

ELECTRICAL REVIEW

FOUNDED
1872

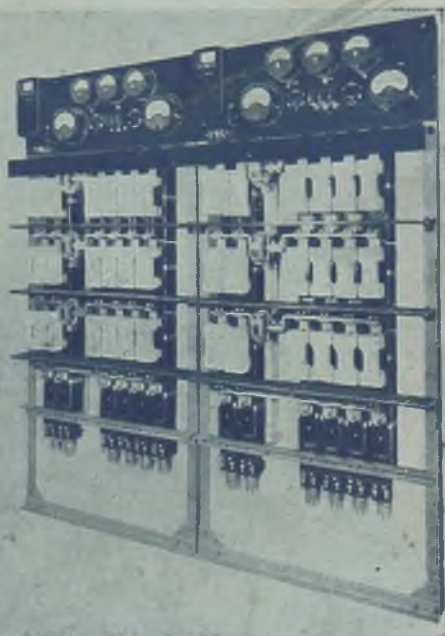
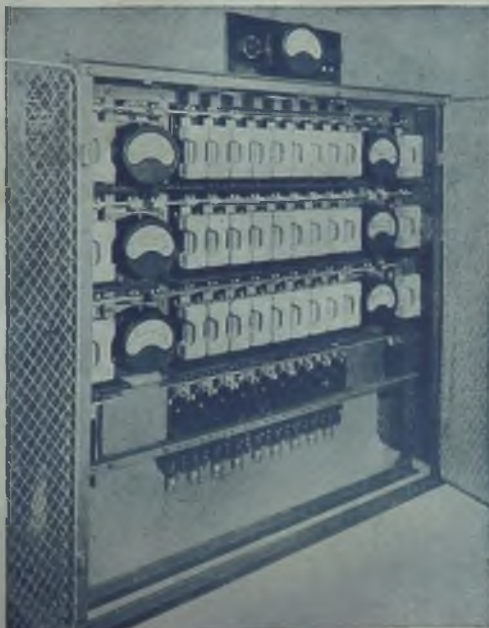
Vol. CXXXIV. No. 3475

JUNE 30, 1944

9d. WEEKLY

DISTRIBUTION PANELS FOR SUBSTATIONS

These typical Sub-station Distribution Panels, built up with Henley standard tailless type units, show how readily any desired arrangement of fuses, instruments, etc., can be assembled on an angle iron framework, making a neat and compact assembly for installation in a Sub-station.



HENLEY

UNIT TYPE
DISTRIBUTION
PANELS



We shall be pleased to put forward suggestions for panels to meet your particular requirements.

INDUSTRIAL SWITCHGEAR

and TRUNKING
SYSTEMS

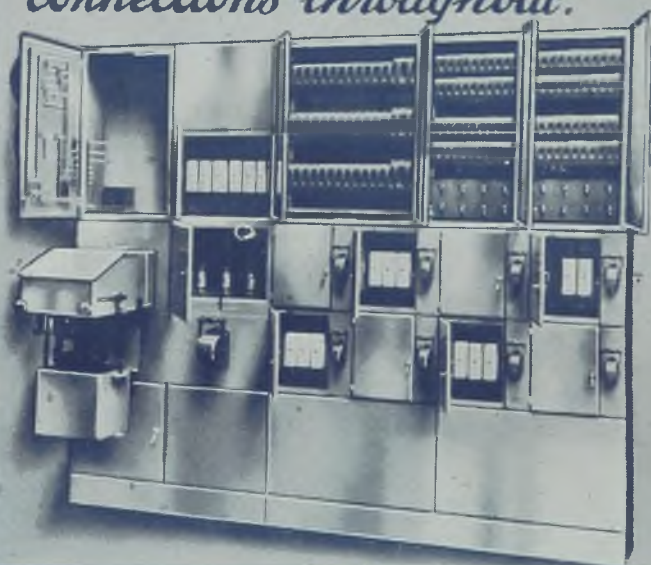


*Labour costs on site are
saved by using solid copper
connections throughout.*

ALSO
MAKERS
OF THE

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OVERHEAD
DISTRIBUTION
SYSTEMS



DRAKE & GORHAM LTD
STANDARD RD. · NORTH ACTON · N.W.10

Telephones: Willesden 6601-2 Telegrams: Tincomar "Harles London."



Throwing a new light on accidents

Although accidents *will* happen, many of them needn't. Lighting—poor lighting is frequently to blame. Investigation and research prove it, prove also that a scientifically planned lighting system, as created by Siemens, does reduce accidents—a vital consideration in these days of man-power shortage and increased demands on production.



PLANNED Lighting with Siemens Lamps can be the solution to the many production problems resulting from inadequate lighting. Our expert lighting engineers are ready to advise—and without obligation.



What is it?

It is a mixture of solder or pure tin and flux combined in the form of paint or cream. It does not separate and no stirring is required before or during use.

What is it for?

It can replace normal methods of soldering *i.e.* the use of stick solder and flux or hot dip tinning. It is particularly suitable for pre-tinning or sweat soldering.

How is it applied?

By brush or pad. Soldering or tinning is effected by blow-flame, soldering iron, hot plate or by stoving.

Is any special skill required to use it?

No. Satisfactory tinning or soldering can be done by unskilled labour. It is only necessary to apply the paint or cream and to heat. The method lends itself to mechanisation and mass production.

Will it do all soldering jobs?

No, but it offers a very wide field of application and can often successfully replace the ordinary methods of soldering. Our technical department will give further advice.

Can we get a sample?

Certainly, if you apply to us.

FRY'S

METAL FOUNDRIES LTD., TANDEM WORKS, MERTON ABBEY, S.W.19 Mitcham 4023

AND AT MANCHESTER, BRISTOL, GLASGOW AND DUBLIN

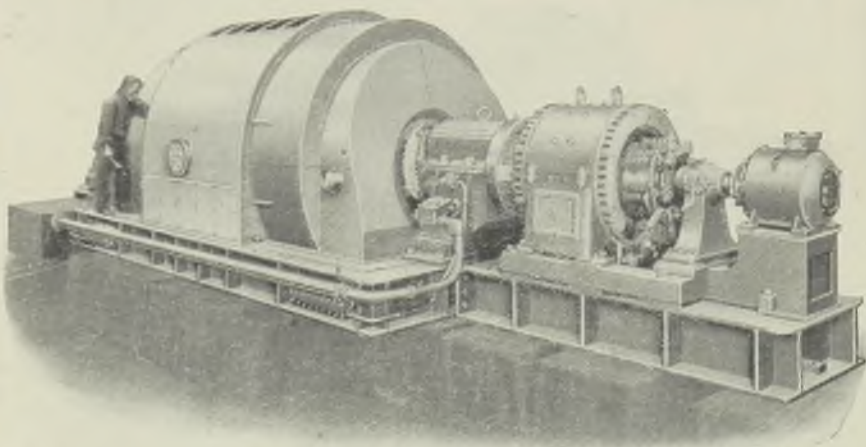
Birmingham Representative: 20 Stanway Road, Shirley, Birmingham.

Telephone: Shirley 1666

TRADITIONAL RELIABILITY



LARGE ELECTRICAL PLANT



15,000 kVA. Synchronous Condenser
on test prior to shipment to
New Zealand.

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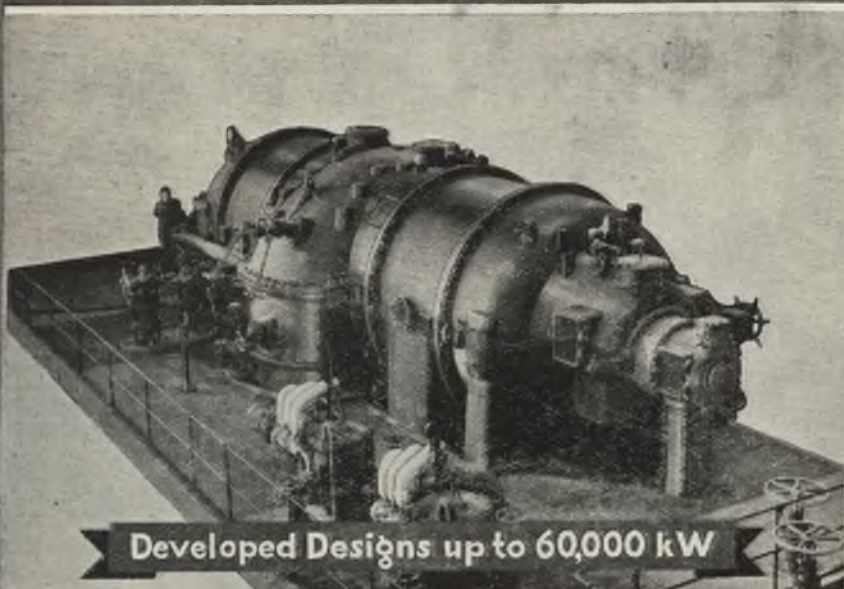
SPECIFY BTH

BTH

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




A3469

LARGE**BRUSH****LJUNGSTRÖM*****Turbo-
Generator
Sets*****Developed Designs up to 60,000 kW**

**MINIMUM OVERALL LENGTH
AND REDUCED WEIGHTS
PERMIT INSTALLATION
IN EXISTING ENGINE
ROOMS**



"Make one grinding wheel do the work of two"



With **Weyde** grinders this great economy can be effected and the scarcity of abrasives relieved proportionately. The explanation lies in the fact that the motors of **Weyde** grinders operate at a more or less constant speed whatever the load, giving equally constant speed to the grinding wheels which, therefore, maintain the highest possible "wheel wear/metal removed" ratio.

Grinding wheel costs are thus appreciably reduced . . . by as much as 50% . . . whilst giving faster production throughout their lengthened life.

IMMEDIATE: Should any of your tools be without maintenance instructions, send immediately for the necessary copies. Applications should be addressed to—Publicity Department, The Consolidated Pneumatic Tool Co. Ltd., Fraserburgh, Aberdeenshire.

CONSOLIDATED PNEUMATIC
TOOL CO. LTD.
 FRASERBURGH ABERDEENSHIRE

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

Robert Sharp and Partners

Pronounced
PROGRESS
in the Insulator world



Another step forward in the intricate business of producing insulators of large dimensions and exceptional capacity. These porcelains for Oil Filled Bushings were supplied to a recent order. To indicate their size we have shown them in correct relation to a 10 H.P. Hillman Minx. Reaching 80 inches in height, they stand out as a definite advance in insulator manufacture. This represents a bigish job, for which the Bullers organisation and resources are well adapted—but we are also producing insulators of small and intricate design. So—whatever your requirements in insulators and ironwork, make sure by specifying Bullers

Bullers

INSULATORS

AND IRONWORK



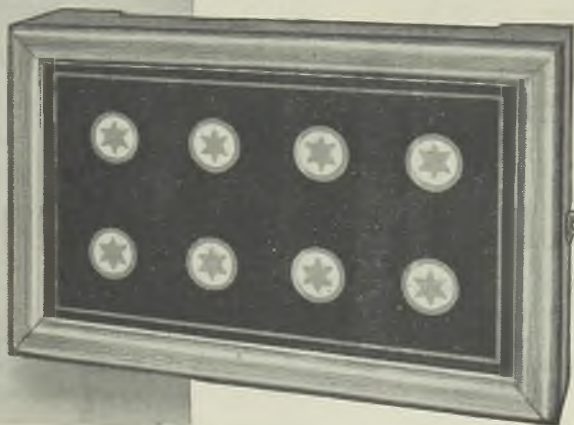
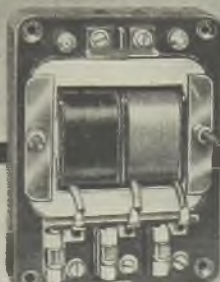
BULLERS, LTD., THE HALL, OATLANDS DRIVE, WEYBRIDGE, SURREY
 Telephone : Walton-on-Thames 2451. Manchester Office : 196, Deansgate, Manchester

G.E.C. INDICATORS

BAKELITE BELLS-PUSHES AND TRANSFORMERS

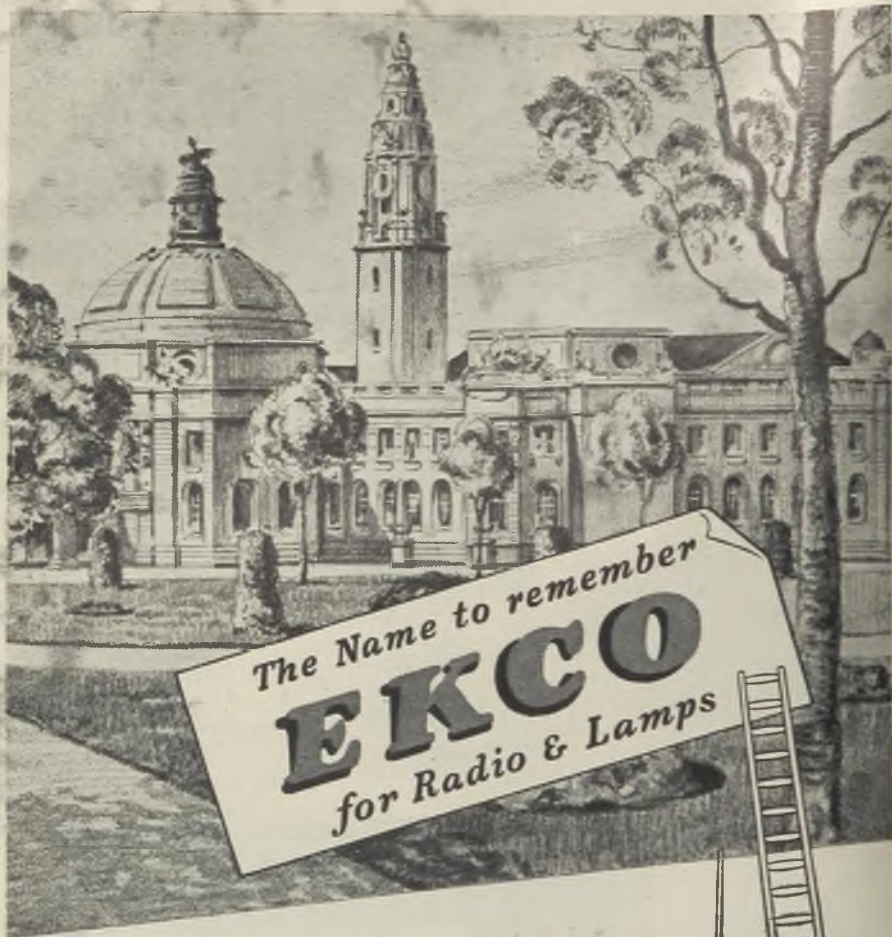
**Get into touch
with your nearest
G.E.C. Branch for
all requirements
in Bell installation
material.**

Note the three
fuses in the
transformer,
one to each pole
on the second-
ary side, thus
complying fully
with I.E.E.
Regulations
No. 210.



G.E.C. quality is being rigorously maintained

Advt. of The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2



CARDIFF AND EKCO

Cardiff knew the quality of EKCO Radio—quickly switched on to EKCO Lamps when they first appeared. Now dominating poster advertising in Cardiff and other great cities, backed up by powerful National and Provincial newspaper "reminder" publicity, is adding impetus to sales. Dealers can rely on the quality of EKCO Lamps to give the customer—satisfaction that builds vital goodwill . . . and they enjoy profitable business.

Write for full details to

E. K. COLE LTD., Lamp Sales Department, Ekco Works, Southend-on-Sea



BACKGROUND SHOWS SUSTAINED
1,000,000 Volt, 50 cycle ARC, 109" long,
PRODUCED BY FERRANTI EQUIP-
MENTS AS SUPPLIED SINCE 1923.

FERRANTI

FOR HIGH VOLTAGE · HIGH POWER
Transformers

FERRANTI LTD., Hollinwood, Lancs.
London Office: KERN HOUSE, KINGSWAY, W.C.2.

REINFORCED CONCRETE IN THE ELECTRICAL INDUSTRY



REINFORCED CONCRETE CHIMNEYS

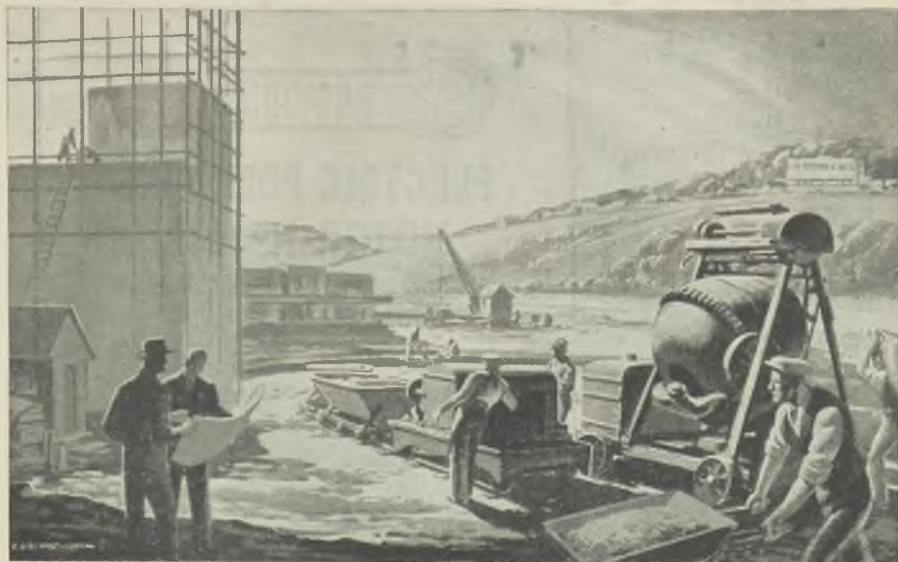
Electricity undertakings in all parts of the country have played a vital part in maintaining the output of our war industries. Their ability to do so has been due in no small measure to the sterling qualities of reinforced concrete structures which have given trouble-free service and provided a high degree of resistance to enemy bombing. The vast schemes of

development and reconstruction which will be called for in the post-war years will make even greater demands on the resources of electricity undertakings. To meet the needs of increased output, reinforced concrete will be the logical choice of material for coal bunkers, cooling towers, water ponds, power houses, offices, and all construction work.

THE REINFORCED CONCRETE ASSOCIATION

94, PETTY FRANCE · LONDON, S. W. 1.

Telephone: Whitehall 9936.

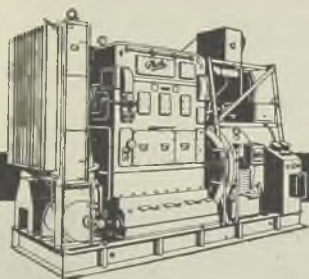


CIVIL ENGINEERING

THE PLANS for Post-War reconstruction must be taken further than the blueprint stage, for in the great field of Civil Engineering many brilliant minds are creating new achievements of lasting merit. Wherever power is required Petter Engines will be ready to play their part in the creation and completion of this new work.

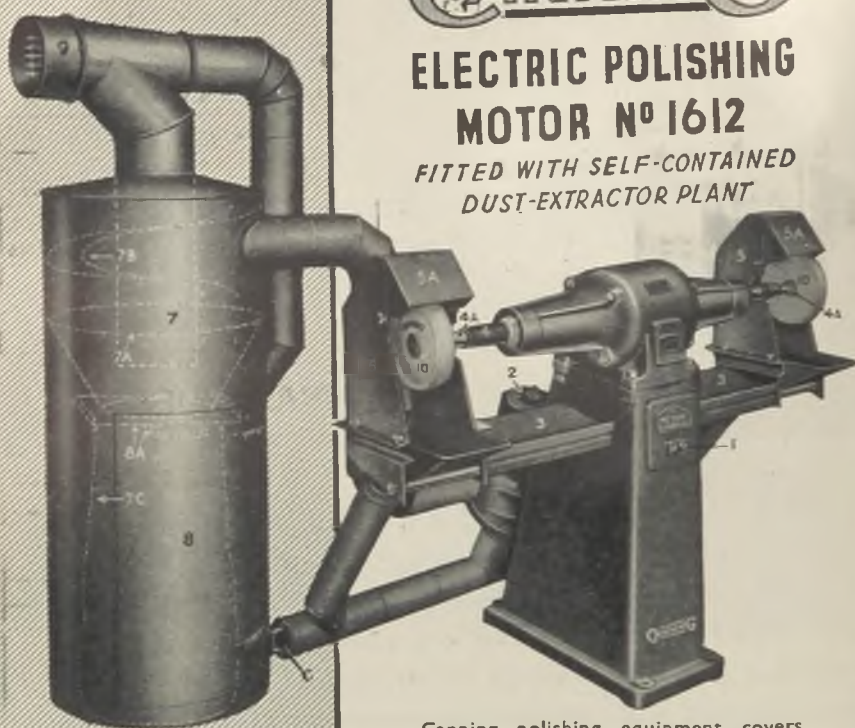
A wide range of Post-War models in sizes from 1½ to 540 B.H.P. will be available.

Write for full information indicating if possible your present or Post-War requirements.



ENGINES

PETTERS LTD · LOUGHBOROUGH · ENGLAND



CANNING

ELECTRIC POLISHING MOTOR NO 1612

*FITTED WITH SELF-CONTAINED
DUST-EXTRACTOR PLANT*

Canning polishing equipment covers the whole range of polishing requirements—polishing motors and lathes, wheels, bobs, mops, brushes and compositions for every purpose.

Our new "Satene" Greaseless Polishing Composition removes burrs, tool and grinding marks, and rust from steel and iron. It gives a satin finish to most metals. Other well-known compositions engaged "on Munitions" include "Lustre," "Peerless," "S.S.," etc. Let us solve your particular polishing problem.

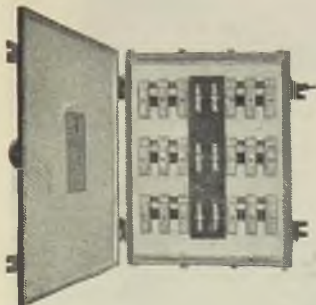
W. **CANNING** & CO. LTD.

GREAT HAMPTON ST., BIRMINGHAM 18.

'ENGLISH ELECTRIC' FUSEGEAR

FOR QUICK DELIVERY LIST No. 2

URGENT REQUIREMENTS FOR AUTHORISED PRIORITY AVAILABLE EX-STOCK OR SHORT DATE



BSS
214

TYPE **S** FUSEBOARDS
H.R.C. FUSES—440AC4 & DC4

500
VOLTS

RATING AMPS	LIST NUMBERS				
	TRIPLE POLE			T.P. & N.	
	4 WAY	6 WAY	8 WAY	4 WAY	6 WAY
30	S30 T4	S30 T6	S30 T8	S30 TN4	S30 TN6
60	S60 T4	S60 T6	S60 T8	S60 TN4	S60 TN6
100	S100 T4	—	—	—	—

TYPE "S" FUSE BOARDS ARE ALSO MANUFACTURED WITH A LARGER NUMBER OF WAYS, AND IN CURRENT RATINGS UP TO 800 AMPS. DELIVERY PERIODS FOR BOARDS NOT LISTED ABOVE ON REQUEST

'ENGLISH ELECTRIC' OVERHEAD BUSBAR DISTRIBUTION SYSTEM

COMPONENT		LIST NUMBERS						
		TYPE O CIRCULAR BUSBARS					TYPE RR FLAT BUSBARS	
		3-PHASE		3-PHASE & NEUTRAL			3-PHASE	
12' 0" LENGTH 250A WITH 6 PLUG POINTS 'ALL-INSULATED' PATTERN		OI-2503-6		OI-2504-6			RRI-2503-6	
BLANK END COVER		OE 2503		OE 2504			RRE 2503	
CONDUIT END COVER WITH CABLE SOCKETS MAX. TAPPING = 2" E.T.		OC 2503		OC 2504			RRC 2503	
PLUG-IN FUSE BOXES	AMPS	D.P.	T.P.	D.P.	T.P.	T.P. & N.	D.P.	T.P.
	30	OF 302-3	OF 303-3	OF 302-4	OF 303-4	OF 303N-4	RRF 302-3	RRF 303-3
	60	OF 602-3	OF 603-3	OF 602-4	OF 603-4	OF 603N-4	RRF 602-3	RRF 603-3
	100	MAX PLUG-IN FUSEBOX FOR TYPE "O" BUSBAR=60 AMPS						
INCOMING ADAPTOR HOUSING WITH CABLE BOX FOR P.I.L.C.A. CABLE		SUPPLIED ASSEMBLED ON 12' 0" LENGTH WHEN ORDERING SPECIFY (A) LIST NO. OF 12' 0" LENGTH (B) POSITION ON 12' 0" LENGTH (C) CABLE SIZE (3 SQ. IN. MAX.) (D) DIRECTION OF CABLE APPROACH						

WHEN ORDERING QUOTE LIST NUMBERS & SPECIFY CURRENT RATING OF CARTRIDGE-FUSE LINKS REQUIRED
Publication FG/103 listing these and other types of Quick Delivery fusegear sent on request.

