Box 7581, c/o The Electrical Review.

DESIGNER and patentee Domestic Electrical Appliances desires contact manufacturers established or wishing to enter industry, view to arrangement for designs, consultations regarding manufacture, marketing, etc.—Box 7648, c/o The Electrical Review.

ELECTRIC Cables. Advertiser (33) desires progressive position at home or would consider later appointment abroad, 11 years C.M.A. Cable Manufacturers, Test and estimating experience including home and export sales correspondence and procedure. M.A.S.E.E.—Box 7669, c/o The Electrical Review.

ELECTRICAL and Mechanical Charge Engineer, 51 MW, A.M.I.E.E. (34), good disciplinarian, keen, ambitious, seeks responsible position, technical administrative, home or abroad. Excellent references.—Box 7597, c/o The Electrical Review.

ELECTRICAL and Mechanical Engineer, B.Sc. (Hons.), A.M.I.Mech.E., G.I.E.E. (27), workshops, drawing office and design experience, desires post as designer, preferably on rotating electrical machinery.—Box 7578, c/o The Electrical Review.

ELECTRICAL Engineer, age 42 with release. Higher National Certificate. Experienced testing and installation transformers, mercury arc and metal rectifiers, cinema sound and projection equipment. Seeks steady permanent post at good salary. London district preferred.—Box 7645, c/o The Electrical Review.

ELECTRICAL Engineer, B.Sc., A.M.I.E.E. (44) seeks permanent position London area. Available shortly. Extensive experience in all types of electrical installations, including M.V. and H.V. overhead and underground distribution, switchgear, lighting and power schemes. Technical and commercial administrative experience, including sales. Present salary £800. Replies to—Box 7604, c/o The Electrical Review.

ELECTRICAL Engineer (34), French, 5 years in metallurgical concern North London. Previous experience French State Railways and wire drawing industry, used to responsible positions needing organizing ability, drive and personality, very adaptable, seeks progressive position with British firm, U.K. or Dominions Australia, New Zealand, Canada or South Africa. Electrical or metallurgical, technical or commercial.—Box 7628, c/o The Electrical Review.

ELECTRICAL Engineer (25), highest technical training, wide practical experience, requires position firm engaged agricultural electrical installations, Oxon., Bucks., Berks., Glos. area. Details—Box 7572, c/o The Electrical Review.

ELECTRICAL Engineer, now demobbed after 6 years' service, lost own contracting business in 1940, not starting again, requires position with established firm where previous experience of all branches of contracting can be used to mutual advantage. Investment considered in sound business.—Box 7583, c/o The Electrical Review.

ELECTRICAL Engineer (32), Higher National Certificate, Electrical and National Certificate (Mechanical), recently returned from abroad, seeks appointment with Electricity Supply Undertaking. Extensive experience in mains development, construction, installation and operation.—Box 7582, c/o The Electrical Review.

ELECTRICAL Maintenance Engineer, 29, requires position, Graduate I.E.E. Higher National Certificate endorsed with workshop organisation and management, and industrial administration. 1st and 2nd Class Certificates of Association of Mining Electrical Engineers. Box 7658, c/o The Electrical Review.

ELECTRICAL Staff Foreman, with wide experience on large contracts, requires post in West Midlands. Used to estimating, costing, organising labour and materials. Full responsibility. Box 7622, c/o The Electrical Review.

ENGINEER, aged 31, desires executive position in a factory organisation; 9 years' practical experience electrical manufacture, 3 years' production planning, estimating and rate fixing, 2 years investigator for M.A.P., Adm. M.O.S., etc., into methods and costs of production. Vicinity London preferred.—Box 7577, c/o The Electrical Review.

EX-R.E. Capt. (Inspector of R.E. Machinery), 27 years in ranks and commission, requires post with reasonable salary. Any district with good chance of obtaining accommodation for 2 adults and 3 children. Qualifications, 27 years' experience in electrical and mechanical engineering as applicable to internal wiring, generation, distribution, Diesel and petrol engines, small refrigerator plants, central heating, and some knowledge of motor vehicle engineering. City and Guilds Certificates held for above subjects.—Box 7664, c/o The Electrical Review.

ENGINEERING Executive (30), A.M.I.E.E., Int. A.M.I.P.E. with sound industrial experience, desires position with Electricity Supply undertaking, min. remuneration £500 p.a.—Box 7643, c/o The Electrical Review.