THE ENGLISH ELECTRIC COMPANY LTD.
— STAFFORD —

For large scale Electrical Purposes



It is noteworthy where Tudor accumulators are to be found fulfilling the most important duties. Over 500 British Power Stations installed Tudor. Many Tudor installations rank among the largest in the land and have an enviable reputation for long-lived reliability. No matter

whether they were installed only yesterday, or over thirty years ago—as many of them were—they are to-day functioning with consistent efficiency.

SAFETYLYTE (Patent No. 313248) is the Tudor Emergency Lighting System, which is automatic and instantaneous in operation. It is installed in thousands of schools, hospitals, factories and other large buildings



TUDOR ACCUMULATORS

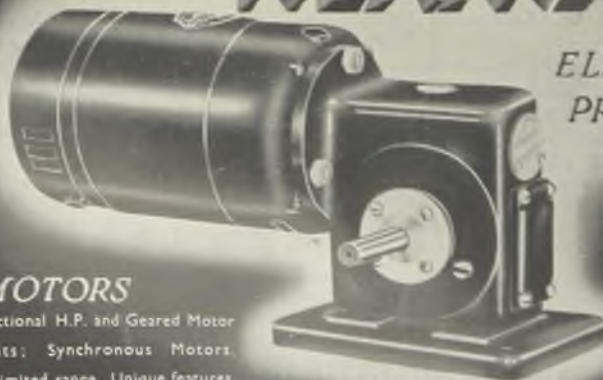
The Tudor Accumulator Co. Ltd.
50 Grosvenor Gardens,
London, S.W.1. SLOane 0168/9

WT38b/44

Accent on Quality

KLAXON

ELECTRICAL PRODUCTS



MOTORS

Fractional H.P. and Geared Motor
UNITES: Synchronous Motors.
Unlimited range. Unique features.
25 years' leadership.

SIGNALS

Industrial & Marine Warning Signals. Indispensable to safety and efficiency ashore and afloat. Types to meet all conditions.

KLAXON, LTD., 201, Holland Park Avenue, London, W.11.

CLOSED but COOL.

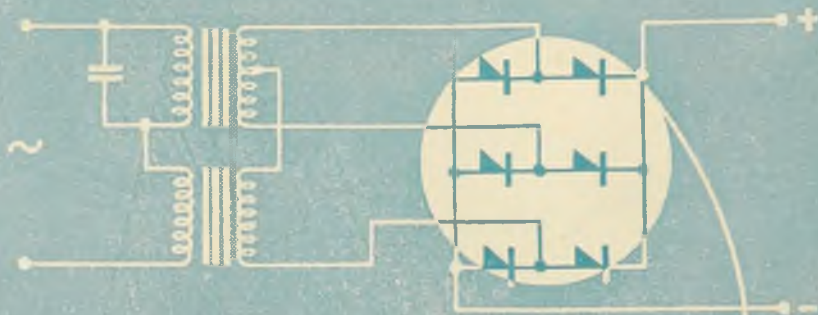
Complete dust and damp protection with efficient fin and fan cooling, compactness with strength, easy installation with long trouble-free service—a Parkinson 'Klosd' Motor.

★ *Write for List of Motors in Stock.*



CROMPTON PARKINSON
LIMITED

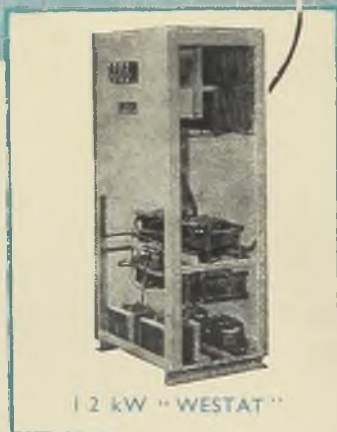
Constant Potential RECTIFICATION "WESTAT" & "NOREGG" SYSTEMS



*One of the many uses
for*

WESTINGHOUSE

METAL RECTIFIERS



The new constant potential circuit system (utilising the "Westalite" selenium-compound rectifier) is the outcome of considerable research to find a means of overcoming rectifier voltage drop and, at the same time, automatically compensate for variations in the voltage of the A.C. supply. The output voltage can be held within the limits of 4 per cent. notwithstanding simultaneous variations in load and A.C. supply.

Send for Pamphlet DP II L to:—

WESTINGHOUSE BRAKE & SIGNAL CO. LTD., PEW HILL HOUSE, CHIPPENHAM, WILTS.



Maintaining the standard of BRITISH CRAFTSMANSHIP

THE Fairey *Barracuda* torpedo-bomber, which achieved such success in its first major strike against the enemy, is of course intended for service under what are essentially modern conditions of warfare. Yet its development is the result of a strict adherence to those same principles of good craftsmanship which produced the deadly longbows of the fighting archers of Agincourt.

This awareness of a great tradition is also apparent in the production of Crabtree electrical accessories. Whether these are for peace-time application or whether—as in the case of those installed in the *Barracuda*—they are equally suitable for military requirements, the aim of their designers is the same: ultimate perfection. To the purist, this objective can never be reached, but in constantly striving to attain the impossible, the products of Crabtree craftsmen have reached such standards of excellence that they are selected for service whenever quality and reliability are of paramount importance.



One of the Crabtree products similar to those used for controlling the camera gun of the *Barracuda*.



AUSTIN WALTERS & SON LTD.

MANUFACTURERS OF
STORAGE EQUIPMENT



Bins and Shelving
single and double-sided



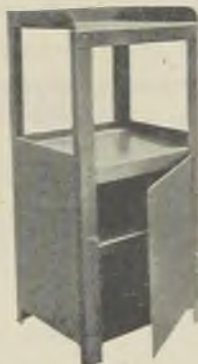
STORAGE RACKS

for
Small Parts
Removable Trays

TOOL CABINETS

39" x 18" x 15"

Lock and Key



STEEL WORK BENCHES

8' 0" x 2' 6" x 2' 8"

Two Lockers with Padlock and Key

AUSTIN WALTERS & SON LTD.
Old Trafford, MANCHESTER 16



Something NEW in Switchgear!

Sordoviso produce a new Plug-In Contactor

Here's some news! Sordoviso Engineers have produced a new design in Switchgear featuring plugged-in relays and contactors which allow immediate accessibility to the mercury switch itself *without the need of detaching a single screw*. The coil unit (supplied with fuse and spare fuse) is *immediately accessible and interchangeable*. The main contact is in an entirely separate compartment from the coil contact, so that the *highest possible degree of insulation between the two is obtained, together with a most compact unit*. Every part of this newly-designed instrument is, in fact, immediately accessible and can be dismantled and rebuilt in a *few seconds!* Available in three different ratings of 5, 10 and 15 amps, with a wide range of voltages up to 500 volts A.C.

(British & Foreign Patents). For full information write:

SORDOVISO

SORDOVISO SWITCHGEAR LTD.

220 The Vale, Golders Green, N.W.11. Phone: Gladstone 6611-2
Contractors to Air Ministry, Ministry of Aircraft Production,
Ministry of Supply, Admiralty, War Office, Department
of Petroleum Warfare, G.P.O., I.C.I.—All Departments.

IN SUPPORT OF THE MINISTRY OF FOOD HERE IS ANOTHER RECIPE FOR YOUR DEMONSTRATIONS:

Meat and Potato Cakes

The
Jackson

COOKING CABINET

Ingredients :

1 lb. of cooked mashed potatoes. A small pot of chicken and ham paste. A little chopped parsley. Pepper and salt. A little reconstituted egg to bind.

Method :

Mix the mashed potatoes with the contents of the pot of chicken and ham paste, adding a knob of margarine, if possible, to make the mixture smooth. Add the chopped parsley

and seasoning and bind mixture with a little reconstituted egg. Divide and shape into little round flat cakes on a lightly floured board. Mark a pattern with the back of a knife and fry in shallow fat.



Cat. No. 192J.

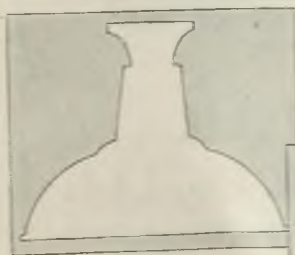
The
Jackson

**ELECTRIC
STOVE Co. Ltd.**

143 SLOANE STREET, LONDON, S.W.1



BLUE PRINT FOR SEEING. Make sure that you have the correct lighting equipment; enlist the help of the Crompton Lighting Service; thus will you make sure of maximum visual efficiency.



CROMPTON LIGHTING EQUIPMENT

FOR THE LATEST

IN LIGHTING

CROMPTON PARKINSON LTD. ELECTRA HOUSE, LONDON, W.C.2.

Telephone: Temple Bar 5911

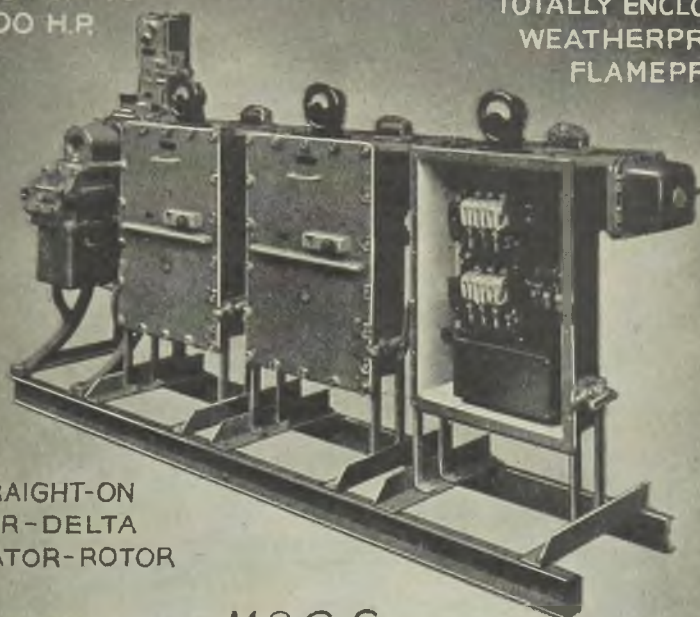
Telegram: Crompton, Light and London.

Contactor Starters

IN STANDARD
SIZES UP TO
300 H.P.



TOTALLY ENCLOSED
WEATHERPROOF
FLAMEPROOF



STRAIGHT-ON
STAR-DELTA
STATOR-ROTOR



M. & C. S.

CONTACTOR STARTERS ARE
AVAILABLE FOR WALL OR
PEDESTAL MOUNTING. SINGLE
UNITS CAN BE BUILT UP IN
BOARD FORM AS ILLUSTRATED.

Write for Descriptive Literature.



M. & C. SWITCHGEAR LTD.

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SALES & SERVICE : OLIVE GROVE RD. SHEFFIELD, 2

LONDON OFFICE : 36 VICTORIA ST., S.W.1

A DOUBLE SAVING OF TIME WITH INSTALLATIONS AND FIXTURES



First, planning is simplified if Rawlplug Fixing

Devices are specified.



Secondly, the work itself, be

it light wiring



or the installation of heavy machinery,

is done much more quickly. Production of the first importance is

being started ahead of schedule because of the



speed,

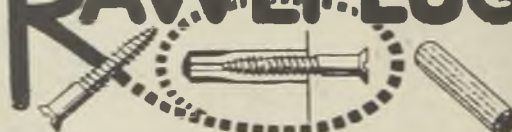
accuracy

and reliability of Rawlplug Fixing Devices



Rawlplugs, Rawldrills, Rawltools, Rawlbolts, Rawldrives, Rawlplastic, White Bronze Plugs, Bolt Anchors, Screw Anchors, Cement-in Sockets, Boring Tools, Tile Drills, Electric Hammers, Mechanical Hammers, Soldering Irons, Toggle Bolts and many products of Industrial and Domestic utility. Write for Technical Literature.

RAWLPLUG



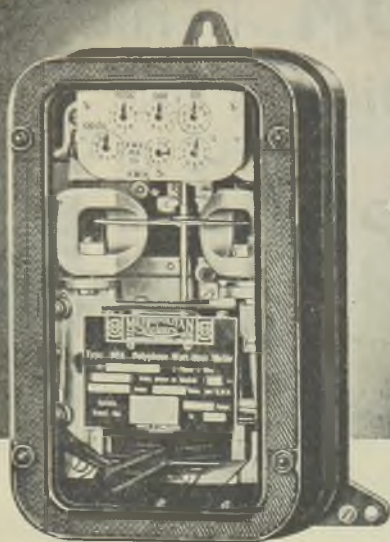
FIXING DEVICES

B 287

Contractors to His Majesty's Government.

The World's Largest Manufacturers of Fixing Devices.

THE RAWLPLUG COMPANY LTD., CROMWELL ROAD, S.W.7



Type NE 4 3 phase-4 wire Watt-hour METER

A development of the well-known NE Meter

- SIMPLE ADJUSTMENTS

The NE 4 Meter includes adjusting devices that are quickly and easily operated without special tools.

- FLAT LOAD CURVE

The high standard of performance that characterises two-element meters is also a feature of this 3-phase 4-wire meter.

- SPACE SAVING

Though the meter has three separate elements, it occupies no more panel space than the standard two-element meter.

*Write for
leaflet No.
356/8-1*



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

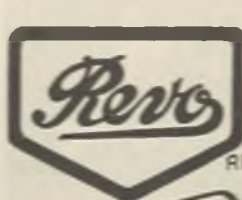
G/A301

*Light aids
production*

IMPROVE YOUR LIGHTING *in consultation with*
METROVICK'S ILLUMINATING ENGINEERS

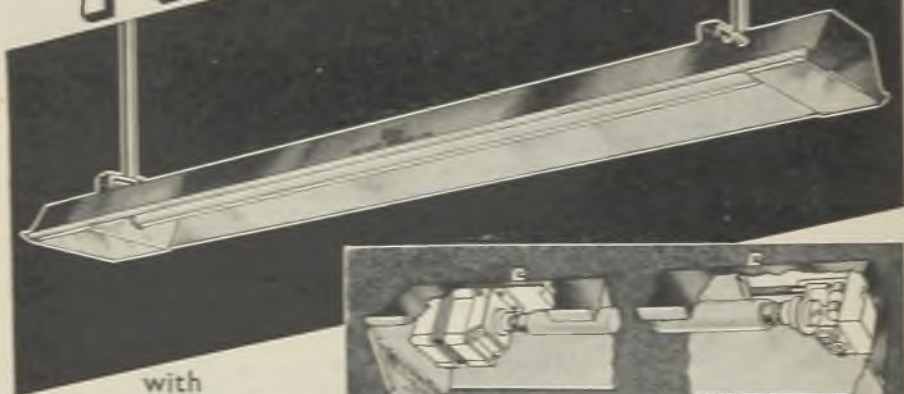
VITREOUS ENAMELLED

for **MAXIMUM** REFLECTION



and **LONGEST LIFE**

'TRUFOLITE'



with
**BUILT-IN
CONTROL GEAR**

FLUORESCENT REFLECTOR FITTING

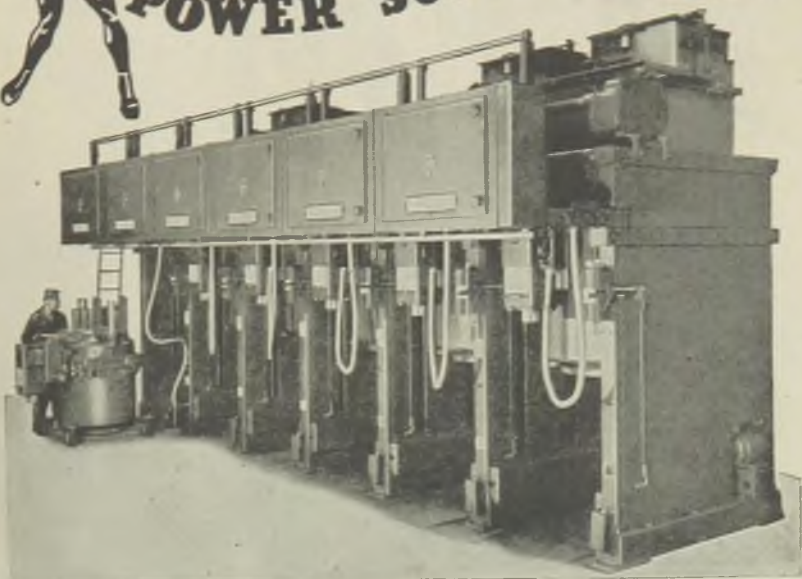
This Revolutionary design (Patents applied for) compactly and uniquely houses all control gear in the ends of the reflector. ● Hinged end covers afford immediate access to control gear accessories. ● Alternative mains connections—either plug and socket detachability or separate mains terminal block. ● Internal wiring. ● Spring-loaded lampholders make lamping amazingly simple. ● Universal mounting fixture caters for any fixing position. ● The entire unit can be instantly lowered for inspection, cleaning, lamp replacements, etc.

Full particulars and prices on application to

REVO ELECTRIC Co. Ltd. TIPTON, Staffs.



THE CHAMPION FOR HEAVYWEIGHT POWER SUPPLY



V-S-B-P 8 SINGLE BUSBAR METALCLAD UNIT

The "V.B.P." and "V.R.P." represent the excellence of "FERGUSON, PAILIN" design and manufacture in the larger types of Switchgear.

Circuit breakers are vertically isolated.

This feature combines a number of advantages, including easy means for inspection and maintenance; self-contained raising and lowering mechanism is used for this purpose.

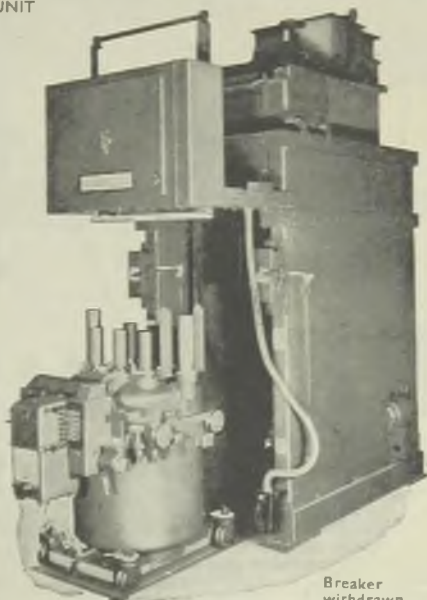


498

FERGUSON, PAILIN LIMITED
MANCHESTER 11 • ENGLAND

LONDON
Temple Bar 8711/2

BIRMINGHAM
Sutton Coldfield 2744
GLASGOW
Central 5080



Breaker
withdrawn



THE PAPER BEHIND THE POWER

ROTHMILL CABLE INSULATING PAPER

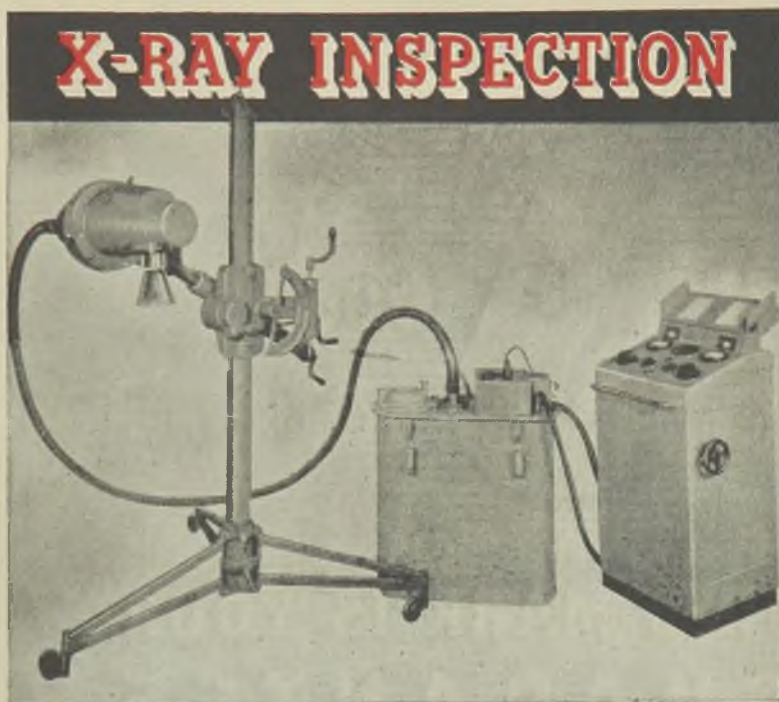
Tullis Russell & Co. Ltd.

The Pioneers of Twin-wire Papers for Printers

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LONDON MANCHESTER BIRMINGHAM
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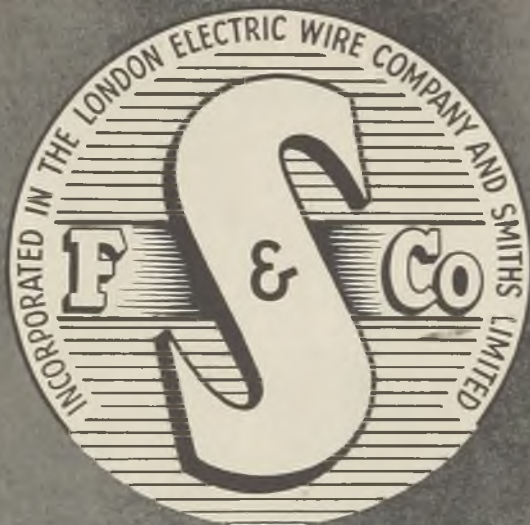
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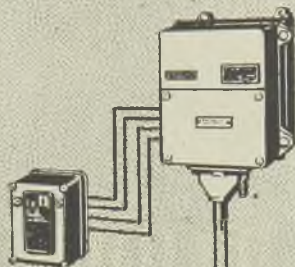
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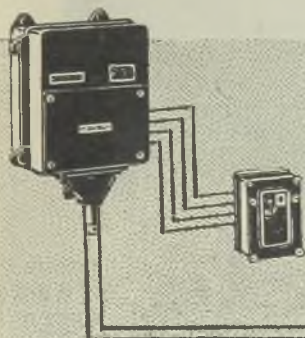
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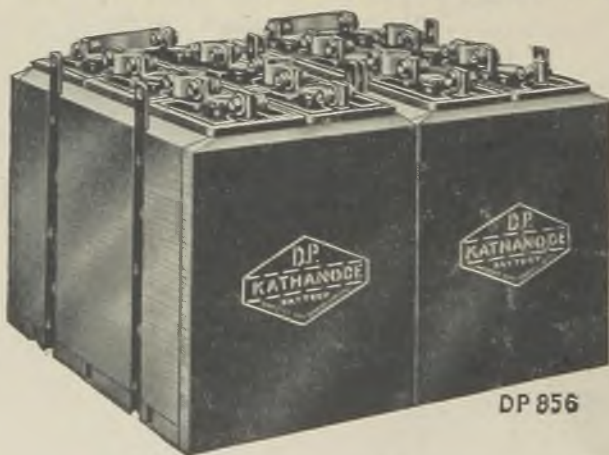
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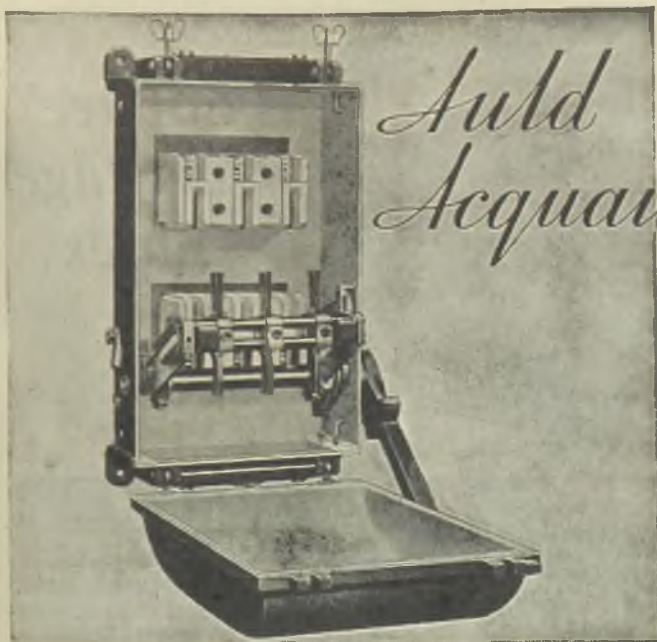
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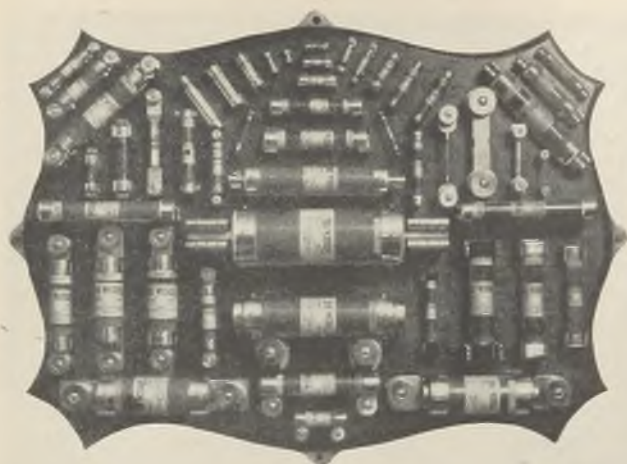
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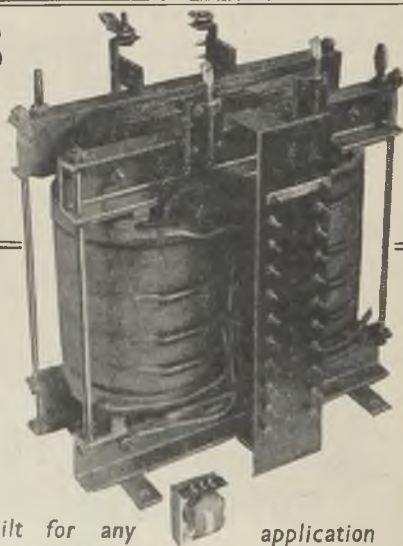
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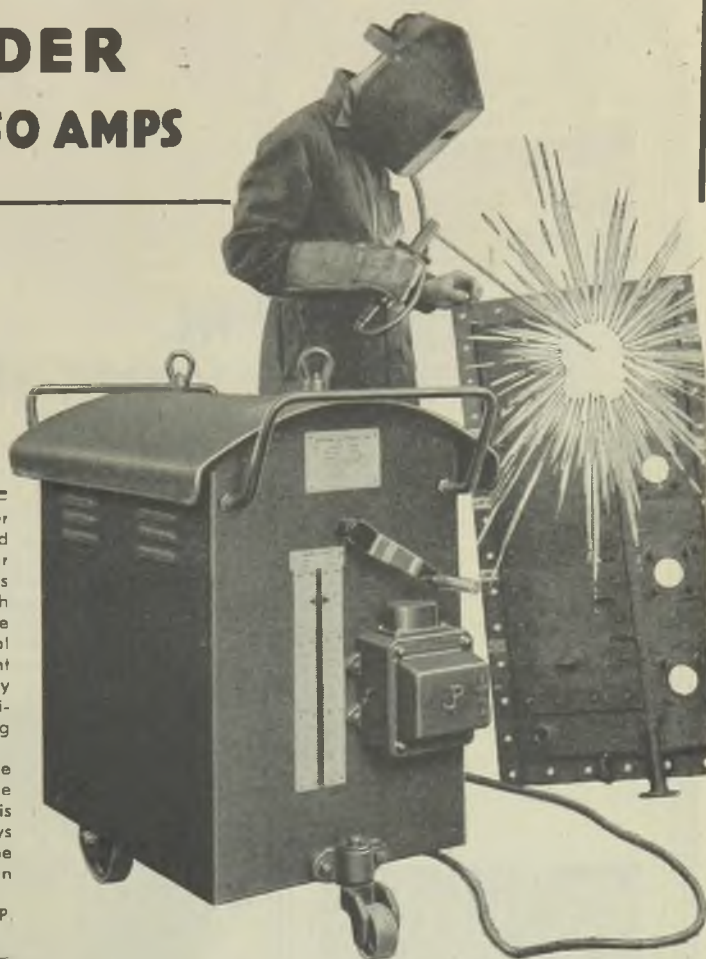
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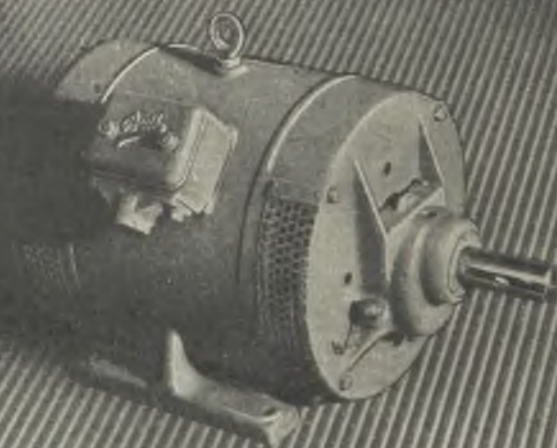
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ELECTRICAL REVIEW



June 30, 1944

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXIV. No. 3475.

JUNE 30, 1944

9d. WEEKLY

Research and Industry

The Electrical Example

AGREEMENT on basic points is apparent in the several reports on the future of research that have been made by various representative bodies during the past year or so. There is, for instance, a consensus of opinion as to the need for a rapid increase in the number of trained workers and to the plenitude of human material available provided—and the proviso goes to the root of the matter—that general and technical educational methods are adequate for meeting the needs of the industrial future. Thus the most recent pronouncement, a statement issued by Nuffield College last week ("Problems of Scientific & Industrial Research," Oxford University Press, Humphrey Milford, 2s. net), refers to the waste of ability due to present educational shortcomings and calls for a large increase in capital and running expenditure on buildings and equipment for scientific work and training.

Threefold System

Although chary of accepting generalisations of the best methods of organising research, the statement gives prominence to the threefold system which has within its existing limits given good results in the electrical industry. In the first place there are the universities, where most (though not all) of the fundamental research is done. Next come the laboratories set up on the initiative of manufacturers, which cover a wide range that extends from long-term research to what is more accurately regarded as development work. In the third category are research associations

which, in addition to undertaking investigations of interest to the industry at large, enable smaller firms to carry out research on a scale which individually they could not afford to do.

An important corollary to the last, which has been advocated in electrical circles, is that each firm, however small, should appoint at least one technical man to keep in touch with the research associations and with progress in research generally. The emphasis placed by Nuffield College on the desirability of constant contact and interchange of personnel between these three groups is quite in accordance with declared electrical opinion.

Government's Contribution

The part to be played by the Government in research is discussed at some length in the statement. In so far as this affects the electrical industry, experience indicates that Government intervention would be best restricted to a generous policy of financial assistance to educational establishments and research associations, leaving manufacturing concerns to work out their own salvation. The subsidising of the Electrical Research Association, for instance, by amounts *pro rata* to those subscribed by its members is satisfactory not only to the extent to which the subventions are really generous but also because of the willingness of all firms profiting by its activities, whether directly or indirectly, to pay their scot.

It ought not to be necessary to make contributions obligatory, at any rate in an industry as healthy as the electrical. Some

co-ordinating body is clearly required to make research effective, and also to ensure that patents are developed so as to stimulate and not hamper invention. For such purposes the setting up of a Research Board composed of representatives of research interests, as suggested by the Institution of Electrical Engineers promises to furnish the most efficient solution. Complementary to activity in research, however, and of equal importance, are the will and ability to make use of its results. A well-informed belief in its value as an indispensable instrument of production is essential if full advantage is to be taken of the greater facilities which, it is to be hoped, will be provided in the future.

Post-War Expansion In recent issues we have published notes on the "five-year plans" of a number of municipal elec-

tricity supply undertakings resulting from the inquiry now being conducted among them by the Electricity Commissioners. It has been reported that Bradford visualises the expenditure of £1,000,000 after the war; now another, nearby, Yorkshire city—Leeds—has gone a million better by announcing its intention (if circumstances permit, of course) of spending £2,000,000 in the first five post-war years. It is becoming evident that the total requirements of the industry will reach a colossal figure; even the smaller undertakings are putting forward estimates of substantial size. In a free market all this would represent work for the electrical manufacturing and contracting industries sufficient to tax their resources to the limit—and beyond.

Limiting Factors It is quite obvious that this will not happen. For a considerable time after the war the electrical in-

dustry will be only one of hundreds clamouring for materials and those materials will be required not only for catching up our own arrears (and in five years these have reached formidable proportions) but also for the rebuilding and re-equipment of vast areas laid waste by war whose claims are, to say the least, of equal importance. Consequently there will be severe "rationing" in the meeting of all these requirements and it is doubtful whether they will be anything like satisfied in five years. The work will have to be spread over a longer period and that will

not be disadvantageous in the long run. Too much was done in a hurry after the last war and although many fortunes were made the community in general had to pay heavily for the post-war boom during the subsequent reaction.

University Extensions REFERENCE has been made to the Leeds estimate of post-war electrical expenditure. The Leeds

University is also budgeting on the grand scale; it anticipates that a long-term programme which it has formulated will ultimately cost £2,800,000. Of this about 67 per cent. is for new buildings and equipment and 28 per cent. for students' hostels. This expenditure will be necessitated not only for general extension and improvement but also by the fact that it is proposed to extend the degree courses from three to four years—a step said to be necessary to relieve the "overloading" caused by the more complicated technical knowledge which students must nowadays acquire.

Magnets ADVANTAGES of permanent magnets over electro-magnets lie in

saving of power, absence of heating and complete immunity from breakdown. Although their scope is wide in the electrical industry, they have in the past been regarded as concerned with the provision of relatively small fields. Nevertheless, recent advances in manufacture and design as a result of the co-operative researches referred to in this issue have enabled them to compete with electro-magnets for heavier industrial duties. Magnetic chucks and separators furnish examples of an increase in their range, which will no doubt be further extended in the fairly near future.

Contractor Registration RECENT moves in this country designed to secure the compulsory registration of electrical con-

tractors add to the interest of similar steps in British Columbia. In that province the Vancouver Electrical Association has drawn up proposed regulations designed not only to bring electrical contractors under control but also electrical retailers. The contractors' licences would be of two classes, unlimited and limited to 250 V 100 A single-phase in "unorganised territories"—a term which our correspondent does not define. Examination

of applicants would be in the hands of a board composed of a Government-appointed chairman, two contractors and two journeymen. Contractors who had been in business for three years would *ipso facto* be licensed upon compliance with certain conditions.

Magnetised Bearings

AN unusual cause of heating of motor bearings was described by Mr. A. W. Lineker at a recent meeting of the South African Institute of Electrical Engineers. A pair of 32-HP 1,450-RPM squirrel-cage motors driving centrifugal pumps had roller and ball bearings housed in the end-shields. After running for fifteen minutes the temperature rose by over 70 deg. F. and after twenty-five minutes the paint on the end-shields bubbled and blistered. After various unrevealing tests, it was discovered by chance that the bearings were strongly magnetised. Subsequently it transpired that the motors had been stored in the engine room of the power station near the rotor of a 12,500-kW alternator which was being dried out with DC at the time.

Price Variations

ILLUSTRATING the point, difficult for laymen to appreciate, that differences in average prices charged to consumers are no criterion of the relative efficiencies of supply undertakings. Mr. J. S. Highfield in a recent contribution to the *Journal* of the Royal Society of Arts, gives figures for 1938 from thirteen representative undertakings, municipal and company. Variations in these are of similar magnitude to those quoted in a paper which he read before the Society twenty-five years ago. Since then load has grown enormously and great economies (particularly in fuel consumption) have been made. The result confirms the view he then expressed that the differences are due to the nature of the demand in each case and not to efficiency of working.

Avoiding Accidents

It was inevitable that with the influx into industry of inexperienced men and women the accident rate should increase. Improvement can be made only by constant supervision and education, a job for a special type of official—the industrial safety officer. The matter is one which

has been given much attention by the Royal Society for the Prevention of Accidents, and its latest endeavour in this direction is the organisation of special training courses at Oxford during June and July. The subjects covered range from methods used to protect people against mechanical, electrical, chemical and other technical risks, through factory law and the study of the "human factor", to publicity and the organisation necessary to keep the whole factory aware of possible dangers. Particulars of the courses can be obtained from the Society at 52, Grosvenor Gardens, S.W.1.

"JANUS" of the Gas Crabbed Age and Youth

Times is, of course, able to look out in two directions whereas, it seems, some of his fellow members of the gas industry gaze steadily down their noses and see no further. He also at times assumes the role of Cassandra to the gas industry: his latest pronouncement is that "the prestige of gas is going down and down. The central organisations seem to have lost all grip, others are satisfied with their temporary war situation . . . and the public fancy turns to other media with fanatical persistence." For "other media" we may read "electricity." "Janus's" remedy seems to be an infusion of young blood into the higher controls of the industry. Perhaps there is something in the assertion (which we have often deprecated) that electricity is in its infancy.

Wise Counsel

IN the same issue of the *Gas Times* Mr. G. M. Gill advocates the use of the best means of operating gasworks plant. He says that in his group of companies electric motors are being used to drive exhausters with excellent results. He recalls having recommended to one board the installation of electric cranes. The oldest director was very upset at the suggestion and less suitable hydraulic cranes were put in. Mr. Gill says that "the company gained nothing and lost a great deal as the result of the decision. Let us be broadminded and use the best means for all engineering work: and not be backward either in inviting the electrical engineer to see how we use his commodity in our works. There is advantage in such a policy and it should lead to co-operation instead of cut-throat competition."

Brewery Installation

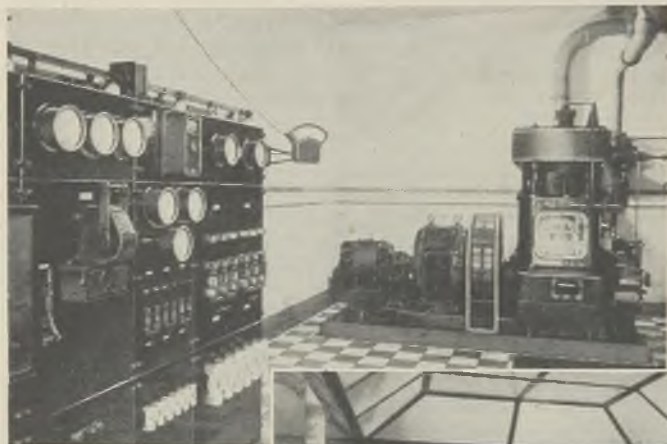
Balanced Process Heat and Power

THROUGH the courtesy of Bentley & Shaw, Ltd., we were recently able to see what pains they have taken at their Lockwood Brewery, Huddersfield, to balance the process heat and power requirements of the brewery so as to effect the maximum possible fuel economy. Broadly the scheme involves private electricity generation to meet the power demands and using the exhaust steam from the prime mover to feed the brewery copper base coils and the calorifier

10,000/12,000 lb. per hr. continuous rating super-Lancashire boiler by Daniel Adamson & Co., Ltd., which normally solely serves a 220-HP vertical high-speed two-cylinder engine by W. H. Allen, Sons & Co., Ltd., directly driving a 175-kW Lancashire Dynamo & Crypto alternator and an exciter. The alternator now meets the whole of the driving power requirements, while the exhaust steam from the engine satisfies the process heat demands as indicated, except that the

fountain coils in the brewing coppers are supplied with live steam at 75 lb. per sq. in. direct from the boilers by way of a reducing valve.

Except for a 50-HP beam engine, which has now been replaced by three motors, the brewery was already completely electrified, so that both the power and heating requirements were fairly easy to calculate. Never-



Above: The 220-HP high-speed prime mover is directly coupled to a 175-kW 400-V 3-phase alternator and exciter, and main distribution is via an open-type switchboard equipped for automatic voltage regulation

Right: The tempering and brewing waters are obtained from an airtesian well on site and from the natural Horse Bank spring; main pump room



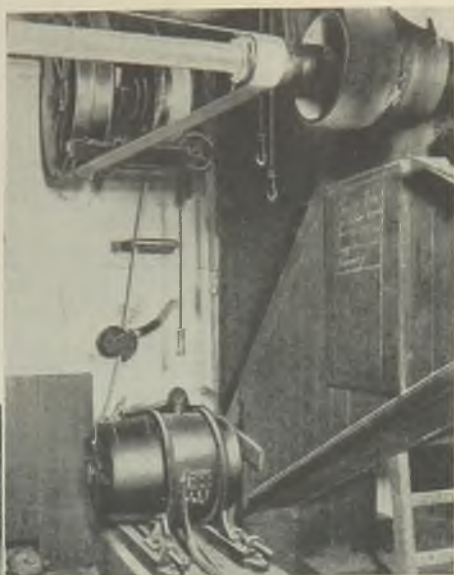
which supplies all the brewery equipment with hot water and the brewing coppers for process, as well as serving the buildings throughout for warming purposes.

Before modern equipment was installed for this purpose two Galloway Lancashire boilers supplied steam mainly for process heating direct and a quantity for machine driving, while the bulk of the power demand was met by public electricity supply. Those old boilers have now been replaced by a

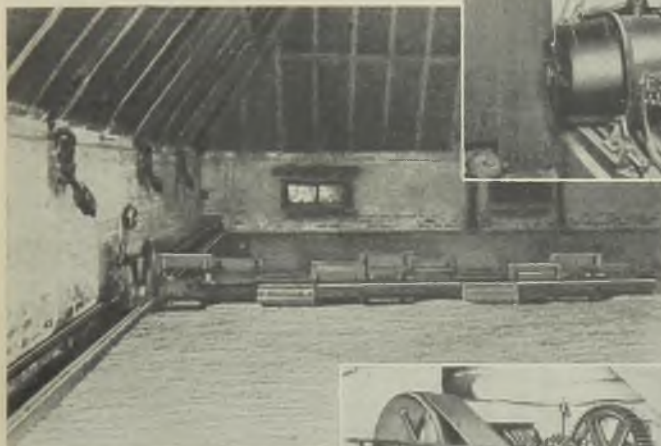
theless, the considerable thought which was put into obtaining a correct balance of these requirements in selecting the sizes and types of new plant is evidenced by the fact that only emergency conditions now necessitate the use of live steam to supplement the normal supply of exhaust steam through a reducing valve, or the pass-out to atmosphere

of the exhaust steam from the engine through a relief valve. Under present-day exceptional fuel economy conditions this procedure is watched with particular care and the reducing and relief valves are regarded strictly as safeguard equipments.

The boiler generates steam at 180 lb. per sq. in., and it is of the double-flue dual-drum type with below-furnace fire tubes through which the gases are passed after leaving the furnace tubes. The boiler is also equipped with tubular air heaters. It is served by sprinkler-type stokers, which are elevator fed from a below-ground hopper. The first engine cylinder is fed directly from the boiler, and exhausts to the second cylinder at 90 lb. per sq. in. The second, *i.e.*, the engine exhaust, is against a back pressure of 30 lb. per sq. in.



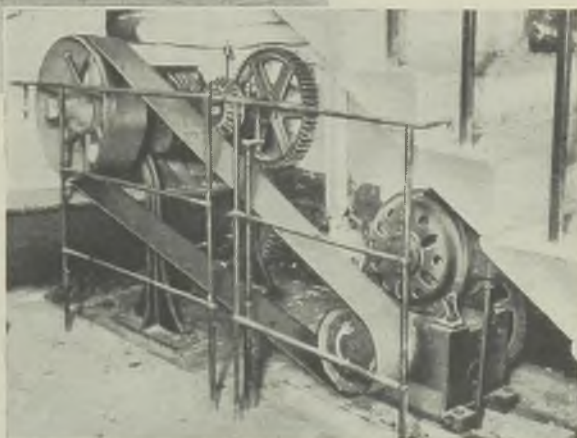
The turner on the kiln floor (left) travels transversely across the floor and the turning buckets revolve around it; the turner and the stripper are driven by a 12-HP motor (above)



Electricity generation is at 400 V, 3-phase, at which voltage the supply is distributed throughout the brewery for power, the lighting supply being split for 200-V, phase-to-neutral distribution. The main distribution is by a simple open-type switchboard which is equipped for Tirrill voltage regulation.

Added interest is given to our references to the electrical equipment in the brewery proper by the following outline of the actual brewing processes. Selected drives only are dealt with, but all the equipment is electrically driven. The generating plant is run during the normal working hours; at night, mainly for lighting, the installation is switched on to public supply.

Barley is, of course, the main raw material, and this is passed through a screening (barley dressing) machine which is driven by



Malt is fed to the grinding mill by a screw conveyor driven by a 5-HP geared motor

a 4-HP 1,440-RPM squirrel-cage motor, which also serves the fan of dust-collecting equipment, transmission being by belt with a four-to-one reduction ratio. From the screens the barley is taken by a screw conveyor to a small hopper from which it is sucked up to a

receiver at the top of the malt kiln and from there drops into a weighing machine. It then falls into various mains in which its flow is controlled by means of butterfly valves, and it then passes into storage bins after first being dried in a revolving drum about 10 ft. long and 8 ft. in diameter. The necessary suction and blowing for these operations are effected by a vacuum pump and a compressor, which are group driven by a 44-HP 750-RPM slip-ring motor with belt transmission on a two-to-one speed reduction ratio. The revolving drum is driven by a $1\frac{1}{2}$ -HP 1,440/118-RPM geared squirrel-cage motor with belt transmission giving a 6-to-1 reduction.

From the storage bins the barley is passed on to the steeping cisterns by means of the vacuum pump and blower (compressor) already referred to. The water in the cisterns is changed a few times during

machine. The turner on each kiln floor consists of a long shaft right across the kiln, which travels along the kiln on rails and rollers. Around the shaft revolve buckets which turn the malt over to ensure even distribution of the heat. As the turner moves forward it engages with racks at the sides of the rails by which the revolving motion is imparted to the buckets. A 12-HP 950-RPM slip-ring motor has two-to-one belt transmission to a countershaft which serves the stripper, and there is secondary belt transmission to another countershaft which serves the kiln turner. This motor also drives the bucket elevator. The malt is stripped into a hopper from which it is passed on to another dressing machine before being sacked or conveyed to gins.

When required for brewing the malt is shot into a hopper from which it is fed by a screw conveyor up to the grinding mill, where it is crushed by rolls and conveyed into the grist cases ready for mashing. The screw conveyor is driven by a 5-HP 950/120-RPM squirrel-cage geared motor with belt transmission on a three-to-one speed-reduction ratio. A 15-HP 1,000-RPM squirrel-cage motor drives the grist mill with four-to-one belt transmission, and the grist elevator is driven by a 4-HP 950/120-RPM squirrel-cage geared motor with two-to-one ratio belt transmission.

The material is now grist and hot liquor is mixed with it in the mash tuns by a Steele's mashing machine, which is driven by a 5-HP 1,440-RPM squirrel-cage motor on a five-to-one ratio belt transmission scheme. The wort (extract) from the mash tuns is drawn off to the brewing coppers, leaving behind the grains, which are disposed of as cattle food. Sugar and hops are introduced in the coppers and

the whole is boiled to attain the required gravity of the resultant beer, and to effect thorough sterilisation.