EXPORT Manager, A.M.I.E.E. (38), good education, works training, wide experience, requires position with progressive firm.—Box 7668, c/o The Electrical Review.

FOREMAN, radio production, age 35, 18 years' experience, seeks change, conversant, bonus and conveyor systems.—Box 7662, c/o The Electrical Review.

GENTLEMAN, shortly redundant war work, desires position as outside sales representative in electrical or radio trade, 18 years' previous experience, excellent connection with industrial firms, corporations, and high-class retailers throughout north of England, North Wales, Merseyside, etc.—Box L. 18, Lee & Nightingale, Liverpool. 2823

GRADUATE I.E.E. (30) requires position as Assistant to Works, Sales or General Manager of electrical manufacturers. Experience with production of batteries, cables, wires. Familiar with technical correspondence; administrative and executive experience.—Box 7573, c/o The Electrical Review.

M.Sc. Honours degree electrical engineering, 16 years' experience, generators, motors, electrical instruments and electronics, own patents, wants to change position.—Box 7661, c/o The Electrical Review.

PRODUCTION Engineer in light electrical manufacture. Qualified electrical engineer. Power engineering experience. Requires appointment as Works Manager or similar position. Available October. Home or Abroad.—Box 7603, c/o The Electrical Review.

QUALIFIED Electrical Engineer (38), technical and administrative experience, seeks position; extensive industrial and supply undertaking experience; positions held—works electrical engineer, district engineer and consumers' engineer.—Box 7629, c/o The Electrical Review.

RADIO Sales Engineer, age 34, wide experience commercial communication and all aviation radio systems, good organizer, ex-F/L R.A.F., 3½ years radio systems experimental test pilot, 2,500 hrs. all types aircraft, seeks situation radio sales exploitation, planning, tendering, England, Portugal, S. America (Buenos Aires preferred) or New Zealand.—Box 7651, c/o The Electrical Review.

R.E.M.E. Officer, now serving in Far East, age 27, release group 26, Grad. I.E.E., Diploma in Electrical Engineering, 2 years' workshop company commander, keen and willing to learn, desires to contact progressive firm in U.K. able to offer position with prospects of advancement.—Box 7576, c/o The Electrical Review.

SALES and Estimating Engineer, excellent connection with consumers paper cables and possessing comprehensive knowledge of trade, seeks executive position.—Box 7571, c/o The Electrical Review.

SUPERVISOR. Electrical and Mech., installations, all classes, survey, planning, construction, maintenance, labour organiser, drive car, 25 years' experience.—Box 7598, c/o The Electrical Review.

YOUNG Electrical Engineer, 18 years' practical and commercial experience, requires responsible position, preferably with part interest; moderate investment available; any proposition considered.—Box 7621, c/o The Electrical Review.

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

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Further particulars on application to F. A. Ellis, M.I.E.E., Engineer and Manager, Electricity Offices, Market Street, Huddersfield. 2835