From the brewing coppers the beer is run into a hop-back which is equipped with finely-slotted plates on which the hops form a filter bed, which keeps the deposit back and lets the beer flow to a pump outside the refrigerating room. The liquid is passed over the refrigerators by this pump, which is directly coupled to a $2\frac{1}{2}$ -HP 950-RPM squirrel-cage motor, and when it is cooled to the required temperature in the air-conditioned refrigerating room it flows by gravitation to fermenting vessels where the yeast is added. The air-conditioning plant is served by a 3-HP 1,500-RPM squirrel-cage



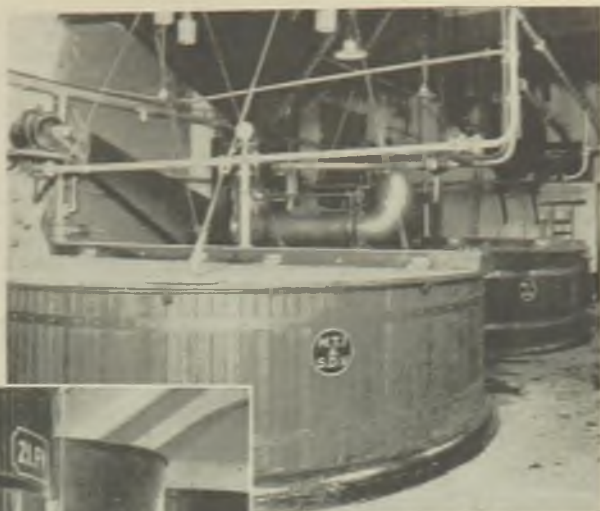
A 15-HP motor belt drives the grist mill

steeping and is aerated twice daily by a 50-lb. per sq. in. compressor driven by a $5\frac{1}{2}$ -HP 1,440-RPM slip-ring motor. After thorough cleaning in this way the barley is passed on to the malting floors where it is arranged in "pieces." Each piece is manually turned periodically to stimulate growth, and by the time it has covered the whole of the floor it is "green malt." This is then conveyed by a bucket elevator up to the kiln floors for drying and curing by means of mechanical turners.

When the maltster has decided that the green malt has attained the correct tint, the malt is stripped, *i.e.*, drawn over the floor for discharge by a wooden shovel controlled by a rope from the drum of the stripping

motor with vee-belt transmission giving a two-to-one reduction.

During the process of fermentation the beer is circulated at regular intervals by a $1\frac{1}{2}$ -HP 1,500-RPM squirrel-cage directly-coupled motor-driven pump, there being for this purpose one pump for two fermentation vessels. When fermentation is nearly finished the resultant crop of yeast is drawn off by a vacuum pump which is directly driven by a 10-HP 1,000-RPM slip-ring motor.



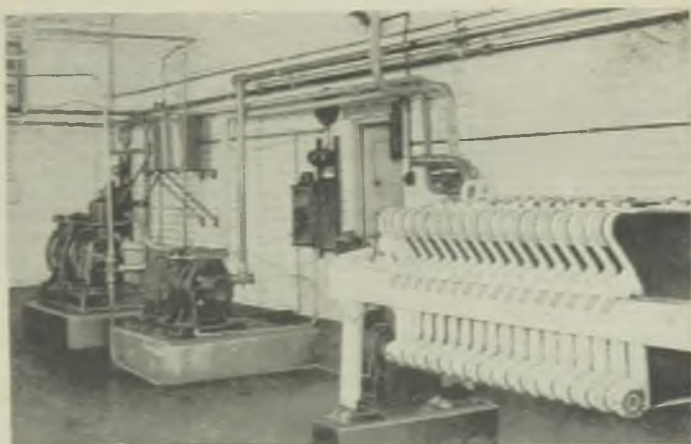
Above: Liquor is mixed with the grit in the machine tuns by a 5-HP motor-driven machine (above tuns)
Left: During fermentation the beer is circulated by $1\frac{1}{2}$ -HP directly motor-driven pumps



days, after which the beer is ready for racking, when it is allowed to gravitate through the racking machine into casks in which the sugar priming and finings are added. The beer is then put into the storage cellars to await delivery for consumption.

Water for cooling, etc., throughout the brewery is obtained from

The yeast is passed into aluminium receivers, leaving just a thin crust on top of the beer. From the receivers the yeast is compressed into cakes in filter presses by means of a 45-lb. per sq. in. air compressor directly driven by a 5-HP 375-RPM slip-ring motor. The beer extracted in the presses is returned to the same vessel from which it was extracted by means of the same air pressure. The period of fermentation is about six



The yeast is sucked into receivers by a 10-HP motor-driven vacuum pump and then compressed into cakes by a 5-HP motor-driven compressor

an artesian well on site by means of a submerged pump driven via an extended shaft by a 14-HP 1,500-RPM slip-ring vertical-spindle motor. The actual brewing water is collected in two underground tanks from the natural Horse Bank spring, and for circulation to the brewery it is fed into a dry well from which it is pumped by an 11-HP 1,500-RPM slip-ring vertically-disposed motor via an extended shaft into tanks on the top of the main brewery building. These main pumps and their motors are Mather & Platt machines and the motors, are

controlled by Allen West combined oil-immersed push-button stator contactor and rotor-resistance starters. The majority of the other motors throughout the brewery are Brook equipments, and the slip-ring units are controlled by Ellison air-break stator switch and rotor-resistance units. The larger squirrel-cage motors are each served by an isolating switch and a star-delta starter, while direct switching is employed for the smaller squirrel-cage motors. All the motor controls are equipped with no-volt and overload protection.

Consumers' Control Units

I.E.E. Discussion Continued

THE consumers' supply control unit of the future and its effect on the design of the electricity meter were debated in March by the Measurements Section of the Institution of Electrical Engineers. Lack of time then prevented the meter aspect of the subject (which had been introduced by MR. G. F. SHOTTER) from being adequately discussed. Accordingly the discussion was resumed at a further meeting, both openers being given an opportunity to recapitulate and amplify their original remarks. MR. C. W. HUGHES on the second occasion deputised for MR. E. FAWSETT who had previously introduced the control unit aspect of the subject.

Knowledge of Load Diversity Needed

Mr. Shotter pointed out that a difficulty which always presented itself was the choice of a watthour meter with a sufficient range to cover domestic loads of from a few watts to 25 kW with the specified accuracy throughout. Fuller knowledge of the load diversity of domestic supplies would be of advantage, not only for the correct choice of meter but also to permit a more scientific approach to the number of sizes required.

In all-electric houses high peak loads of short duration occurred. Apparatus, such as clocks, ran for 24 hours a day and refrigerators intermittently for the same period. It was in an endeavour to cover this wide range that the so-called long range meter was developed, and it was sometimes overlooked that the establishment of such a design might be the means of reducing the number of sizes required.

A considerable controversy had been occasioned by a B.S.S. covering two classes of meter, one with a nominal range of 25/1, or 5 to 125 per cent. and a long range meter with a 40/1 range or 5 to 200 per cent. In addition, meters were made in this country which had an accurate range of 5 to 300 per cent. or 60/1. The Americans were going even further with 5 to 400 per cent., or 80/1.

Experience indicated that a range of 25/1 was not sufficient to cater for normal domestic loads. The use of a meter with, say, a range up to 300 per cent. normal load not only gave more tolerance in the selection of the rating, but at the same time conduced to a more accurate registration of the lower loads.

If a long range meter was used the normal 2½-A instrument would allow peak loads up to 7½ A to be recorded. That size would seem to cover a large number of flats and cottages in rural areas where lighting, and perhaps an iron and a wireless set only were connected. Even if the industry considered this size unsuitable, there was no doubt that the 5-A long-range meter could not be dispensed with. Another difficulty was the prepayment meter when the capacity of the combined equipment was limited by that of the switch.

Mr. Hughes recapitulated the points raised by Mr. Fawsett and put forward certain others of his own for discussion.

Fitting in the Meter

Referring to the supply control units which had been shown on the previous occasion and to the additional ones now exhibited, he said it had been assumed in designing those units, which were intended for dwellings serving lower income groups, that the tariff would be such that only one meter would be required. The meter was the most awkward item to fit neatly into the assembly as at present there was no standard overall size, fixing centres, or terminal block dimensions. So far as quarterly meters were concerned, there were indications that the manufacturers were prepared to effect some measure of uniformity and it was essential that such standardisation as was applicable to the prepayment meter should follow.

The centres of the fixing holes should be fixed relative to each other; the terminal block should be standard and the same as that of quarterly meters; the position of the terminal block relative to the fixing centres

should be standard; the coin slot should be on the front of the meter and the maximum rectangular volume needed to contain any meter should be known. Without this information it was almost impossible to design a satisfactory consumers' control unit.

Silhouettes of the outlines of eleven modern prepayment meters were exhibited and it was shown that no two were the same shape, and very few were so shaped as to fit conveniently into a control unit. Dealing with three modern designs, he pointed out that in one case the prepayment mechanism was on the side and in the other it added to the height of the meter.

It was obviously impossible to design a consumer's unit which would readily take all the fixing centres shown on a diagram he exhibited, except by considerably increasing the cost or making the back of the unit of wood. If he had shown the relative positions of the terminal blocks with relation to the fixing centres, the complication would have made the diagram impossible to follow.

Suggesting that the complete prepayment meter case, including the coin box, should form a clean rectangle—with the prepayment mechanism above the meter proper; that the terminal block should be at the bottom of the meter in exactly the same position as on a quarterly meter, in relation to the meter mechanism; and that the coin slot should be on the front of the case with the coin knob recessed, he said he believed that all this could be done without in any way retarding progress.

Other Speakers' Views

Although the main object of the meeting was to discuss meter design, the whole subject of the consumers' supply unit again came under review.

There were decided views that units of the type which have been designed and were on view would not find favour in the ordinary house if they were to be placed in a prominent position for easy access. Suggestions were made that the units should be recessed in the walls in inconspicuous positions, and a unit (see *Electrical Review*, June 23rd, 1944, p. 894) with a clock at the top and a looking glass occupying the remainder of the outside cover of the unit was regarded favourably by one speaker.

While it was agreed that heretofore fuses and meters had usually been put in very inaccessible places it was felt that no violent swing to the other extreme was called for. If an attempt were made to put the various items of the unit in too small a compass, some limitation might be put on future development. There was general agreement that it was most desirable that the prepayment meter should be dispensed with altogether, though it was recognised that the time was not yet ripe for this.

A plea was made for this problem of meters to be considered from a national point of view, in relation to world markets after the war in order to meet competition and sell the best meter. Proposed standardisation should not concern itself with the internal mechanisms of meters.

Reports from large users all over the country showed general agreement with the proposal to reduce the number of different meter ratings and to indicate clearly on the meter the maximum load at which it could be used, dispensing with the present low rating marking which, it was said, was largely disregarded. If this were done, it was claimed that more efficient use would be made of the working range, which would automatically mean a reduction in the number of ratings. Researches into testing were urged as a necessary preliminary to the standardisation of meters. On the manufacturers' side, it was claimed that standards must start, not with the manufacturers, but with the tariff makers.

French Developments

Supply Companies' Reports

THE Swiss paper, *Journal de Geneve*, has published a detailed article describing how the principal French electricity enterprises are situated. It states that the *Energie Industrielle*, which comprises a large group of companies and has a capital of 500 million francs, is continuing work on a new hydraulic plant on the Cere River, on the upper Isère and on the Gave du Pau, all far removed from the din of battle at the moment. In order to facilitate the execution of these great works, the *Energie Industrielle* is amalgamating many of its affiliated concerns. All those situated in the Pyrenees, for example, are to be combined in one undertaking for the purpose of expediting expansion. It has also absorbed the *Société des Forces Motrices de la Savoie*.

The *Compagnie Parisienne de Distribution d'Electricité* has not been able to undertake any serious expansion owing to restrictions, and its activity, in the main, has been maintenance. Restrictions, have, of course, caused a great decrease in its sales of electricity. Consumption fell by 4 per cent. last year over 1942 and 13 per cent. over 1941. At a recent meeting the chairman said that the theft of electricity had grown to dangerous dimensions. He also said that after the war the company would have to undertake considerable reconstruction work.

At a meeting of the *Pechiney Company*, the chairman spoke of the importance of cheap energy after the war to enable the electro-metallurgical industries to compete with American, Canadian and German factories which, he expects, will prove redoubtable competitors. He then drew attention to the great expansion in electrical plant in France, mentioning new dams and power plants in the Pyrenees, the construction of a new dam at Castelnau in the Massif Central (this has temporarily been suspended) and the inauguration of new power lines by the *Société de Transport d'Energie Alpes-Durance*.

Permanent Magnets

Results of Recent Research into Alloys

THERE can be but few industries, estab-

lished for more than a century, with a product generally accepted as completely developed, which have suddenly blossomed forth by the application of research and increased the performance of their products by nearly twenty times in thirty-five years. This is, however, the position of the permanent magnet industry, in which progress

By Alun Edwards, B.Sc., Ph.D. "Magnet" published in 1600. During the whole of the next 300

years progress was slow. The surface finish of rolled bars improved, the consistency of composition of the steel became better, and magnetisation was carried out electrically instead of by stroking with lodestones. Otherwise the magnets were fundamentally the same as those made in Gilbert's day, and they were used for the same purposes, chiefly ship's compasses. A plain carbon steel was used, and magnets were heat-treated as tools but without being tempered.

At the close of the last century it became understood that the hardening properties of steel were due to the presence of iron carbide, and that other carbides existed which might have even greater hardening powers. Also, means were devised to measure the magnetic qualities of magnets and to compare the effects of various alloy additions. The introduction of a steel containing carbon and tungsten followed, but this was not extensively developed at the time, for the demand for permanent magnets was still quite small. A few steelmakers took up tungsten magnet steel as a side line.

At the same time the motor-car industry was growing, to be followed by the aircraft industry, both of which require high-tension magnetos. The production of these was at first mostly in the hands of German firms, who secured a definite lead over British manufacturers in the technique of tungsten magnet production. The position at the outbreak of the last war was serious. Resources were mobilised, and the permanent magnet makers never let the country down, although at one time supplies of tungsten were so short that when a consignment arrived it was collected from the railway by taxi and driven straight to the furnaces.

The position in Germany was even worse. They had no tungsten at all to spare, and were driven in desperation to find an *ersatz* material in chromium steel. This, although inferior to tungsten steel, was perfectly satisfactory if the magnets were made slightly larger to compensate for the difference, and it held its own after the war on the grounds of cheapness and freedom from cracking. No magnet alloy which has come into regular commercial production has ever completely disappeared, but has found its own sphere of



Fig. 1.—Magnetic separator drum, 30 in. by 20 in. diameter, giving performance equivalent to that of an electro-magnetic drum of the same size

has been so rapid that text-books have been left behind. Many electrical engineers do not realise the power and reliability of modern permanent magnets, which each year enter fields formerly the exclusive province of the electromagnet. The large magnetic separator drum, 30 in. long by 20 in. diameter, shown in Fig. 1, is energised entirely by permanent magnets and gives a performance equivalent to an electromagnetic drum of the same size.

The method of making permanent magnets which has been practised for three centuries is described (in Latin) in Gilbert's "De

usefulness, depending on the relative importance of the three factors—performance, cost, and weight. Even plain carbon steel is still used for a few applications.

In order to secure uniformity of production, it was found necessary to measure the complete demagnetisation curve of each magnet, a procedure which is still followed to-day. Normally this test would take several hours, but special workshop testers were devised to do it in minutes, making possible the acceptance or rejection of magnets on a proper basis of measurement. This form of test also indicates how heat-treatment should be modified to deal with slight variations in steel composition; consequently the magnetic tolerance limits may be kept quite narrow.

After the war, a number of firms were left in the trade with experience of making finished magnets and a number of others who made magnet steels. It is not many years since the sales literature of several firms, and those by no means the least in the magnet industry, consisted of a table of stock bar sizes, a price list of extras for rolling to special sizes and some heat-treatment instructions. The customer was expected to forge and machine his own magnets and to heat-treat and test them. He had to design the magnet according to such knowledge or guesswork as might be at his disposal, and the steelmaker furnished the bars for the magnets without knowing very much about the purposes for which they were to be used.

The next advance came from abroad. A scheme of research in Japan produced the cobalt steels, which are fundamentally chromium magnet steels, with a matrix of ferro-cobalt instead of iron. The properties depended on the proportion of cobalt; each manufacturer was at liberty to decide how much cobalt he would use, and in the absence of a standardised range of alloys it appeared as though chaos might reign; the need for co-ordination within the industry became more evident every day.

The Cobalt Magnet Association (now the Permanent Magnet Association) came

into being in order to maintain reasonable price levels and to prevent the possibility of uncontrolled competition leading to ever lower standards of manufacture. It standardised five cobalt steels, containing respectively 3, 6, 9, 15 and 35 per cent. cobalt; these are adequate for all reasonable requirements and have remained standards to this day.

Cobalt alloys did not retain their lead for very long. Iron-nickel-aluminium, or Alni, alloys soon appeared, and their characteristics necessitated a complete re-orientation of the industry. Designs, methods of production, everything was changed. Ingot moulds had to give way to sand castings, forging presses to grinding machines. The united industry was able to acquire the rights to make the new alloy and, which is more significant still, was able to guide and advise customers in its proper use.

The P.M.A. was determined that the next advance should come from Sheffield. It was not long in coming. The discovery of Alnico gave us a material capable of eight times the energy of carbon steel. It has additional valuable properties, including extreme resistance to magnetic decay under conditions of heat, vibration, and demagnetising fields. Another advantage is

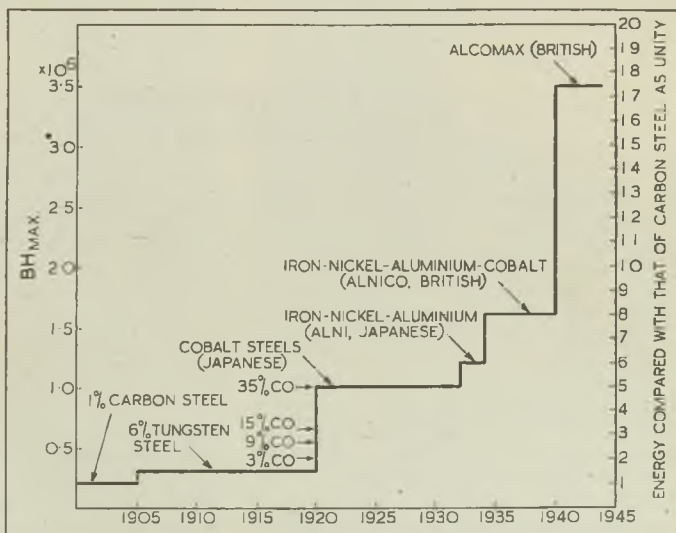


Fig. 2.—Energies of various magnet alloys

that a higher energy material allows the use of a smaller magnet with smaller leakage surface, and consequently the efficiency of the magnet is increased even more than the energy increase would suggest.

The research of the P.M.A. up to this date had been of a severely practical character,

chiefly investigation of new magnet designs and alloy researches of the type that had produced Alnico, but with a wider outlook we began to support more fundamental research. Sir Laurence Bragg, Dr. Bradley, and their co-workers at the Cavendish Laboratory and elsewhere were encouraged to carry out a complete X-ray examination of the iron-nickel-aluminium-copper system. The methods developed by this school of research have proved to be the most rapid way of determining the structures of an alloy system and discovering phases which might be missed by the alternative methods of micro-examination and thermal analysis. From the magnetic point of view, it has been shown that Fe_2NiAl , which is the basis of Alni, splits up on cooling into two body-centred structures, one of which is practically pure iron, the other having approximately equal atomic proportions of iron, nickel and aluminium. It so happens that although these two structures are so different in composition, their lattice spacings are almost identical, with just sufficient difference to produce a condition of great strain in the heat-treated alloy, which is the cause of its high energy and coercive.

An even greater advance was made possible by P.M.A. research in 1938. If a cube of permanent-magnet material is tested in the three main directions it is found to

be isotropic, that is, the magnetic properties along each of the three axes are equal. Only one of these axes is used when the magnet is magnetised, and the properties in the other two directions are wasted. It has been found possible, by heat-treatment in a strong magnetic field, to increase very greatly the magnetic properties along one preferred axis, at the expense of the other two axes which are not used. The P.M.A. anisotropic alloy is known as Alcomax and is capable of more than twice the energy of Alnico. Its discovery opens up great possibilities and, now that the practical difficulties of production have been overcome, its use is rapidly extending.

The chief difficulty in pursuing an extensive research programme is the ever-present preoccupation with day-to-day problems, and, in order to supplement the work which is carried out by members themselves, the P.M.A. has equipped its own research laboratory, in which a considerable amount of alloy research is being carried on. This co-operative research is at present being extended. In addition, research is being carried out on the design of magnets and their conditions of operation.

Finally, there is a long-term project of fundamental research into the manifestation of permanent magnetic properties by certain groups of alloys.

Use of Land

Acquisition, Compensation and Betterment Charges

LAST week the text was issued of the Government's Town and Country Planning Bill and at the same time proposals on compensation and betterment were published as a White Paper (Cmd. 6537, Stationery Office, 3d.). Briefly, the Bill empowers Local Planning Authorities to acquire, by a simplified and expedited procedure, land in war damaged, as well as land required for re-development and planning. It also amends the law relating to compensation for the acquisition of land for public purposes.

Sections 28 to 31 modify certain existing provisions of the Town and Country Planning Acts in respect of statutory undertakings. (i) If such an undertaking appeals, during the interim period before a planning scheme has become operative, against a decision by a Local Planning Authority upon its application for permission to develop land, its appeal will in future be considered not only by the Minister of Town and Country Planning (as under the present law) but also by the Government Department specially concerned, in the case of electricity supply undertakings, the Electricity Commissioners; and any Order resulting from that joint Consideration will be subject to Parliamentary review. (ii) A similar procedure will apply to the revocation or modification of a consent given to a statutory undertaker to develop land. (iii) The Bill places a five-year time limit on the powers of a Local Planning

Authority to postpone consideration of a development for which a statutory undertaker has sought consent; and the undertaker may require the power of postponement to be exercised jointly by the Minister and the appropriate Department instead of by the Local Planning Authority. (iv) The provisions for compensation to statutory undertakers provided in the Bill are made applicable to the cases described in (i) and (ii) above. (v) At the instance of the statutory undertaker, refusal of permission for development (or conditions imposed upon it) will be brought before Parliament in a Provisional Order.

In the White Paper the Government accepts in principle the recommendations of the Uthwatt Committee regarding the public acquisition of land in areas requiring development as a whole and provisions for the purpose are included in the Town and Country Planning Bill. The Committees' proposals for dealing with the problems of compensation and betterment are, however, considered to be hedged about with serious practical difficulties.

An alternative scheme is proposed by which the payment of compensation and the collection of charges upon "betterment" (i.e., enhanced value of land due to public improvements) would be centralised in a Land Commission. The aim is to secure a balance between compensation and betterment over a reasonable period of years.

Organisations of the Industry—II

Incorporated Municipal Electrical Association

THE idea of a Municipal Electrical Association was put forward

by Mr. J. H. Rider at a meeting of municipal electrical engineers in July, 1895, when a committee was appointed to draw up a constitution. Originally, membership was confined to municipal engineers and an executive committee was formed consisting of Mr. Arthur Wright (president), Messrs. W. H. Arnott and C. H. Wordingham (vice-presidents) and Messrs. C. S. Vesey-Brown, Albert Gray, John Hesketh, A. B. Mountain, H. Faraday Proctor, J. H. Rider and W. L. Madgen (hon. secretary). Members of municipal electricity committees were invited to the first annual convention in 1896 and later were admitted to membership. Assistant engineers were able to become associates. The objects of the Association were, *inter alia*, to promote the interests of municipal electricity undertakings and to that end to bring municipal electrical engineers into relationship one with another.

The Association was incorporated in 1901. Owing to its rapid growth, the necessity arose for a reconstruction of the constitution, and the membership was reconstituted in three classes: (a) members; (b) honorary members; and (c) associated members. The "members" are local authorities owning electricity undertakings. Honorary members are elected by the Association as an acknowledgment of the services which they have rendered as officers or members of the Council. Associated members are elected by the Council. These are persons who are or have been chief electrical engineers. Each member, *i.e.* the local authority, nominates and is represented by, a member of its electricity committee and its chief electrical engineer.

It is difficult to enumerate the many objects of the Association, but the following gives some indication of its powers:—

To promote the interests of municipal electricity undertakings and to bring municipal electrical engineers and chairmen and members of municipal electricity committees together. This is achieved by holding

periodical meetings for the discussion of subjects germane to municipal electricity undertakings.

To take such action as is lawful and expedient for the protection and defence of the rights or interests of municipal electricity undertakings, including the promotion or support of, or opposition to, legislative and other measures likely to affect them.

To establish a reading room, library and collection for purposes of research and for supplying information on electrical matters and to print and publish from time to time papers especially prepared for the Association, and any records, abstracts, etc., relating to electricity or allied undertakings.

To undertake such independent investigations and tests of materials, methods, and appliances as may be considered advisable, and to issue certificates of such tests and to accept fees or remuneration for these or other services, and to retain skilled advisers when it is desired to have independent legal, engineering or other advice.

The powers of the Association also extend to the purchase or leasing of land and buildings, etc., which it can re-sell or sub-let if it desires. For this and other purposes it may borrow or raise money by the issue of or upon bonds, debentures, bills of exchange, promissory notes or other obligations or securities of the Association.

Membership and Management

The Association is empowered to admit any persons whether eligible for membership or not to be honorary members on such terms and to confer on them such rights and privileges as may seem expedient. The membership is now 348; this is equivalent to 95 per cent. of the municipal electricity undertakings in Great Britain.

The Association is managed by a Council of 41 members, consisting of a president, vice-president, immediate past-president, an

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Mr. W. P. Lilwall,
President



Mr. J. W. Simpson,
Secretary

honorary treasurer, an honorary secretary and 36 other members. Seven of these members directly represent the seven Centres of the Association, viz. the Mid-East England, South-East and East England, North-East England, Central England, North-West England and North Wales, Scottish, and the South-West England and South Wales Centres. Since the inception of the Association it has been customary for the president to be a chief electrical engineer, also the vice-president. Provision, however, has since been made for a local authority representative to be elected as vice-president every third year. In the case of ordinary members the period of service on the Council is three years, and a third of the members retire each year and are eligible for re-election.

There are a number of standing committees and sub-committees. During the present emergency the normal functions of the Association have given way to matters connected with, and arising out of, the war. There are also a number of joint committees with kindred associations and the I.M.E.A. is represented on a large number of bodies connected with the electrical industry. It is recognised as the medium between the Electricity Commissioners, the Central Electricity Board and Government Departments and municipal electricity undertakings.

Benefits of Co-operation

The Association believes in close co-operation with other sections of the industry, and to this end (as mentioned above) has been instrumental in establishing joint committees whereby numerous matters may be discussed with the frankness which the subject deserves. It is not too much to say that great mutual benefit has been derived from this co-operation, and the Association hopes to continue its efforts in this direction. Joint committees have been formed with the B.E.A.M.A., the Institute of Municipal Treasurers and Accountants, the E.L.M.A., etc. The Association also confers with the E.A.W. and is always willing to lend a helping hand in its work.

It is impossible to give in an article such as this even a slight insight into the work of the Association, and it would be difficult to refer to any particular aspect, as in so doing one might inadvertently give a totally wrong impression. Suffice it to say that the work of the Association in the past few years has grown in strength and importance.

It is a noteworthy fact that a number of past-presidents of the Association are holding or have held, important positions with the Electricity Commissioners and the Central Electricity Board.

In conclusion, reference must be made to the annual convention of the Association. From its inception this has been one of the most important of the Association's activities.

The first one, held in London and Brighton, was very successful and each succeeding convention has repeated this success and added to the Association's prestige. It is hoped that immediately on the conclusion of hostilities arrangements will at once be made to hold a convention and so regain the opportunity of personal contact which is essential to all concerned.

The Association is at the present time giving a great deal of consideration to the question of post-war planning, and it is still unanimously of the opinion that wherever practicable the preservation of the individual identity of existing municipal undertakings should be retained and extended.

The Association uses its best endeavours to give good service to its members and to the industry as a whole. Nine years ago a Journal was introduced and is issued monthly; in this members are kept informed of matters affecting the supply industry.

South African Notes

From Our Cape Town Correspondent

WHAT is described as the first stage of an entirely new power station for Bulawayo, Southern Rhodesia, is contemplated by a decision taken at a recent special meeting of the City Council to borrow when required a sum not exceeding £500,000 for the purpose. It was stated that there had been negotiations with Great Britain to ensure that such requirements for use during the years 1947, 1948 and 1949 should be given their proper place in the manufacturing programme. Of an estimated expenditure of £475,000, about £325,000 was in respect of the supply and erection of a 15,000-kW turbo-alternator and three boilers. These figures were based on present-day costs and the contractors would provide for a fall in the price of labour, raw materials, etc., to be reflected in the final price.

The city electrical engineer said that the plant it was proposed to order would constitute the first stage of an entirely new power station on the Thirteenth Avenue side of the present power station, the existing one being quite incapable of further extension. He said that the 15,000-kW turbo-alternator and boilers would, when installed as the first stage of the new power station, be operated at full load, which, of course, was the most economic one.

In the power supply section of the South African electrical industry considerable developments are anticipated after the war, but for the manufacturing industry that has been developed during the war the outlook is not so bright. It is said that in so far as some sections of war production are concerned, the labour position is such as will permit a contraction without very serious difficulties. None the less there will probably be a large surplus of productive labour, machinery and other fixed capital which cannot hope to find employment unless there is a future for post-war electrical manufacture in South Africa. Many of the electrical materials now made in South Africa, however, can be imported at a lower price and in better quality in normal times.

PERSONAL and SOCIAL

News of Men and Women of the Industry

A TRIBUTE to Mr. C. W. Salt, city electrical engineer of Carlisle who, as announced last week, is to retire shortly, was paid at a meeting of the City Council. Alderman J. R. Potts, chairman of the Electricity Committee, said that much of the success attained by the electricity undertaking had been due to Mr. Salt's foresight and skill in management during his twenty-five years with the department. The Council is advertising for a successor to Mr. Salt. The scale salary for the post is £1,800 per annum but, in accordance with Clause 10 of the agreement, the commencing figure will be 85 per cent. of this.

I.E.E. Students' Premiums.—The Council of the Institution of Electrical Engineers has awarded the following premiums for students' papers for the session 1943-44 (Value £10): Messrs. J. D. McNeil, B.Sc. (Eng.), B. J. Prigmore, B.A., G. T. Shears, and J. F. Stirling, B.Sc. (Value £5): Messrs. F. Ashworth, B.Sc. and E. D. Taylor, B.Sc., L. C. Hall, D. H. Ray, and J. H. H. Teece, B.Sc. (Eng.).

Mr. A. Rees, chief assistant (generation) with the Swansea Electricity Department, is to retire in December next and it has been decided to advertise for a successor at a salary of £802, rising to £842. Consideration of the appointment of a boiler-house superintendent and certain salary increases under the scheme of reorganisation for the staff at Tir John has been deferred by the Finance Committee pending the circulation among members of a detailed report by the borough electrical engineer (Mr. H. E. Blackiston).

Mr. C. A. Stephens has been appointed a director of A. Reyrolle & Co., Ltd. He is acting works manager and has been with the company for over twenty-two years.

Miss Caroline Haslett, C.B.E., Director of the Electrical Association for Women, has recently left this country on a Government-sponsored

Manager as the Link between the Inventor, the Skilled Workman and the General Public."

Mr. Norman Jones, A.M.I.E.E., A.I.Mech.E., who has been on the technical staff of the Ashton-under-Lyne Electricity Department since 1939, has been appointed chief engineer. Mr.

Jones, who is thirty-six, obtained his technical education at the Manchester College of Technology (of which he is an associate) and received practical training with the Rochdale Corporation Electricity Department, under the late Mr. F. H. Rudd, then borough electrical engineer. He held a number of posts on the engineering staff of this undertaking before going to Ashton.

The position of chief engineer at Ashton has been vacant since the appointment of Mr. P. Bregazzi as chief engineer and manager at St. Helens.

The East Grinstead Urban District Council is advertising for an electrical engineer (temporary wartime appointment) to fill the vacancy caused by the recent death of Mr. J. B. Morgan. A salary of £600 per annum is offered.

Miss Elizabeth Macdonald, secretary of the Engineering & Lighting Equipment Co., Ltd., has been appointed a director of the company. She will continue to act as secretary.

In 1938, Lancashire Dynamo & Crypto, Ltd., in common with other industrial concerns, considered it desirable to proceed with Civil Defence organisations. As part of this scheme, an ambulance brigade

was formed, recruited from both male and female members of the staff and works, who have been trained to a high state of efficiency. Many of the members hold the St. John medallion, whilst the remainder possess either the voucher or certificate as a result of examinations. The photograph shows the ambulance team at the Trafford Park works as it exists to-day, with the doctor and superintendent of the St. John Ambulance Brigade who were responsible for the special

training. Also in the picture is Mr. J. H. Dunbar, works director and head of the Civil Defence organisation at the Trafford Park works. It is hoped that this team will ultimately form the nucleus of a permanent brigade after the war.

At the recent annual Convention of the Association of Municipal Electricity Unde-



Mr. Norman Jones



The Lancashire Dynamo & Crypto Ambulance Brigade

mission to Canada and the United States. Before leaving, Miss Haslett had the honour of being received by the Queen.

The Council of the Institution of Factory Managers has awarded the Sir Henry Fildes Medal for 1943 to Mr. David H. Cairns, of Perth, for his essay on "The Scope of the Factory

takings of South Africa and Rhodesia, Mr. A. T. Rodwell, general manager of the Johannesburg Electricity Department, was elected president for the ensuing year, and Mr. J. S. Clinton (Salisbury) was re-elected vice-president.

Mr. W. E. Crawley, has retired after more than fifty-two years' service with Ferranti, Ltd.; he was engaged by Mr. C. P. Sparks in 1892, when the company was in Charterhouse Square.



Mr. W. E. Crawley

Shortly after the establishment of the works at Hollinwood, Mr. Crawley went there in 1898, and was occupied for some fifteen years on meter development problems. It was in 1913 that he commenced his interests in meter sales, which, during the past thirty years, have made for him a very wide circle of friends, not only in this country, but in South America and on the Continent. For the past twenty-five years he has been responsible for the sale of Ferranti meters in the Southern Counties. He reached retiring age in 1940, but he carried on with his duties and the occasion was marked by a presentation from the directors and staff of the company.

It is of interest to recall that Mrs. Crawley, too, was a member of the Ferranti staff at Charterhouse Square, and they were married on Mr. Crawley's transfer to Hollinwood. Their many friends will wish them both long years of happy retirement.

Mr. James Gray has joined the board of the Decca Record Co. and will be in charge of the company's export and overseas interests. Mr. H. F. Schwarz, who has been in charge of radio production for many years, has also been appointed to the board.

The Croydon Electricity Committee has appointed Mr. L. Fisher, technical assistant and deputy mains engineer, Cheltenham Electricity Department, as distribution superintendent.

We reproduce herewith a portrait of Mr. Arthur E. Skan, who, as we reported in our last week's issue, has been appointed to the boards of George Ellison, Ltd., and Tufnol, Ltd. Mr. Skan has been connected with the Ellison organisation for the past twenty-five years. During the latter part of this period he has held a senior executive position in Tufnol, Ltd. (formerly Ellison Insulations, Ltd.).

The Ottawa correspondent of *The Times* reports that Senator Bouchard has been relieved by the Premier of Quebec of his duties as chairman of the recently constituted Quebec Hydro-Electric Commission. It is believed that the Premier's action is due to a speech recently made in the Senate by Mr. Bouchard.



Mr. A. E. Skan

Mr. F. W. Hartree, foreman wireman, who has been in the service of the Hammersmith Borough Council for forty years has retired on superannuation. A presentation was recently made to him by Mr. J. R. Jones, the chief electrical engineer.

Mr. G. Shaw Scott is retiring from the position of secretary of the Institute of Metals as from to-day (June 30th). He is succeeded by Mr. K. Headlam-Morley, who is to continue as secretary of the Iron & Steel Institute.

Obituary

Mr. E. B. Ball.—The death occurred on June 17th, of Mr. Edmund Bruce Ball, managing director of Glenfield & Kennedy, Ltd. Mr. Ball, who was born in Norfolk, received his technical training in Manchester. After being with Reavell & Co., Ltd., and then spending some years abroad as a commercial representative of British engineering firms, he became works manager of D. Napier & Sons, Ltd. He had been managing director of Glenfield & Kennedy since 1918. In 1939-40 Mr. Ball was president of the Institution of Mechanical Engineers.

Mr. H. Marryat.—We report with deep regret the sudden death on June 22nd, of Mr. Howard Marryat, chairman of Marryat & Place, Ltd., Marryat & Scott, Ltd., Dewhurst & Partner, Ltd., John Bennie, Ltd., and Claude - General Neon Lights, Ltd., and one of the best-known and most esteemed figures in the electrical contracting industry.

Mr. Marryat was born in 1871 and in 1887 was apprenticed to Ronald A. Scott, of Acton. Four years later he commenced business on his own account and, among other work, installed the first motor directly coupled to a printing press, at the works of Hazell, Watson & Viney. He took an active part in the foundation of the Electrical Contractors' Association and maintained his interest in the Association to the last. He was president in 1922-3 and 1934-5 and edited the Association's journal for twenty-five years.

Mr. Marryat was also a worker in the cause of electrical benevolence. He had been chairman of the E.I.B.A. and was a member of the committee formed by Mr. Frank Parkinson in 1937 to investigate the requirements of the electrical industry in all matters concerning the prevention and alleviation of distress. He was a member of the Institutions of Electrical and Mechanical Engineers and served for many years on the I.E.E. Wiring Rules Committee. Last year he read a paper which raised a great deal of discussion on "The Standardisation of Motor Dimensions." He was on his way to an I.E.E. meeting at Exeter when his death occurred.

Mr. Marryat's keen interest in the training and welfare of apprentices is well known in the industry. His own company's lads have secured a large majority of the E.C.A. apprentices' medals. In 1916, in co-operation with Dr. Laws, of the Northampton Polytechnic, he evolved a scheme whereby boys attended school



The late
Mr. H. Marryat

for two months and then spent one month at work throughout their apprenticeship period.

Apart from business affairs, Mr. Marryat was an enthusiastic student and collector of watches and possessed one of the finest collections in this country. Earlier this year he gave one of the "Friday afternoon discourses" on the subject at the Royal Institution when he exhibited a hundred or more of his watches.

One of Mr. Marryat's sons, Mr. John Marryat, is a lieutenant-commander in the R.N.V.R. and was awarded the D.S.C. in 1941. His other son, Robert, is carrying on in the business. His daughter is Mrs. Kent Harrison.

We extend our deepest sympathies to Mrs. Marryat and the family.

Mr. A. Bishop—We regret to report the death of Mr. A. Bishop, borough electrical engineer of Buxton since 1918. From 1902 to 1905 Mr. Bishop served as apprentice and improver to a firm of electrical engineers in Manchester.

In 1906 he was articulated as pupil to the Maidenhead borough electrical engineer, to whom he eventually became senior assistant.

When Mr. Bishop went to Buxton the generating plant was entirely steam driven and had been run at a loss since the station was first opened (May, 1900). Accordingly he prepared a scheme for introducing internal combustion engines using town's gas. The installation of the first gas set (1920) reduced the deficit to £1,547 by March, 1921, and by the end of 1923 a profit of £3,500 was realised: from that time onwards a profit has always been made. The introduction of Diesel oil engines in 1924 and 1926 produced greater economy still in working costs, with an average consumption 0.629 lb. per kWh. Under Mr. Bishop's leadership the number of consumers and the m.d. increased tenfold.

Mr. W. J. Marston.—We regret to record the death at Coventry recently at the age of sixty-two of Mr. William Joseph Marston, who in September, 1942, retired from the position of city electrical engineer. Mr. Marston first joined the Coventry Electricity Department at the age of sixteen. Later he was for a short period on the staff of the Eccles undertaking before returning to Coventry where he became deputy city electrical engineer and in 1930 he was appointed to the position of chief in succession to Mr. G. Tough.

Mr. W. H. Pomeroy.—The death has occurred at Newcastle-on-Tyne, of Mr. William Henry Pomeroy, chief electrical engineer at the Walker-on-Tyne Naval Yard of Vickers-Armstrongs, Ltd., and previously electrical engineer with Palmers (Hebburn) Co., Ltd. He was fifty-four.

Mr. P. S. Turner.—A memorial service was to be held at St. Michael's, Cornhill, yesterday (Thursday) for Mr. P. S. Turner, Associated Electrical Industries, Ltd., whose death was reported in last week's *Electrical Review*.

Will.—The late Brig.-Gen. Sir William Horwood, who was a director of a number of companies, including Philips Lamps, Ltd., left £20,559.

Parliamentary News

By Our Special Reporter

Standardisation of Supply

IN the House of Commons on June 20th, Mr. Bossom asked the Minister of Fuel and Power whether he intended to standardise the voltage of electricity throughout England and Wales after the war at, say, 230 volts; to convert all DC supplies to AC; and whether the Electricity Commissioners had estimated the approximate cost of unifying all the mains, transformers and other apparatus owned by all the various supply authorities to enable electricity supplied throughout England and Wales to be standardised at 230 volts AC.

Major Lloyd George said that in January, 1944, a committee of the Institution of Electrical Engineers published a report in which it estimated that on a pre-war basis the cost of standardising the voltages of alternating current consumers was £15,800,000; it gave no estimate of the cost of converting DC systems to AC. If only because of its financial implications he was unable to regard standardisation of voltages and supplies apart from the general question of the reorganisation of electricity supply, which was now receiving the active consideration of the Government. He was fully aware of the importance of carrying out the work of standardisation of the voltage of electricity supply at the earliest possible opportunity.

Mr. Bossom asked the Chancellor of the Exchequer if he would consider a grant to the various supply authorities covering the cost of standardising electricity supplies on the understanding that this would be repaid in due course under some agreed arrangement.

Sir John Anderson said that the financial aspects of the problem of standardising supplies of electricity could only be considered as part of the general question of the reorganisation of electricity supply.

Mr. Bossom asked if the Chancellor would keep in close contact with the Minister of Production as well as with the Minister of Fuel and Power in this connection. Sir John Anderson said that they were in consultation with these Ministers.

Agricultural Electricity

Colonel Clarke asked the Minister of Agriculture whether he had any plans whereby the agricultural industry might be encouraged to make a greater use of electricity for the provision of power and light on farmsteads and in agricultural dwellings.

Mr. T. Williams, who replied, said he presumed that Col. Clarke was referring to the post-war period. The possibility of the greater use of electricity on farm premises was a matter that would be considered in connection with post-war agricultural policy and was being taken into account in the active consideration which the Government was giving to the future organisation of the electricity supply industry generally.

Col. Clarke asked if the Minister appreciated what a difference it would make to the clean milk campaign if every cowshed had electricity to provide light and power for milking machines and things of that sort. Mr. Williams said that that point was fully appreciated.



The late
Mr. A. Bishop

CORRESPONDENCE

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

Electrical Terminology

I AM very pleased to see Dr. Hughes's general agreement with my article in your issue of June 2nd. The list of wrong terms I gave was not intended to be complete and the additions Dr. Hughes quotes are pertinent.

With regard to my use of the term "obsolete," this was deliberate, on the principle that only the agreed term should be used and all others avoided, whether specifically labelled "obsolete," "depreciated" or "alternative."

With Dr. Hughes, I hope that teachers will obtain personal copies of the relevant British Standards.

Bexley, Kent.

E. H. W. BANNER.

Electricity for Grain Drying

THE letter from the consumers' engineer of the Bedford Electricity Department raises a question which is receiving a considerable amount of attention by this undertaking at the present time.

There is no doubt that the ease and reliability of control of temperature which can be obtained by electrical heating methods is infinitely superior to that which can be attained when solid fuel is used. The one disadvantage is the considerably increased cost of the heating medium. Whilst this is partially off-set by reduced labour costs and a smaller risk of possible loss due to overheating, mentioned by Mr. Wild, it is obvious that if electric heating is to be developed for this purpose something more than the mere substitution of an electric heater for the usual coke furnace is necessary in order to reduce the heating costs. It is also essential that electricity should be offered for this purpose at a tariff which makes it commercially practicable.

This load, in general, only occurs in the summer although some re-drying is occasionally carried out in the winter. In spite of the very low annual load factor it appears that it is an economical proposition from the point of view of the undertaking to supply energy at the "unit" charge of the domestic or business tariff, providing that the load is kept off the undertaking's peak. Even so, more requires to be done and if any headway is to be made in electric drying it is essential that a drying equipment designed solely for electricity as the heating medium should be developed. From some preliminary investigations carried out in this undertaking, there is good reason to think that such a dryer can be designed which, in a size having

an output of two tons of dry grain per hour, will not have a maximum loading of more than 120 kW, which is about 60 per cent. of the loadings that have commonly been mentioned in connection with this problem.

There are three ways of carrying out electric drying which we are investigating, namely, by air heating, infra-red heating and radio-frequency heating. Many factors will need to be considered including consumption, capital costs, and the simplicity of control by the farmer or his staff. Further development can best be carried out by some body having adequate facilities and able to obtain the co-operation of manufacturers. For this reason I should like to support Mr. Wild's suggestion that this is a matter worthy of the attention of the Electrical Research Association.

Norwich.

A. W. ALLWOOD,

Technical assistant,

Corporation Electricity Dept.

Post-War Planning

FROM the spring of 1940 up to the present time, there have been attempts by various sections of the electrical industry to form associations, groups, call them what you will, of firms or individuals interested in the marketing of electrical plant and materials in the immediate post-war period. Such planning is no doubt both necessary and desirable, but I have noted with great regret that many of the proposals have not made any avowed provision for safeguarding the interests of men who are now serving in the forces or who have been taken from their normal peacetime business and directed into other work of greater national importance.

The motivating force, in many cases, appears to be either the consolidation of the position which certain firms have achieved during the war, or the desire to be first in the field when hostilities cease. Established interests are no doubt well able to take care of their own prospects, but it seems to me that many of our "planners" in the electrical industry are paying little attention to the just claims of those members of the industry who, through the war, are not able to take advantage of present circumstances.

May I suggest that anyone who is invited to support one of these schemes, shall ask himself "How would the operation of this plan effect the man who has to re-establish himself after the war?" and if the answer is, that such a man would suffer, then the proposal should be opposed by all legitimate means. I feel strongly on this matter as I happen to be one of those who had to travel

the long and often bitter road a generation ago which led from demobilisation.

By virtue of their specialised training and value to industry, electrical workers (apart from volunteers) are not called upon in great numbers to bear arms in time of war. This possibly accounts for the claims of the Service man being overlooked by some post-war planners who themselves have not experienced the benefits and penalties of serving in His Majesty's Forces, but in my view, this makes it all the more important that these claims should not only be met, but anticipated.

Finchley, N.3.

W. E. LAWTON.

Power Point Positions

BECAUSE I fully appreciate the value of the space devoted to correspondence in the *Electrical Review*, I propose to cease fire with this friendly shot towards Mr. and Mrs. A. Milne of Glasgow.

I suggest that they consider the use of a small round screwed hook located on the skirting board to act as an anchorage for the flexible which, of course, will still "decorate" the home and be a trap for the unwary, just as it is now with the plug in its present absurd location, namely some 4 in. off the floor.

The last sentence in Mr. Milne's letter on "Plugs and Sockets" in your issue of June 16th exactly expresses my point when I plead for the plugs to be 30 in. off the floor.

London, S.W.14.

D. P. WILSON.

Power-Factor Slide Rule

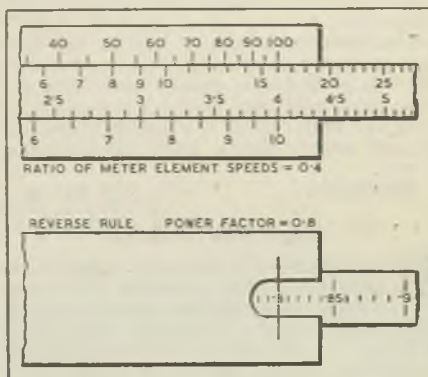
I WAS much interested in the special slide rule made by Mr. W. M. Gore as detailed in June 9th issue. However, it should be pointed out that the ratio of kVAR over kW can be instantly converted to power factor by the use of one's own ordinary slide rule, if one first marks the reverse side of the sliding portion of the rule as described below (the method of marking being carried out to suit the type of construction of the rule, either by lightly stamping such numbers as .9, .85, etc., with small nameplate stamps, or Indian ink).