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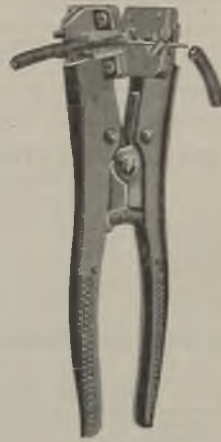
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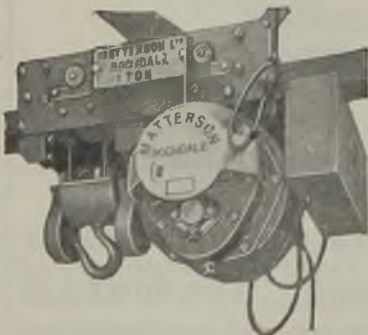
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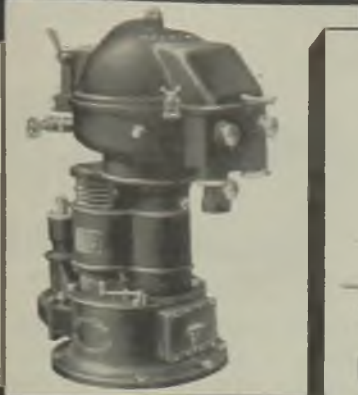
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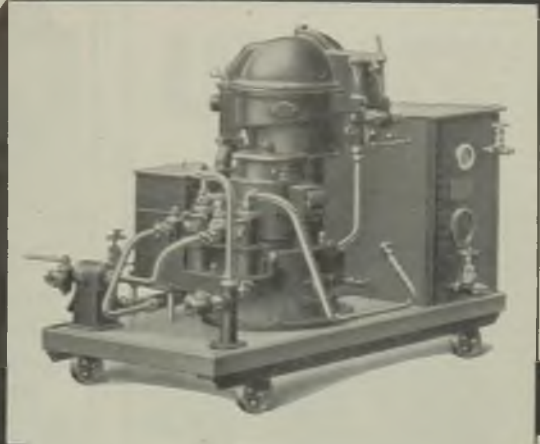
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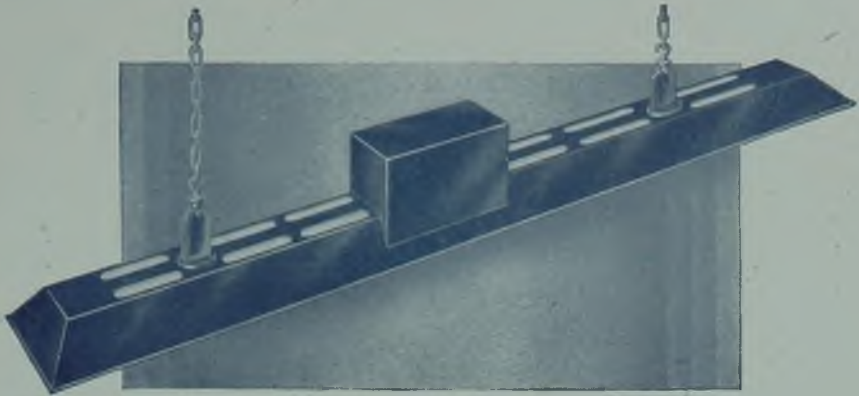
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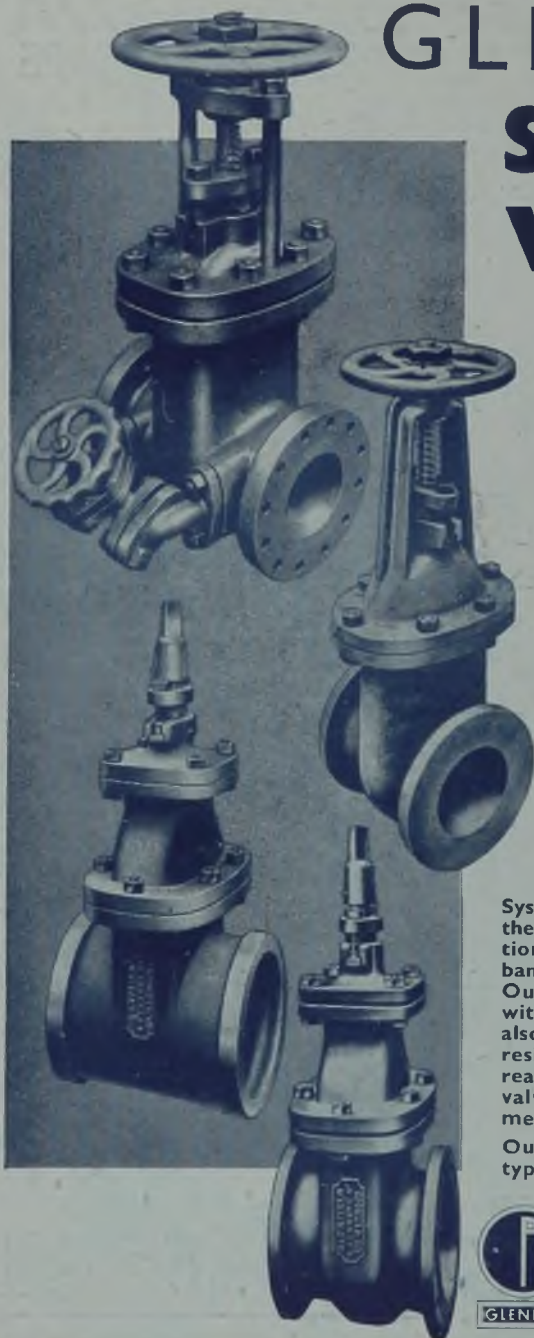
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