All that is necessary is first to use the cosine or tan tables to mark the reverse side of the sliding rule with p.f. values to correspond to ratios of kVAR and kW, so that when scales C and D have been set in the usual way to the ratio desired, the rule is then turned over in the hand and the appropriate p.f. is read off the back of the sliding rule against a datum line which has been scribed at one end of the rule. Even if this face of the rule has been used for other values, there is usually ample space for the few extra numbers to be marked, and no need for confusion if such numbers are filled in with a coloured ink.

I suppose that, broadly speaking, power station men will prefer to use a rule based

on kVAR and kW readings, but mains and meter men may find greater use for markings based on the speeds of meter discs when the pressure coils are connected from red to yellow and from yellow to blue.

My rule is marked to show p.f. based on the ratio of meter element speeds when one



Ratio of meter element speeds = 0.4; reverse rule, power factor = 0.8

element of a polyphase meter varies with the other element with a change of p.f. At the point where one element reverses due to a system p.f. of less than 0.5 so also do the markings made upon the slide rule.

I would point out that both methods are equally fallacious when the load on the system or circuit measured is seriously unbalanced.

Watford, Herts. W. B. ASKEW, A.M.I.E.E.

Earth Connections

THE necessity for the utmost care in checking the connections to small electrical appliances is well illustrated by the following incident. A domestic installation connected to a 250-V AC supply included a cooker and kettle. The cooker appeared to be efficiently earthed, there being a substantial wire from the cooker frame to a nearby water main. The kettle was operated through a three-pin plug and three-core flexible, the third pin of the plug being connected to the cooker earth. When the consumer came to install a water softener, he cut the incoming water main and, whilst holding the two ends of the severed pipe, received an electric shock. This was fortunately no more serious than to cause a slight burn.

Subsequent investigations revealed that the earth connection was attached to the portion of water pipe made dead by the consumer's cutting the pipe. Also, when the shock was received the kettle had just been switched on. The kettle was, therefore, tested for insulation resistance and proved to be quite sound, but examination of the connections of the three-core flexible cable showed the neutral and

earth wires to be crossed (*i.e.*, the return wire from the kettle element was to earth, instead of being to the neutral of the supply).

It then became obvious that this cross-connection had been the cause of the shock to the man working on the water pipe, as when the kettle was connected whilst he was holding the two ends of the pipe, he completed the return circuit through his body.

The faulty connections had in this case been made by an amateur, but the moral of the tale is that one should never take the colours of multicore cables for granted, as these are only correct if correctly connected at *both ends*; always verify by inspection or test.

Scunthorpe.

H. PEACE.

Plugs and Sockets

MR. PALMER'S adverse criticism in your issue of June 16th of Mr. Illingworth's views on fuses appears to have been based upon a profound study of a girl's leg. If Mr. Palmer has the inclination, I think he should switch his studies from feminine curves to oscillogram curves, particularly those relating to the test performance of fuses. Study of these would not only bring to him enlightenment but would also do much to dispel his carefully nurtured theories of twenty-six years' standing.

The type of fuse to be installed for the protection of any circuit is dependent upon several factors, among which can be mentioned (a) the maximum fault kVA available, (b) the normal full load current, (c) the degree of overcurrent protection required, (d) the size of cable the fuse will be called upon to protect.

Consider how these factors apply to domestic installations. It is now generally agreed that the pre-war conceptions relating to the loading of flexibles do not conform to present-day lines of thought. In fact it has been demonstrated that domestic flexibles can carry substantial overloads without creating any detrimental effect upon the cable insulation. (For those who prefer definite fuse protection the 2, 5, 10 and 13-A pin fuses of the proposed new domestic standard fused plug and socket give ample selectivity from varying loads up to 3 kW.) It is also agreed that individual domestic appliances rarely break down through overload, therefore it is the factor (a)—fault kVA—that calls for careful consideration.

With a domestic installation one can safely assume that the maximum fault kVA, whether it be brought about by a fault on a clock circuit or on a hot-plate circuit, produces much the same value of fault current. The problem to be solved when fusing lightly loaded appliances is whether the performance of a 2-A fuse in these fault conditions is any

better than that of a 13-A fuse in the same conditions. The solution can only be found by a comparative study of the respective oscillogram curves giving the performance of each fuse when tested under these conditions. The prospective current and fault kVA would be constant, and it would be found that the difference in the times taken to clear the fault is negligible—in fact, a matter of some ten thousandths of a second.

Mr. Palmer's reference to the spluttering of molten metal, etc., and the consequent reduction of this with reduction in size of fuse is incorrect when the small size of domestic fuse is under consideration. The amount of metal melted is dependent upon the value of the fault current and its duration, and from the foregoing there would be little discernible difference in the amounts of molten metal produced.

I should have thought that Mr. Palmer's investigation of the case of the girl's singed leg would have been followed up by an even more careful examination of the installation earthing system. For the complete protection of the operator of portable appliances, etc., good earthing is even more important than good fusing.

London, S.E.3.

W. T. ANDREWS.

I HAVE been interested in reading the letters from Mr. Thomas Atherton, of Dorman & Smith, Ltd., and Mr. Robert Illingworth in reply to mine which appeared in your issue of May 26th.

I note what Mr. Atherton says about pin centres, dielectric requirements and convenience of wiring, but I am far from satisfied. Just as it is impossible to put a quart into a pint pot I still consider it impossible to get 15-A accommodation in a 2-A space. In spite of what Mr. Atherton says I do not believe the rubber bush is an effective cord grip and this belief is confirmed by engineers who have seen an "advance" model, or sample, of the plug.

With reference to my statement about the new plug not being wanted by the trade being quite untrue, as Mr. Atherton says, I can still say that I have not yet met anyone who has one word to say in favour of it. It is news to know that D. & S. have been inundated with orders and additional interesting news to know the new plugs are being installed in the "Poplar" kitchens. Mr. Atherton, in his last paragraph, appears to be quite nettled because I patented an open slot terminal twenty-five years before he thought of one. This information may be of some value to other manufacturers in spite of Mr. Atherton's solemn warning.

I do not agree with Mr. Robert Illingworth about my criticisms being premature when they were based on all the information that was available, the article not being obtainable, neither do I agree with him that my inter-

pretation is entirely wrong, as, since I wrote my last letter I have had reports from people who have seen one of the new plugs and they agree with me. In Mr. Illingworth's third paragraph he says plug capacity should be higher than 10 A, but that 15 A is too large and then talks about high priced articles. *Query*: What will the difference be between the manufacturing costs and selling prices of 13-A and 15-A plugs. Mr. Illingworth's practice of using only the maximum size of fuses confirms what I previously said would be done. No, Mr. Illingworth, I am not worried about flexibles; far too much fuss has been made about these in the past.

May I ask if the I.E.E. approves of these suggested ring mains in houses. Have all supply authorities agreed to this new method of wiring? Have new rules been drawn up to govern this suggested new type of installation? I am all out for electrical development, but I do want to see it on safe, sound and substantial lines with reliability on the upward grade even if the initial cost per house goes up one or two per cent. for the best accessories rather than worked down to a bazaar price, which will do no good to the trade and will inevitably bring its own troubles to the user of the equipment.

Broadford.

HARRY MOSS.

NEW BOOKS

Practical Electrical Wiring and Contracting. Edited by A. C. Greenwood. Pp. 384; figs. Odhams Press, Ltd., Long Acre, London, W.C.2. Price 8s. 6d.

This book purports to describe the best modern wiring systems for all types of buildings, the authors being practical electricians who themselves have carried out the work described. Wiring diagrams and illustrations are given of installation work, electrical accessories and equipment.

The opening chapter entitled "How Electricity Works" literally rockets the reader through the principles underlying generation, distribution and application of electrical energy. Supply distribution, wiring systems, practical wiring and repair work, testing and fault location, electrical apparatus and lighting equipment, and planning and contracting are dealt with in separate chapters.

From the data given it is apparent that the "Recommended War Emergency Relaxations" and the symbols as denoted in B.S.S. No. 447-1932 are not considered or complied with in this work. In good practice the use of elbows, split elbows and bends and outlet couplers as illustrated have long been discontinued and it is doubtful whether installation engineers would agree that the termination of conduits in bushes, the wiring being carried forward to the equipment unprotected, is desirable, as illustrated, for example, in Chapter 4 and Chapter 11 of the book.

The picture in Chapter 3 of a ceiling cord operated switch suspended directly over the bath is a most unsatisfactory arrangement. The statement that metal baths, water pipes, etc., in bathrooms require bonding to an earth lead requires amplification since this only arises when metal conduits and casings housing electrical cables and equipment are installed on the surface. Use of v.i.r. or t.r.s. cables in conduit buried in the ground for sub-feeders between buildings and garages can hardly be considered good practice and in the construction of substations one would expect effective provision to be made to carry away oil in the event of a fracture occurring in the transformer or switchgear casings.

Contractors will be interested in the concluding paragraph of the book where it is stated that, should the progress of work be going badly "it may be possible to remedy

the defect by replacing staff and expediting supplies." Generally the text lends itself to interesting the amateur and handyman and as such the value of this book to the general installation industry calls for most careful consideration.—J.F.

Apprenticeship for a Skilled Trade. By F. Twyman, F.Inst.P., F.R.S. 70 pp. Price 5s. Published by Chas. Griffin & Co.; obtainable from the author at 98, St. Pancras Way, Camden Road, N.W.1.

The author, who is managing director of Adam Hilger, Ltd., and chairman of the Technical Optics Advisory Committee for the Imperial College of Science and Technology, puts forward a scheme of apprenticeship for optical instrument making which he presented last December at a meeting of representatives of the L.C.C. Education Department, scientific instrument makers and trade unions.

Mr. Twyman, in dealing with the considerations on which the scheme is based, makes an interesting survey of origins, motives, laws and customs of apprenticeship. He will probably be considered "reactionary" in deprecating the raising of the school-leaving age, or rather the prevention of boys from entering industry at the age of fourteen, but he presents a reasonable argument for permitting boys who show "practical" aptitude to start their apprenticeship at that age.

A 16-page appendix on "Apprentices and the Law" by Henry Newcome Knight, LL.D. (Lond.), rounds off this readable study of a much-discussed subject. Another appendix sets out at length the form of indentures used for industrial apprenticeship by the Berlin Chamber of Industry and Commerce.—J.H.C.

Applied Electricity. By A. W. Hirst, M.Sc. (Eng.), M.I.E.E. Second edition. Pp. 367; illus. Blackie & Son, Ltd., 66, Chandos Place, W.C.2. Price 17s. 6d.

In this new edition material has been added to cover more adequately the electrical engineering syllabus of the Engineering Cadet Course. Considerable additions have been made to the chapters on AC circuits and transmission, distribution and utilisation. Two entirely new chapters are included on materials and elements of thermionics. A change has also been made in the method of representing vector quantities to conform to B.S.S. recommendations.—W.R.C.

COMMERCE and INDUSTRY

Leeds University Plans. South Wales Apprentices.

Luton Electrical Society

At a meeting at Luton last week, the Mayor, Ald. J. Burgoyne, presiding, it was decided to form a local Electrical Society. A resolution to this effect was proposed by Mr. Bruce Campbell, plant engineer, Vauxhall Motors, Ltd., and seconded by Mr. C. T. Mellings, borough electrical engineer, Luton. Mr. Mellings said he had been forcibly impressed with the potentialities of the Luton district. In its development electricity would play its part, and in looking forward to the electrification of the railway from London, he suggested that Luton might become an important centre for further education.

Supporting the proposal, Mr. E. Morgan, district secretary of the Electrical Trades Union, emphasised the large numbers of people who were directly employed in the electrical trades, and Mr. W. E. Park, principal of Luton Technical College, spoke of the many trades on which electricity impinged. Mr. A. F. Plummer, chairman of the Luton branch of the Electrical Contractors' Association, thought the formation of such a society was overdue.

It was decided that the society should be named the Luton Electrical Society and that membership should include people living outside Luton. Mr. C. T. Mellings, was elected chairman, Mr. B. Campbell, vice-chairman, Mr. W. G. Tildesley, hon. secretary, Mr. A. F. Plummer, hon. treasurer, and Messrs. W. E. Park, R. Connor, E. Morgan, T. G. Odell, C. Thompson and S. N. Farmer, were elected to the Committee.

Natural Lighting

The fourth of the series of Lighting Reconstruction Pamphlets issued by the Illuminating Engineering Society is now available (price 1s.) entitled "Natural Lighting." It deals with the assessment of daylight, the importance of the direction of light, and the essential characteristics of good natural lighting.

Future of Leeds University

A total expenditure of £2,800,000 is envisaged in a report approved last week by the Court of Leeds University which has been prepared for the University Grants Committee. Of this £140,000 will be required in the immediate post-war period to provide for arrears of maintenance, temporary accommodation for students, new buildings and hostels. The long-term expenditure will include £1,875,000 for new buildings and equipment and £785,000 for hostels.

Among the proposals are that degree courses should be extended from three to four years;

that a minimum sum of £20,000 per annum should be allocated to research; that new schools should be established; and that the salaries of the staff should be improved.

Apprentice Training in South Wales

Realising that the importance of electrical manufacturing development in South Wales depends largely on the training of apprenticeship labour, South Wales Switchgear, Ltd., has instituted at its works at Treforest a scheme for recruiting and training local boys as craftsmen



Apprentices working on switchboard assembly

and technical engineers. Giving us details of the scheme, Mr. A. J. Nicholas, general manager of the company, says that to obtain the right class of boy various secondary schools have been approached, through the Ministry of Labour. The selected boys take a practical training through the works and are permitted to serve in various sections of the factory to increase their general engineering knowledge.

After the factory training they qualify for the drawing office and for higher engineering positions. They are granted one day a week, with pay, to attend either the Cardiff Technical College or the School of Mines, Treforest, with the object of obtaining the Ordinary National Certificate and finally the Higher National Certificate in Electrical Engineering. There are already eighteen boys of school certificate standard undergoing this class of apprenticeship and those who have been in the firm's employ for about two years have already reached Ordinary National Certificate standard.

Boys who have not reached secondary school certificate standard are taken in as trade apprentices and receive training in any one section of the works to become assemblers, machinists, toolmakers, wiremen and testers. They are encouraged to attend evening classes and if they show promise can be transferred to

the indentured apprenticeship class. All boys are taken on a three months' probationary course. The company also proposes to hold classes during work hours of both a practical and theoretical value relative to switchgear. Mr. Nicholas believes that, given full encouragement, there is no reason why South Wales should not develop as a large engineering centre such as the North-West and the Midlands.

Institute of Fuel Students' Medal

To encourage the preparation of papers by students of fuel technology, the Council of the Institute of Fuel has decided to make an annual award of a medal, together with books and/or instruments to the value of £5. Student members of the Institute or students under twenty-five of any university or technical college in the United Kingdom are eligible to compete for the prize which will be awarded for the best paper dealing with some subject relating to the preparation or utilisation of fuel, or allied subjects. The student is left free to choose his own subject if he so desires but various subjects are suggested for his guidance. Papers submitted for this competition should be addressed to the Secretary, the Institute of Fuel, 30, Bramham Gardens, London, S.W.5.

Heating and Ventilating Engineers

The meeting of the Institution of Heating and Ventilating Engineers fixed for July 19th has been cancelled. On September 6th, in the Lecture Hall of the Institution of Mechanical Engineers at 6 p.m., a paper on "Unit Heaters" will be presented by Mr. G. L. Copping, and on September 20th Sir Alfred Egerton, M.A., F.R.S., is to submit a paper on "Trends in the Development of Heating Installations for Domestic Purposes."

Training for Foreign Trade

The School of Slavonic and East European Studies is arranging special part-time courses for training personnel for foreign trade. Business firms and others interested are invited to select personnel to attend these courses, which will be designed to give students a sound basis of knowledge of the spoken languages, together with some understanding of the cultural and economic background of the countries concerned. The languages for which provision will be made are Russian, Polish, Czechoslovak, Serbo-Croat, Bulgarian, Hungarian and Rumanian. Forms of enrolment and other particulars may be obtained from the secretary of the School, 15, Gordon Square, London, W.C.1.

Registration in British Columbia

Our Vancouver correspondent says that considerable progress has been made by the Vancouver Electrical Association in its endeavour to secure British Columbia legislation governing the licensing of electrical contractors. A draft of the proposed regulations has been submitted to interested parties.

The draft provides for the registration of all retail dealers who sell electrical supplies and appliances (other than lamps). This legislation is suggested for the purpose of control and inspection and would be granted on payment of a proposed annual fee of \$5. It is suggested that electrical contractors and repair shops should be licensed under two different classifica-

tions. Those receiving an "A" licence would be unlimited in their operations and would pay a \$25 licence fee. Those working under a "B" licence would pay a fee of \$10 and would be limited to the handling of general repairs and installations in unorganised territories not exceeding 250 V 100 A single phase. It is proposed that industries employing maintenance men should be licensed on payment of an annual fee of \$10.

A board of examiners consisting of five members would be appointed by the Government; the chairman would be the Chief Inspector of Electrical Energy, or an assistant appointed by him. The other members would comprise two electrical contractors and two journeymen.

It is proposed that all contractors who have been continuously in business for a period of three years shall be automatically granted a licence upon complying with certain conditions.

E.C.A. Year Book

In addition to containing a list of E.C.A. members, the war emergency supplement of the Electrical Contractors' Year Book for 1944 just published, gives details of the various agreements affecting the electrical contracting industry. It is obtainable from the Electrical Contractors' Association, Africa House, Kingsway, London, W.C.2, price 5s. (5s. 6d. post free).

Locomotive Braking

Very powerful electric locomotives are rare enough in this country to direct special attention to the paper contributed by Messrs. L. Lynes and A. W. Simmons to the Institution of Locomotive Engineers, which is concerned with braking trials carried out with five different kinds of train, ranging from an 80-wagon unbraked goods to a 16-coach vacuum-braked passenger train. Details of the locomotive (No. CC1) have not yet been revealed, but it was jointly designed by Messrs. O. V. Bulleid (chief mechanical engineer) and A. Raworth (chief electrical engineer) of the Southern Railway. It is equipped with straight air brakes for engine use only, an emergency air brake and an automatic combination for simultaneously vacuum braking hauled vehicles and air braking the engine.

Railway Radio Network

A complete radio network has been built up by British railways as a safeguard against a breakdown of other means of communication. For this system, 42 fixed radio stations and 40 mobile stations have been fully equipped.

South Africa Tariff Changes

Under amendments of the South African customs tariffs which came into force on March 20th, the intermediate duty on insulated electric cable and wire, flexible cord, is changed from 10s. per 100 lb. to 5 per cent. *ad valorem*, and the maximum duty from £1 per 100 lb. to 10 per cent. *ad valorem*. Tariffs on radio apparatus are also changed from a "number of values" to an *ad valorem* basis of charging ranging from 5 to 25 per cent.

Fluorescent Lighting in Canada

Mr. M. C. Lowe, administrator of capital equipment and electrical products for the War-time Prices and Trade Board, Canada, has

announced that the purchase and installation of new fluorescent lighting fixtures in manufacturing concerns, offices and classrooms no longer require purchasers' declarations or permits from the Board. Any other installations are subject to the administrator's approval.

Machining Light Alloys

Frequent requests for advice have caused the Birmingham Aluminium Castings (1903) Co., Ltd., Birmid Works, Dartmouth Road, Smethwick, Staffs, to publish a 26-page booklet (price 1s.) containing recommendations for machining light alloy castings. It is primarily intended to furnish general information for war workers who are not well acquainted with aluminium and magnesium. The booklet does not deal with highly specialised cases, being concerned with average shop jobs. The tables of cutting angles, speeds, feeds and cuts for turning are arranged for rapid reference to many classes of high alloys.

The Junior Institution

The Junior Institution of Engineers to-day celebrates its sixtieth anniversary, its president this year being Sir Maurice Denny, Bt., C.B.E., whose father was president of the institution in 1895-96. The Institution recently held a function at which a founder member, Mr. F. R. Taylor (elected 1884) was present, and also its first secretary, Mr. Walter T. Dunn. Membership has risen steadily and to-day it is over 1,600. The Institution is noted for the lively and informal discussion of the papers and lectures given at its weekly Friday evening meetings. During the past session more meetings were held than in any previous session.

Proposed Forty-hour Week

A circular has been sent to all affiliated unions by the Trades Union Congress asking that it shall be empowered to request the Government to introduce a Bill authorising the Minister of Labour to legalise agreements in all industries for the establishment of a forty-hour week as a maximum. Where an industry has no scheme, it is proposed that the Minister shall draft one and be given powers to enforce it if necessary.

Canteen Records Charge

Mr. Charles Wilkinson, assistant manager of the Helsby works of British Insulated Cables, Ltd., was fined £10 and ordered to pay £15 8s. costs at Frodsham, on June 21st, for failing to keep an accurate record showing meals and hot beverages served in the company's canteen and the stocks of rationed food held at certain periods. Defendant said he had been assistant manager for eight years and had been with the company for 37 years. He signed the papers as senior executive officer, but did not manage the canteen. There was a canteen manageress and two assistants for keeping records. It was impossible for him to check everything which he signed; he did not know the returns were inaccurate.

Auto-Electrical Technicians

The Association of Auto-Electrical Technicians, which was formed in 1932 as the Society of Automotive Electrical Engineers, informs us that after October 1st, admission will be by examination and existing members applying for

re-grading must take an examination for the next higher grade. The scope of the examination covers marine, automobile and aeronautical electrical engineering and sufficient choice of questions will be given in the examination for an expert to concentrate on his own speciality. The Secretary of the A.E.T. is Mr. C. C. Feldman, 19, Church Crescent, Whetstone, N.20.

Collapsible Tube Manufacturers' Association

We are informed that this Association has now been reorganised and incorporates the leading manufacturers of the country. The members' aims are said to be the attaining of a high standard of manufacturing efficiency, and the giving of the best possible service to all tube users. Advice or technical information will be freely given by individual members or by the Association's Technical Committee. The Secretary is Mr. W. E. Fitzhugh, National Bank House, 101, Baker Street, W.1. Telephone: WEL. 1727.

"Hiduminium" Applications

A new company, Hiduminium Applications, Ltd., the registration of which was reported in our issue of June 16th, page 861, has been formed by High Duty Alloys, Ltd., Reynolds Tube Co., Ltd., and Reynolds Rolling Mills, Ltd., to collaborate with designers and constructors in any industry to secure the best use of "Hiduminium" aluminium alloys. Further information may be obtained from the company's offices, 95, Farnham Road, Slough, Bucks.

Trade Announcements

The works and offices of Santon, Ltd., will be closed from July 8th, until the morning of July 17th. A small staff will be available to deal with urgent matters.

W. T. Henley's Telegraph Works Co., Ltd., are taking over the premises of their old agents, Witty & Wyatt (Cardiff), Ltd., who have gone into voluntary liquidation. The usual stocks will continue to be held at the premises (5, Burt Street, The Docks, Cardiff), and all Witty & Wyatt's old employees have been retained.

Changes of Name

The Tuskitube Manufacturing Co., Ltd., Hanwell, Middlesex, has changed its name to Telephones & Radio Coil Winding Co., Ltd.

Strong Electric Distributors, Ltd., have changed their name to Strong Electric Corporation (Great Britain) Ltd.

TRADE MARK APPLICATIONS

The following applications have been made for British trade marks. Objections may be made within a month from June 21st:—

Design. No. 627,918, Class 9. Electrical instruments and apparatus not included in other classes.—E.R.G. Resistors, Ltd., 1021a, Finchley Road, London, N.W.11.

ELECTRIC EEL (design). No. 627,900, Class 12. Electric industrial trucks.—Steel & Co., Ltd., 4, Dean's Yard, Westminster, S.W.1.

Mass Installation

Wartime Experience Applied to Post-War Housing

FOR some years after the war large numbers of houses will no doubt be built of brick and pre-cast

concrete with partitions of cellular material; timber will be employed only where it cannot be avoided. About four million new houses will be needed, and safety with speed and simplicity and economy in the use of essential materials will be the criteria of design. While some of the materials previously used for electrical installations may not be commercially obtainable in the early future or possibly will not again be required, the fullest use must be made of those that are available and suitable for their purpose.

Experience gained during the war will be applicable to many post-war conditions.

Thus problems encountered in electrifying huddled camps for 500 to 2,000 occupants are akin to those for supplying small villas in which the load requirements and social conditions are somewhat similar.

In the first place I would emphasise the value

of conferences with architects at the drawing-board stage. I have found them very ready to collaborate, even to the extent of modifying structural details so as to allow easier fixing of accessories; this entails no extra cost when dealt with early, and it has often considerably facilitated the task of the electrician. Such collaboration also has the great advantage of permitting the choice of the most suitable sites for substations and control rooms, thus making major economies possible.

Control gear should be of the simplest type. On the camp sites a fuse-switch to serve as an isolator under camp control, with high-rupturing-capacity fuses, which provide enough discrimination in protection, is ample for the purpose and avoids troubles often brought about by complicated mechanisms.

The use of unarmoured underground cables, p.i.l.c. and s, made to B.S.S. 480, have proved quite satisfactory, subject to the adoption of the precautions set out below. Although conservation of labour is a primary consideration in deciding cable routes, the joint use of trenches excavated for other services is not so advantageous as might first appear. Excavations are to varying depths, as drains, for instance, have to be laid to falls, independently of the contour of the ground. No continuity of progress can be achieved, as branch extensions and testing

By T. Dunwoody,
Associate I.E.E.

demand the exposure of the services until the virtual completion of the scheme.

The authorities used to insist

that the cables should be laid concurrently with the other services, with the result that numerous faults developed. Some of these became apparent only after the cable had been in use for some time, the length of which depended upon the dampness of the soil. Breakdowns of underground cable laid under these conditions were caused by sheath injuries due to puncture by picks, scouring by boots, falls of bricks and other objects, the use of sharp flints in reinstatement, which were forced on to the cable in "backfill," and subsidence owing to the absence of a firm bottom. These troubles occurred with the same frequency with or without warning tiles or boards.

Such faults were later obviated by digging stepped trenches, by starting the laying only after all other services were completed (whether or not the same trenches were

used), by completing cable laying in one operation and immediate reinstatement of soil. Trenches also used for other services were reinstated up to the level of the stepping and thoroughly consolidated; 3 in. of soft or riddled earth was spread over the trench before the cable was laid and again over the cable immediately it was in position. Permanent reinstatement was carried out, after a 1,000-V test of the cable, without delay; bricks, flints, etc., were removed from "backfill." Cables were laid at not less than 1 ft. 6 in. below final surface level and as far as possible away from road verges carrying vehicular traffic, while the number of underground joints was reduced to a minimum.

The following further precautions apply to all cable laying:—Liberal use of rollers for long lengths of cable, drawing the cable off drum so that the latter rotates in the right direction, expert supervision of laying off necessary to avoid damage when long lengths cannot be laid in one operation, care in laying ducts under roads to secure freedom from internal projections and immediate sealing of cable ends exposed by cutting. Where cable laying is the last operation the risk of damage becomes negligible. In one camp, which had to be built with extreme rapidity, cable laying was not begun until fourteen days before occupation. One joiner (a typical instance) supervised the

For immediate post-war installation work the use of plastic conduit should be seriously considered, the author says. Looking to the more distant future he foresees "pre-fabricated installations" comprising ribbon conductors moulded solidly in plastic panels

laying of 300 yd. of cable and himself made over thirty joints, tested the cable and supervised the reinstatement and had everything ready for the occupying personnel when they arrived.

Standardisation of a limited number of sizes of cables and accessories has offered great advantages. For example, for bare copper conductors used on overhead line systems, the standards are 0.1, 0.05 and 0.03 sq. in. for main runs attached to poles, and 0.0225 and 0.007 sq. in. for p.b.j. cables for services attached to buildings. No fuse control is considered necessary between the main switchboard in the control room and the switch unit in individual buildings.

As the expense of automatic protective appliances is generally not warranted, reliance must be placed on the satisfactory operation of the fuses by fault conditions. Earth resistance values have proved to be highly erratic. Water mains are unreliable as asbestos-cement pipes are now generally used; even the sheathing of the supply authority's cable is known to vary. Best results are obtained by driving earth rods at selected points, but the degree of protection required is difficult to achieve. The elimination as far as possible of metal (which must be earthed) as mechanical protection is desirable. An all-insulated system (with unearthed neutral) and avoidance of metal-clad portable appliances gives the best insurance against shock. Two lamps in series with their middle point earthed give an accurate and visible indication of insulation defects.

Wiring Methods

Of the various wiring methods, the catenary is the simplest but it is objectionable on safety grounds and liability to abuse, while assembly expends more labour than the economy in material warrants. Cleat wiring involves the greatest economy in materials but not in labour. Furthermore, the work is uninteresting and has not the appearance of a workmanlike job. This discourages the wireman, which is detrimental both to speed of erection and to the safety of the finished job.

Heavy-gauge screwed-steel conduit is unlikely to find a place in modern domestic schemes, for which it is costly, inflexible and difficult to install; the ability to draw cables in and out presents negligible advantages, while the conduit provides an exposed path for heavy fault currents. Slip light-gauge conduit has similar defects and, in my experience, is costly, unreliable and open to abuse during installation. The electrical resistance of its joints varies greatly and it deteriorates quickly.

Flat lead-covered v.i.r. cable has one sphere only—in old or occupied premises. It calls for greater skill in installation than

perhaps any other system. Provided the connections receive special treatment by sealing and the use of sleeving and provided the action of decaying wood is prevented, its life is much longer than that of most types. Tough-rubber-sheathed cable has many virtues. It is not so neat and inconspicuous as lead-covered cable, but it is easy to handle and cheap to install. It has a long life where it is not exposed to sunlight. Large supplies are, however, not likely to be available for some time to come. In the present stage of development the sphere of mineral-insulated cables, which represent a laudable attempt to depart from convention, will probably be outside the domestic field; they are as inflexible as conduit and difficult to adapt.

Plastic Conduit

Slip-plastic conduit, which has great labour saving possibilities, should be seriously considered for immediate post-war work. Tubes should be made in 8-ft. lengths, which is about the maximum needed in a domestic installation, and greater output would reduce the cost to a more attractive level. An economical range of plastic fittings, based on grip pressed steel fittings, is needed. Large numbers will have to be produced for prices to be comparable with those of steel accessories.

What was probably the first example of a complete electrical installation protected by plastic material was furnished by a bungalow, the wiring for which was run in rigid and non-hygroscopic tube made up of laminations of low-grade paper bonded by synthetic resin. A presentable and symmetrical job was achieved. Only 5-ft. lengths of tube were obtainable, but effective fibre couplings were devised. Accessories were housed in boxes made from plastic tube with a fibre back and front which also served as a junction box. An experimental installation was also made in a Nissen hut using self-tapping screws and saddling the conduit direct to the corrugated sheets. The tube cost twice as much as steel conduit, but the ultimate cost of the installation in the Nissen hut was only the same as that of a catenary system. There seems to me no reason why the use of unbraid untaped cable should not continue, but plastic conduit could be employed equally well with p.v.c. cable if this proves more suitable.

In my view, the force of circumstances which removed the former restrictions on the number of outlet points to a circuit and on the position of fuses has also eliminated an economic hindrance to development. In spite of the number of outlets and in spite of the number of appliances, there is a saturation point above which the demand for electricity in any given domestic establishment will not rise. Maximum demand is related to two factors—the number of inhabitants

and the physical dimensions of the rooms. One cooks for a certain number of people, one lights a certain floor area and one warms a certain volume of air, all enclosed within the walls of the house. The constant that can be deduced from these factors should be used as the basis for designing the economical minimum number of circuits required. Each circuit should be fused on the basis of the maximum safe current of the cable composing it and each outlet point should have its local fuse.

In regard to trends for the future, the installation will probably be prefabricated,

comprising ribbon conductors moulded solidly in plastic panels, specifically designed for walls and ceilings; a trough forming an integral part of the structure will be employed to convey circuit cables to the ribbon conductors.

Connection of the conductor to the ribbon and erection of accessories will probably be the only *in situ* operation. Most electrical appliances will be built-in and with current-carrying components inaccessible and the substitution of synthetic materials for metals other than those carrying current, a shock-proof installation will be achieved.

ELECTRICITY SUPPLY

Further Post-war Projects. Position in Eire.

Bridport.—SATISFACTORY RESULTS.—Presenting the report of the Electricity Committee for the past year at a meeting of the Town Council, Councillor S. J. Gale said that although a deficit had been expected, due to continually rising costs, there was actually a small surplus. It was not proposed to make any alteration in prices at present. He expressed appreciation of the work of the borough electrical engineer (Mr. H. F. Castle) and his staff.

Chesterfield.—PROPOSED POWER STATION.—The Electricity Committee is seeking the permission of the Electricity Commissioners to erect a large generating station within the borough.

Couldson.—STREET LIGHTING.—The Highways Committee has been in correspondence with the County of London Electric Supply Co., Ltd., with reference to damage to lamp standards by accidents and to glassware by stone throwing. The company inquired whether the Council required replacement immediately after the war as if so it would be necessary to place orders with manufacturers as soon as possible. The Committee has requested the company to place orders accordingly at a cost not exceeding £2,000.

Croydon.—CHARGED AGAINST RESERVE.—The Electricity Committee has agreed at the request of the Electricity Commissioners to charge £60,305 in respect of works in the Addington area to reserve fund instead of borrowing.

Turbine Re-blading.—The Committee is to partially reblade a 25,000-kW turbine at an estimated cost of £1,800.

Dumfries.—SUPPLY TO WANLOCKHEAD.—The County Electricity Committee is considering extending the supply of electricity to the village of Wanlockhead.

Keighley.—MAINS AND SWITCHGEAR.—The Town Council is applying for sanction to borrow £31,404 for buildings, mains, switchgear and fire extinguishing equipment.

Leeds.—£2,000,000 POST-WAR ESTIMATE.—The city electrical engineer (Mr. F. Nichols) presented a report to the Electricity Committee at its last meeting setting out the department's general requirements during the five years following the end of the war. Mr. Nichols estimated that approximately £2,000,000 capital expenditure would be required, which would

include the provision of mains and a substation for manufacturing purposes on the south side of the city where, but for wartime restrictions, the need for development after the war would not have been so urgent.

London.—THEFTS OF TIME SWITCHES.—There has been an unusual number of electrical time switches stolen from public shelters in Lewisham and the Emergency Committee has received a report from the insurance company asking that additional protection should be afforded. The borough engineer, after experimenting with a number of devices, has submitted a proposal for a locking strap for each time switch, the estimated cost of the device being 3s. The Committee has given authority for the provision of 250 of these.

ELECTRICITY FOR PUMPING.—The Metropolitan Water Board has made arrangements with the County of London Electric Supply Co., Ltd., and the West Kent Electric Co., Ltd., for power supplies for electric pumping plant at certain points, the Board to make contributions of £969 and £390 respectively towards the cost of cables, etc.

FLOODLIGHTING IN PARKS.—Reporting upon proposals for park amusements after the war the L.C.C. states that experience has shown that the public would appreciate floodlighting in selected parts of parks, and it is also considered that floodlighting might be provided at gymnasia and playgrounds. It accordingly proposes to allow for both these features.

Paisley.—STREET LIGHTING.—The Lighting Committee has authorised the purchase of the necessary fittings to complete the lighting of High Street and Broomlands with tungsten lamps at an estimated cost of £400. It is intended also to proceed with similar lighting on the main bus routes of the town.

Salford.—POWER STATION EXTENSIONS.—The Electricity Committee is to prepare plans for the extension of generating plant at Agecroft power station.

SUPPLY TO GASWORKS.—The Electricity Department is affording a supply of electricity to carbonising plant at the gasworks at a cost of £484.

Wigan.—FIVE-YEAR PLAN.—A five-year development scheme for after the war is estimated by the borough electrical engineer to cost £157,640.

Workington.—POST-WAR DEVELOPMENT.—Mr. C. W. Emanuel, engineer and manager of the Corporation Electricity Department, has submitted to the Electricity Commissioners post-war schemes estimated to cost £106,797.

Overseas

Eire.—DEBATE ON ELECTRICITY POSITION.—Electricity supply and rural electrification were discussed at some length in the *Dail* recently.

Mr. Costello, speaking for the Fine Gael opposition party, complained that steps had not been taken to meet an electricity shortage, which appeared inevitable on March 5th when the Shannon supply fell to one-fifth of the normal. He suggested that the British who had treated them generously in regard to supplies would have given more coal if a representative had been sent to negotiate. Deputy Cogan declared that there were 299 million tons of coal in reserve in the Leinster coal area and that the Government had failed to develop these resources.

Mr. Lemass, replying, said that as regards native coal the important matter was not how many million tons were under the ground but how much they could get out of it now, and the number of skilled workers and machinery available. It would be foolish to expect to get more than the 60 per cent. increased production that was being obtained. Expert examination had not justified the belief that there were unlimited neglected resources. The seams were too narrow for working on the British system.

The E.S.B., said the Minister, was preparing plans for a new Dublin steam station. He did not agree with the suggestion that generating stations should be set up in the country's coal-fields. It was better to use turf instead and keep coal for other purposes. Future generation of electricity in Eire must, if possible, be independent of imported fuel. They would have to use water power and turf, a suitable combination, because a dry year was a good year for cutting turf, and in a wet year, with their reservoirs full, they would need less turf. There were even defensive considerations, he added, which might induce them to decide not to have another large steam generating station in Dublin. It might be more feasible to have a number of small stations throughout the country away from the large centres of population. In the course of his reply Mr. Lemass said that promises of delivery of certain outstanding parts of mechanical and electrical equipment for the Poulaphouca installation had recently been received by the E.S.B.

Italy.—ROME'S ELECTRICITY SUPPLY.—A special correspondent of the *Manchester Guardian* reports that the supply of electric power in Rome is improving daily and is already sufficient to provide rationed services for lighting and cooking and a skeleton service of trams and trolley-buses. This has been achieved in spite of the fact that the two big power plants at Terni and Tivoli were put out of action. The Germans also attempted to wreck the two large steam operated stations in Rome itself, but the Italian staff prevented the sabotage from becoming effective and the stations are now working to full capacity. Allied engineers are also linking a number of small commercial plants which escaped the notice of wrecking parties.

Portugal.—PLAN TO ELECTRIFY COUNTRY.—A Bill for the electrification of the whole of

Portugal was published on June 16th. It is an eight-year plan to electrify railways, provide power for all industries and bring electricity to the remotest villages. Except for two brief months of the year the source of the supply will be hydraulic and in this way considerable imports of coal will be saved. This scheme is expected to cost the Treasury £12,760,000, but private electricity undertakings will be invited to take part in the establishment of a grid. Portugal's present consumption of electricity is one of the lowest in Europe.—*Reuter*.

Russia.—POWER PLANT RECONSTRUCTION.—The reconstruction of the central power station at Kiev is in full swing, and other power stations in the vicinity are already working. This was announced over the Soviet Radio by Novak, administrator for electric power station construction. He also said that, having destroyed the Kharkov power station, the Germans thought that they had put the industry of the town and province out of action for several years to come. Actually the buildings of two town power stations had been completely reconstructed within five months. A turbine and generator and many instruments and machine parts were manufactured by Kharkov workers.

It is also reported that at Dneprodzerzhinsk the reconstruction of the 25,000-kW hydro-electric station has been completed, while industry at Taganrog is again working smoothly thanks to the laying of a 76 km. h.v. cable connecting the Azov-Black Sea area with the Donbas.

In the Krasnodar region many new hydro-electric stations are being built on rivers and canals. Some fifteen will be put into commission this year to supply electricity to farms.

TRANSPORT

Glasgow.—EMERGENCY BRAKES ON TRAMS.—With reference to the acceptance by the Municipal Transport Committee of a tender of £5,625 by the Metropolitan-Vickers Electrical Co., Ltd., for additions to emergency brake equipment, the manager reported that an employee of the Transport Department had designed an adjustment of the equipment in respect of which he holds the patent rights. The Committee agreed that the employee should be granted a payment of £150 on condition that the Corporation has the right to incorporate the design in any tramcars for use on its tramway system, without any other payment by way of royalty.

CONTRIBUTION TOWARDS REPAIRS.—At a meeting of the Transport Committee it was reported that Imperial Chemical Industries had agreed to pay the Corporation £7,000 towards the cost of repairing plant at the Pinkston power station, the damage having been attributed to the fouling of the Forth and Clyde canal with acid in 1941.

Leeds.—HIGHER TRAM FARES.—At a meeting of the Corporation Transport Committee it was decided to recommend the City Council to increase tram fares to yield an additional £75,000 revenue in six months.

Wolverhampton.—PURCHASE OF TROLLEY-BUSES.—The Town Council has approved a Transport Committee recommendation to purchase fifteen additional double-deck trolley vehicles at a total cost of £45,000. This is the number allotted to the Department by the Ministry of War Transport for 1945-1946.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

London Electric Wire Co. & Son Ltd., Ltd.—Presiding at the annual general meeting held in London last week Mr. W. J. Terry (chairman and managing director) said that home sales were slightly lower during 1943, but the output was maintained at a high level. Export sales were still further reduced for reasons beyond their control. Every effort had been and would be made to maintain the company's overseas connections and when possible to increase exports.

Referring to the proposed superannuation scheme for the staff, he said that after receiving the approval of the meeting to an additional contribution of £25,000 every effort would be made to implement the scheme before the end of the year.

With regard to the future, the chairman said that the highest standard of efficiency would be demanded from both managements and employees. It was essential that reasonable prices should be obtained for the products of industry so that conditions could be progressively improved. The fixing of selling prices to-day was causing considerable difficulty owing to the attitude of some Government Departments which were still pursuing a policy of elaborate cost investigation at times amounting almost to an inquisition. The Select Committee on National Expenditure had recommended that a principle of fixed prices should be adopted, but the fixing of profit margins on a capital employed basis—unnecessary and unreasonable in the case of established industries—was still persisted in. The pursuit of such a policy carried to the extent of attempting to depress profits below the pre-war level was surely open to question. The ultimate effect would be to undermine the financial structure of industry. The position was likely to arise that many firms would be unable to attain their E.P.T. standard and would not have available financial resources to meet the expenses of rehabilitation when the time came.

The Electric Construction Co., Ltd. reports a net profit for the year to March 31st last of £149,120, against £118,201 in the previous year. Out of this £100,000 (£55,000) is provided for taxation and £4,600 (£15,000) for deferred repairs, £15,000 (same) being transferred to general reserve and £2,500 (nil) to superannuation fund. The ordinary dividend, as already announced, is maintained at 12½ per cent, and £38,411 (£33,641) is carried forward.

J. Stone & Co., Ltd.—The accounts for 1943 show a trading profit (after deducting reserve for taxation) of £659,989 compared with £596,762 for 1942. The net profit, when allowances for depreciation, etc. have been deducted, is £238,305 (against £232,126). To this is added £319,441 (£276,415) brought in. A sum of £50,000 (against nil) is transferred to reserve and the dividend on the ordinary shares is maintained at 25 per cent, £318,546 being carried forward. It is stated that every effort is being made to regain the large pre-war export market after hostilities cease. Overseas sub-

sidary and associated companies have again had successful trading and many of the specialised products are now being manufactured in the Dominions.

Wakoll Cables, Ltd.—In its statement circulated with the report and accounts Mr. A. E. Read (chairman) says that the directors have given a great deal of consideration to post-war conditions and the possibilities of further extending the company's business. They have every confidence in future prospects and when hostilities cease the company will be in a position to resume immediately the manufacture of its normal products.

Cable & Wireless (Holding), Ltd.—The revenue account for 1943 shows gross receipts of £1,356,834, as compared with £1,370,343 for 1942 and after deducting expenses, directors' fees, income tax and funded income stock dividend a profit of £1,230,976 (£1,221,702). To this is added £279,120 brought in and £10,000 balance of E.P.T. account, making £1,510,096 (£1,476,607) available. As already reported, the dividend on the ordinary stock is maintained at 4 per cent, and £312,608 is carried forward. The consolidated balance sheet shows that quoted investments stand at £19,729,617, with a market value at December 31st last of £19,565,260. An E.P.T. account is included for the first time. This shows that the amounts to be recovered by the principal company from other companies within the group for the years 1939 to 1942 aggregate £4,180,000.

Cable & Wireless, Ltd. (the operating company) reports a revenue for 1943 of £10,201,375—the highest yet recorded; this compares with £9,907,530 for the previous year. Working expenses amount to £3,654,903 (£3,492,376) and maintenance charges, £1,221,239 (£1,059,716). Taxation abroad requires £218,705 (£241,741) and provision for E.P.T., income tax and transfer to special account under Treasury agreement, £2,240,000 (£2,109,000). The net balance is £1,228,492 (£1,277,718). The final dividend is 2½ per cent, again making 4 per cent. for the year, and £409,566 (£380,674) is carried forward.

Marconi's Wireless Telegraph Co., Ltd. reports a revenue for 1943 of £890,731, against £816,620 for 1942. The net profit is £244,129 (£241,457), after providing £311,434 (£364,684) for administrative and research expenses, £143,642 (£120,200) for depreciation, £6,386 for fees and £172,240 for N.D.C. and income tax. After paying the final dividend of 3½ per cent, already announced, which maintains the year's distribution at 7 per cent, £255,759 (£169,139) is carried forward. Assets in enemy and enemy occupied territories now stand in the accounts at £1.

Whitehall Electric Investments, Ltd. record a consolidated gross income of £221,056 for the twelve months ended March 31st, £19,671 more than in the preceding year. Income from investments in American and Foreign Power amounted to £130,951 (£57,744), from West of England companies £59,500 (same), from other investments £27,036 (£44,714), and from interest and

fees £569 (£10,198). A sum of £55,259 is deducted for loss on investments, whereas in 1942-43 a profit of £36,212 from sale of investments was included in the total. The net profit is £122,586 (£133,736). After the payment of the preference dividend £20,200 is added to the undistributed balance, making £368,700.

Kerry's (Great Britain), Ltd.—Mr. E. P. Richardson, chairman, in a statement circulated with the report and accounts, refers to the change of name of the company (previously the East London Rubber Co., Ltd.). He says there is every reason to think that the advantages anticipated from the change are being realised. The year under review is described as having been a very busy one, in spite of the shortage of supplies which was most marked in the electrical, radio, cycle and motor tyre departments.

Simms Motor Units, Ltd.—Referring to the company's development and research work the chairman (Mr. Tom Thornycroft), in a statement printed with the report and accounts, says that in order to ensure the utmost possible employment after the war and develop the export market they must have the support of the Ministry of Labour in providing the additional technicians required. Due to the company's generally increased efficiency the profits have materially increased, but the low profit standard only allows the company to retain a small part of the profits.

British Electric Traction Co., Ltd.—Speaking at the annual meeting on June 23rd, the chairman (Mr. Richard J. Howley, C.B.E.) said that their electricity supply companies continued to develop and important wartime contracts were being carried out. A notable advance in the recognition of the value of electricity for general purposes was shown by the number of large farms which were being connected to their mains in some areas.

Keith Blackman, Ltd., report a net profit for the year to March 31st last of £192,451, against £149,601 for 1942-43. Taxation requires £150,000 (£96,080), £3,000 (£10,000) is provided for deferred repairs and £10,000 (£15,000) is placed to reserve account. The ordinary dividend is maintained at 20 per cent. and £43,497 (£44,546) is carried forward.

The Chloride Electrical Storage Co., Ltd., is repeating last year's final dividend of 5 per cent. plus a bonus of 5 per cent. on its "A" and "B" ordinary shares, making 15 per cent. (same) for the year.

Associated British Engineering, Ltd., reports a net revenue of £20,194 for 1943-44 (against £18,114). The ordinary dividend is 7 per cent. It is stated that during the year the book value of the company's holding in the Brush Electrical Engineering Co. was reduced to par.

The Anglo-Argentine Tramways Co. is putting forward a scheme of arrangement for a further postponement of debenture interest and sinking fund obligations. The company points out that its position has been brought about by the persistent refusal of the Argentine authorities to permit an increase in fares, which remain at the pre-1914 level; by the disregard of the Argentine Government of the conditions under which the Buenos Aires Transport Corporation was formed; and delay due to the war in obtaining funds for the purchase of independent transport

undertakings in Buenos Aires. It is stated that the company's present cash resources are sufficient only to cover essential expenses in carrying on business until the Buenos Aires problem is settled.

Montreal Light, Heat & Power Consolidated.—The president (Mr. J. S. Norris) has announced that no dividends will be paid for the current quarter on account of the failure of the Quebec Government to make an offer of indemnity by the agreed date—June 13th. The company's property is being taken over by the Quebec Government in pursuance of its policy of acquiring all public utilities in the Province.

Electric & General Investment Co., Ltd.—The accounts for the year ended May 31st show a gross revenue of £16,222 (£15,923) and a net balance of £3,299 (£3,084). The final ordinary dividend of 7 per cent. makes 10 per cent. (against 9 per cent.) for the year and £20,219 (£20,053) is carried forward.

The Revo Electric Co., Ltd., is paying a final dividend of 10 per cent., with a bonus of 2½ per cent., for the year 1943-44, making a total of 17½ per cent., as for 1942-43.

The Telephone Manufacturing Co., Ltd., states that the net profit for 1943, after certain adjustments and before meeting taxation, was £274,083 (against £334,278). The dividend is unchanged at 9 per cent.

The Victoria Falls and Transvaal Power Co., Ltd., is paying a final dividend of 11 per cent., again making 15 per cent. for the year.

R. B. Pullin & Co., Ltd., have again declared an interim dividend of 5 per cent.

New Companies

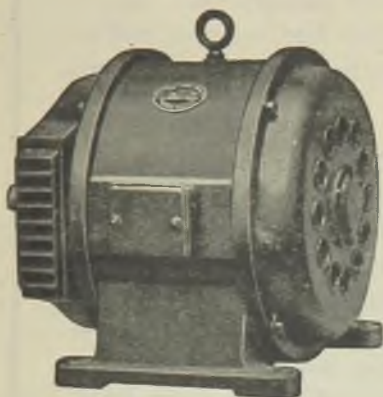
F. H. Wheeler Wholesale, Ltd.—Private company. Registered June 9th. Capital, £5,000. Objects: To carry on the business of electrical, mechanical, agricultural and general engineers, etc. Directors: J. W. Trayler, Knoll Cottage, Sutton Place, Abinger, Surrey; and S. A. Charouneau, 12, Kingston Avenue, N. Cheam. Registered office: Imperial Buildings, 7, Oxford Road, Manchester 1.

Breffni Products, Ltd.—Private company. Registered June 10th. Capital, £900. Objects: To adopt an agreement with A. C. Hubert, and to carry on the business of electrical, radio, and general engineers, etc. Directors: L. F. Breffni O'Rourke, Woodside Cottage, Lower Peover, Ches., and four others. Registered office: 170a, Monton Road, Monton, Lancs.

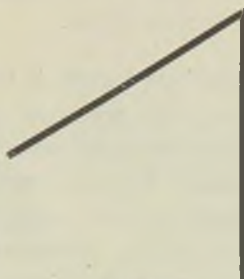
Page (Repairs), Ltd.—Private company. Registered June 5th. Capital, £1,000. Objects: To carry on the business of electrical, mechanical, motor, and general engineers, and processors, etc. Directors: R. Page, 8, Woodlands Road, Surbiton; and R. K. Wagstaff, 4, Acar Mansions, 7, Nottingham Road, Croydon. Registered office: 51, High Street, Kingston-on-Thames.

Sharpies Hill (Electrical), Ltd.—Private company. Registered June 15th. Capital, £1,000. Objects: To acquire the business of an electrical engineer carried on by J. A. Somerset, at 47, Chester Road, Manchester, as James Hill & Son. Directors: J. A. Somerset and G. S. Somerset, both of Racehill, Dunham Road,

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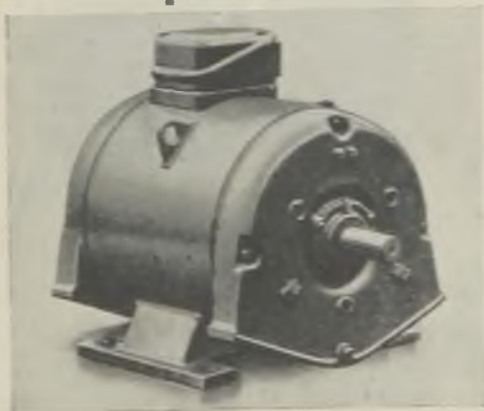


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Although our 1939 designs of industrial A.C. motors are still well to the fore in their field, we have planned a new range which incorporates a number of worthwhile improvements.

All sizes from frames A to H (up to about 75 h.p. at 1500 r.p.m.) are now of uniform appearance and enclosure—an enclosure that gives very adequate protection for all ordinary conditions. Shafts and bearings are even larger, to take care of especially exacting drives. Terminal boxes are more convenient and permit of cable entry from any of four directions, two lifting eyes, out of the way of conduit, being fitted. These and other improvements put L.S.E. industrial A.C. motors still further ahead.

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Electrical Implement & Radio Engineers, Ltd.—Private company. Registered in Dublin June 12th. Capital, £500. Objects : To carry on business of radio and electrical engineers and technicians, radio and electrical dealers, salesmen and servicemen, general electrical contractors and consultants, etc. First directors : E. Kenny, 24, Castlewood Avenue, Rathmines, Dublin, and Hilda Dowling, 1, Vernon Avenue, Clontarf, Dublin.

Hardy-Johnson Engineering Co., Ltd.—Private company. Registered June 17th. Capital, £1,500. Objects : To carry on the business of engineers, machinists, toolmakers, manufacturers of electrical control gear, electric motors and appliances, etc. Directors : F. L. Genge, 823, Warwick Road, Tyseley, Birmingham, 11, and three others. Registered office : 823, Warwick Road, Tyseley, Birmingham.

Companies' Returns

Statements of Capital

Express Cable Engineering Co., Ltd.—Capital, £300 in £1 shares. Return dated January 19th. 142 shares taken up. £142 paid. Mortgages and charges : Nil.

J. R. Halliwell, Ltd.—Capital, £1,000 in £1 shares. Return dated February 7th. 925 shares taken up. £925 paid. Mortgages and charges : Nil.

Midland Electric Wire Co. (1939), Ltd.—Capital, £2 in £1 shares. Return dated February 23rd. Both shares taken up. £2 paid. Mortgages and charges : Nil.

Cricklewood Wholesale Electric, Ltd.—Capital, £2,000 in £1 shares. Return dated February 22nd. 1,650 shares taken up. £1,650 paid. Mortgages and charges : Nil.

Acorn Electrical Co., Ltd.—Capital, £100 in £1 shares. Return dated January 14th. All shares taken up. £100 paid. Mortgages and charges : Nil.

General Transformer Co., Ltd.—Capital, £1,000 in £1 shares. Return dated February 9th. All shares taken up. £1,000 paid. Mortgages and charges : Nil.

Great Asby Electric Light & Water Company, Ltd.—Capital, £2,000 in 400 shares of £5 each. Return dated February 28th. 282 shares taken up. £1,410 paid. Mortgages and charges : Nil.

Electroway Heaters, Ltd.—Capital, £5,000 in 3,000 ordinary and 2,000 preference shares of £1. Return dated March 3rd. 3,000 ordinary and 1,720 preference shares taken up. £4,720 paid. Mortgages and charges : Nil.

Electrical Manufacturers' Finance Co., Ltd.—Capital, £150,000 in £1 shares. Return dated March 7th. All shares taken up. £150,000 paid. Mortgages and charges : Nil.

Zenith Electric Co., Ltd.—Capital, £26,250 in 25,000 ordinary shares of £1 each and 25,000 deferred shares of 1s. each. Return dated March 7th. 25,000 ordinary and 23,334 deferred shares taken up. £5,563 paid. £20,603 14s. considered as paid. Mortgages and charges : Nil.

English Electric Co., Ltd.—Capital, £5,000,000 in £1,500,000 6½ per cent. cumulative preference and £3,500,000 ordinary stock and shares of £1. Return dated March 9th. £1,135,844 preference stock and £2,359,154 ordinary stock taken up. £1,381,659 10s. paid. £2,113,338 10s. considered as paid. Mortgages and charges : £1,110,611.

Synchronome, Ltd.—Capital, £7,000 in £1 shares (1,400 ordinary, 600 preference and 5,000 second preference). Return dated January 31st, (filed March 1st). 1,400 ordinary, 600 preference and 4,200 second preference shares taken up. £700 paid. £5,500 considered as paid. Mortgages and charges : £18,500.

Mortgages and Charges

J. & J. Couch, Ltd.—Mortgage on 4, Kellys Gardens, St. Ives, Cornwall, dated May 23rd, 1944, to secure all moneys due or to become due from the company to Midland Bank, Ltd.

Rees, Mace Manufacturing Co., Ltd.—Deed-charged on the company's undertaking and property, present and future, including uncalled capital, dated June 5th, 1944, to secure all moneys due or to become due from the company to Midland Bank, Ltd.

Hilbert & Whitwam, Ltd.—Satisfaction on May 14th, 1944, of assignment dated April 24th, 1944, and registered May 1st, 1944.

Liquidations

Witty & Wyatt (Cardiff), Ltd.—Winding up voluntarily. Liquidator, Mr. W. R. Gresty, Midland Bank Chambers, Bute Street, Cardiff.

Electronaire Marketing Co., Ltd., 300-324, Gray's Inn Road, London, W.C.1.—Liquidator, Mr. H. P. Naughton, Carey Street, London, W.C.2, released June 14th.

W. G. Cannon & Sons, Ltd.—Meeting to be held at 31, Budge Row, London, E.C.4, on July 21st, to receive an account of the winding up by the liquidator, Mr. J. P. Southwell.

Bankruptcies

T. G. Helme, lately carrying on business at Imperial House, 80-86, Regent Street, London, W.1, as electrical equipment manufacturer (now in the Army).—Trustee, Mr. H. H. Gaine, Carey Street, London, W.C.2, Official Receiver, released June 14th.

A. W. Sommer, radio dealer, carrying on business at 20, Belmont Circle, Harrow, Middlesex.—Trustee, Mr. L. A. West, Carey Street, London, W.C.2, Senior Official Receiver, released June 14th.

T. P. Wood and T. George, trading in partnership as T. P. Wood, 28, Queen Street, Ipswich, electrical contractors.—Trustee, Mr. K. E. Fisk, 13a, Great Colman Street, Ipswich, Official Receiver, released June 14th.

J. H. Matthews, electrical dealer, carrying on business at 232, Town Street, Bramley, nr. Leeds.—Last day for receiving proofs July 7th. Trustee, Mr. H. C. Bowling, 24a, Bond Street, Leeds, Official Receiver.

Michael Skulnick, battery manufacturer, 83, Wellesley Court, Maida Vale, London.—Trustee, Mr. P. Phillips, 76, New Cavendish Street, London, W.1, appointed June 8th.

STOCKS AND SHARES

TUESDAY EVENING.

STOCK Exchange markets pursue their business with composure, and with prices showing normal steadiness. The war news from Europe, as well as that from Asia, is held to be cheering, and, with this in mind, the gilt-edged markets continue to attract attention. Something of a boomlet in stocks and shares has sprung up in Wall Street on the expectation of an early conclusion to hostilities; overseas securities (and "insecurities") are to a limited extent in favour. Shares in home electricity supply, electrical manufacturing, and equipment companies hold their previous prices with noteworthy firmness. The dividend declarations have come up to expectation in most cases. Prices of shares in the speculative group are lower in consequence of profit-taking sales.

Cable & Wireless

The annual figures, following upon the recent announcement of 4 per cent. dividend on the ordinary stock of Cable & Wireless (Holding), show the total revenue of the company to have risen by £23,500 during the year. The total revenue of the Holding Company, £1,356,838, has given satisfaction but the prices of the two stocks, preference and ordinary, show little change. The assets of the group now stand at a little under £58,000,000, an increase of nearly £3½ million on the year.

Callender's Cable

Callender's Cable & Construction Co.'s net profit of £465,000 is £14,000 up on the year. As already announced, the final dividend will make 20 per cent. on the ordinary shares for the year, the same as in 1942 and 1943. In the four previous years, 1938 to 1941 inclusive, the dividend was reduced to 15 per cent. per annum as compared with 20 per cent. in the two earlier years, 1936 and 1937. The company's financial position reflects the care as well as the conservatism, with which its affairs have been administered for years past. Callender's holds controlling and other interests in various cable companies. The issued capital is £400,000 in 6½ per cent. preference, a similar amount in 7½ per cent. "B" preference and £1,123,916 in ordinary shares, all of £1 each.

Henley's

W. T. Henley's Telegraph Works has had a very good year and the dividend, as already notified, is again 20 per cent., a rate which has been paid annually since 1937. The company in its present form goes back to 1880, but the history of the business is more than 100 years old. The present capital is £1½ million, divided into £200,000 in 4½ per cent. prefer-

ence stock, and the remainder in ordinary stock of 5s. units. The company now has reserves amounting to nearly £1,100,000, and there is a handsome excess of current assets. The dividend announcement had no effect upon the price of the shares. It remains at 26s. 9d., showing a yield on the money of £3 14s. 9d. per cent.

Few Price Fluctuations

After the fifty or so rises chronicled in last week's price-lists, it is not surprising to find that changes this time are upon a smaller scale. Most of them are again upward. The radio group has lost a little of its recent exuberance: E.M.I., Cossor and E. K. Cole are easier; Pye deferred hold their previous advance. Chloride Electrical Storage have gained 2s. 6d. at 4½. Aron Electrics at 61s. and Hall Telephones at 29s. have put on 1s. each. Amongst other shares that have risen are British Aluminium, Enfield Cable, Ever Ready, General Electrics and Siemens. London Electric Wire at £2 x.d. have recovered the dividend. Ultra Electrics kept steady at 9s. 7½d.

Home electricity supply shares retain their last week's gains and Metropolitans, with a rise of 1s. 6d. to 41s. 6d., have come more nearly into step with others of their class. Electric Finance & Securities are 1s. up at 57s. 6d. on the increase in the dividend. De la Rue at 9½ are ½ down.

Then and Now

Experience gained during the air raids of 1940-41 showed that the holder of home electricity supply shares was then rendered a little nervous by the possibility of physical damage being done to the property of companies in which he held an interest. This had a depressing effect upon prices, and for a time the market lay in an uncertain state. It was not long, however, before the need of investment for acquiring sound industrial securities, made its influence felt. Purchases soon restored the full extent of falls that had taken place. Since then, the tendency has been almost consistently upward, with very few reactions, and the shares of the leading companies, as our list shows, now give an average yield of about 4 per cent.

Miscellaneous Matters

Calcutta Trams again spurted 3s. 6d. to 52s. 6d., optimism being given wide scope as to the possible terms of acquisition if the Calcutta Corporation takes over the business. Calcutta Electric Supply remain good at 41s. 6d. and Cawnpore Electrics rose 1s. 6d. to 37s. in spite of the cut in the dividend. British Electric Traction deferred is 20 points higher at 1315. In the overseas group, International "Tel. & Tel." surrendered last week's gain and returned to 21. Some of the

(Continued on page 938)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend		Middle Price June 27	Rise or Fall	Yield p.c.	Company	Dividend		Middle Price June 27	Rise or Fall	Yield p.c.
	Pre- vious	Last					Pre- vious	Last			
Home Electricity Companies						Public Boards					
£ s. d.						£ s. d.					
Bournemouth and Poole	12½	12½	61/6	..	4 1 2	Central Electricity 1955-60 (Civil Defence) ..	3	3	100	..	3 0 0
British Power and Light	7	7	33/-	..	4 4 10	1955-75 ..	5	5	115	..	4 7 0
City of London ..	7	5½	29/-	..	3 14 7	1951-73 ..	4½	4½	107	..	4 4 4
Clyde Valley ..	8	8	41/6	..	3 17 0	1963-93 ..	3½	3½	103½	..	3 7 8
County of London	8	8	42/-	..	3 16 0	1974-94 ..	3½	3½	100	..	3 5 0
Edmundsons:						London Elec. Trans. Ltd.	2½	2½	97	..	2 11 3
7% Pref. ..	7	7	34/6	..	4 1 4	London & Home Counties 1955-75	4½	4½	113	..	3 19 8
Ord.	6	6	29/6	..	4 1 4	London Pass. Trans.: A	4½	4½	121½	..	3 14 1
Elec. Dis. Yorkshire	9	9	45/6	..	3 19 6	B	5	5	121½	..	4 2 4
Elec. Fin. and Se- curities ..	12½	13½	57/6	+1/-	4 13 9	C	3	3½	72	..	4 10 3
Elec. Supply Cor- poration ..	10	10	47/-	..	4 5 0	West Midlands J.E.A. 1948-68 ..	5	5	108½	..	4 12 4
Isle of Thanet ..	Nil	Nil	18/-	..	—	Telegraph and Telephone					
Lancs. Light and Power	7½	7½	36/-	..	4 3 4	Anglo-Am. Tel.: Pref.	6	6	120½	..	4 19 7
Llanelli Elec. ..	6	6	26/-	..	4 12 4	Def.	1½	1½	30	..	5 0 0
London Assoc. Electric	3	4	24/6	+6d.	3 5 3	Anglo-Portuguese	8	8	27/-	..	3 18 6
London Electric	6	6	28/-	..	4 5 9	Cable & Wireless: 5½% Pref. ..	5½	5½	114	+½	4 16 6
London Power Red. Deb.	5	5	104½	..	4 14 7	Ord.	4	4	80	..	5 0 0
Metropolitan E.S. ..	8	8	41/6	+1/6	3 17 0	Canadian Marconi \$1 Nil	4	4cts.	10/3	+6d.	—
Midland Counties ..	8	8	41/-	..	3 18 0	Globe Tel. & Tel.: Ord.	8½*	5*	40/-	..	2 10 0
Mid. Elec. Power ..	9	9	44/-	..	4 1 9	Pref.	6	6	30/-	..	4 0 0
Newcastle Elec. ..	7	7	31/-	..	4 10 4	Great Northern Tel. (£10)	Nil	Nil	24½	..	—
North Eastern Elec. Ordinary ..	7	7	34/-	..	4 2 4	Inter. Tel. & Tel. Nil Nil 21 -1 -					
7% Pref.	7	7	35/-	..	4 0 0	Marconi-Marine ..	7½	7½	34/3	..	4 7 7
Northampton ..	10	10	48/6	..	4 2 6	Oriental Tel. Ord. 16 10 49/- +1/-					
Notting Hill 6% Pref. (£10) ..	6	Nil	11	..	—	Telephone Props. 6 Nil 17/6					
Northmet Power: Ordinary ..	7	7	39/6	..	3 11 0	Tele. Rentals (5/-) 10 10 12/-					
6% Pref.	6	6	30/6	..	3 18 8	Traction and Transport					
Richmond Elec. ..	6	6	25/6	..	4 14 1	Anglo-Arg. Trans.: First Pref. (£5) Nil Nil 2/6					
Scottish Power ..	8	8	40/6	..	3 19 0	4% Inc. Nil Nil 6					
Southern Areas ..	5	5	23/-	..	4 7 0	Brit. Elec. Traction: Def. Ord. ..	45	45	1315	+20	3 8 6
South London ..	7	7	28/-	..	5 0 0	Pref. Ord. ..	8	8	180	..	4 9 0
West Devon ..	5	5	23/6	..	4 5 1	Bristol Trams ..	10	10	56/6	..	3 10 10
West Glos.	4½	3½	24/6	..	2 17 4	Brazil Traction ..	\$1	\$1½	27½	..	6 7 3
Yorkshire Elec. ...	8	8	43/-	..	3 14 5	Calcutta Trams ..	5½	6½	52/6	+3/6	2 9 7
Overseas Electricity Companies						Cape Elec. Trams 5 6 25/6					
Atlas Elec. Nil Nil 7/9						Lancs. Transport 10 10 45/6					
Calcutta Elec. .. 6* 6* 41/6						Mexican Light: 1st Bonds ..	5	5	104½	..	4 15 7
Cawnpore Elec. ... 10 7 37/- +1/6						Rio 5% Bonds 5 5 105½					
East African Power 7 7 33/6						Southern Ry.: 5% Prefd. ..	5	5	79	..	6 6 9
Jerusalem Elec. ... 7 5 29/- +6d.						5% Pref.	5	5	118½	..	4 4 9
Kalgoorlie (10/-) 5 5 10/6						T. Tilling ..	10	10	59/6	..	3 7 3
Madras Elec. 4* Nil 23/6						West Riding ..	10	10	44/6	..	4 10 0
Montreal Power 1½ 1½ 28/-						(Continued on next page)					
Palestine Elec. "A" 4* 5* 41/-											
Perak Hydro elec. 6 7 11/-											
Shawinigan Power 83cts. 90cts. 16½ +½											
Tokyo Elec. 6% 6 6 21 +1											
Victoria Falls Power 15 15 4½											
Whitehall Inv. Pref. — 6 24/-											

* Dividends are paid free of Income Tax.

Company	Dividend		Middle Price June 27	Rise or Fall	Yield p.c.	Company	Dividend		Middle Price June 27	Rise or Fall	Yield p.c.
	Pre- vious	Last					Pre- vious	Last			
Equipment and Manufacturing											
Aron.Elec.Ord. . .	10	15	61/-	+1/-	4 18 4	General Cable (5/-)	15	15/-	15/-	..	£ s. d. 5 0 0
Assoc. Elec. :						Greenwood&Batley	15	15	45/-	..	6 13 3
Ord.	10	10	55/-	-6d.	3 12 9	HallTelephone(10/-)12½	12½	29/-	+1/-	4 6 3	
Pref.	8	8	40/6	..	3 19 0	Henley's (5/-) . .	20	20	26/9	..	3 14 9
AutomaticTel.&Tel.12½	12½	12½	67/-	..	3 14 9	4½% Pref. . . .	4½	4½	24/-	..	3 15 0
Babcock & Wilcox	11	11	51/3	+3d.	4 5 7	Hopkinsons	15	17½	67/-	..	5 4 6
British Aluminium	10	10	48/3	+9d.	4 3 0	India Rubber Pref.	5½	5½	23/6	..	4 13 9
British Insul. Ord.	20	20	5½	..	3 11 9	Intl. Combustion	30	30	6½	..	4 10 8
British Thermostat						Johnson & Phillips	15	15	74/6	..	4 0 6
(5/-)	18½	18½	21/-	..	4 8 1	LancashireDynamo	22½	22½	97/-	..	4 12 9
British Vac. Cleaner						Laurence,Scott(5/-)12½	12½	13/-	..	4 16 2	
(5/-)	15	30	30/-	..	5 0 0	London Elec. Wire	7½	7½	40/-xd	+9d.	3 15 0
Brush Ord. (5/-)	8	9	10/3	..	4 7 10	Mather & Platt. .	10	10	52/6	..	3 16 4
Burco (5/-) . . .	15	17½	16/-	..	5 9 5	Metal Industries(B)	5	8	50/-	..	3 4 0
Callender's	15	20	5½	..	3 13 8	Met.Elec.CablePref.	5½	5½	21/3	..	5 3 6
ChlorideElec.Storage15	15	85/-	+½	3 10 7	Murex	20	20	105/9	..	3 15 6	
Cole, E. K. (5/-)	10	15	32/-	-1/6	2 6 10	Pye Deferred (5/-)	25	25	30/-	..	4 3 4
ConsolidatedSignal	24	27½	6½	..	4 4 6	Revo (10/-)	17½	17½	42/6	..	4 2 4
Cossor, A. C. (5/-)	7½*	10*	25/6	-1/-	1 19 3	Reyrolle	12½	12½	70/-	..	3 11 5
Crabtree (10/-) . .	17½	17½	40/-	..	4 7 6	Siemens Ord. . .	7½	7½	34/6	+6d.	4 7 0
Crompton Parkinson						Strand Elec. (5/-)	7½	10	7/9	..	6 9 0
Ord. (5/-)	20	22½	32/3xd	..	3 9 6	Switchgear & Cow-					
E.M.I. (10/-) . .	6	8	33/9	-½	2 7 4	ans (5/-)	20	20	18/6	..	5 8 1
Elec. Construction	10	12½	54/-	..	4 12 7	T.C.C. (10/-) . .	5	7½	22/6	..	3 6 8
Enfield Cable Ord.	12½	12½	57/6	+6d.	4 7 0	T.C. & M.	10	10	55/-	..	3 12 6
English Electric	10	10	53/3	..	3 15 2	TelephoneMfg.(5/-)	9	9	11/9	..	3 16 8
Ensign Lamps (5/-)25	15	21/3	..	3 10 8	Thorn Elec. (5/-)	20	20	25/-	..	4 0 0	
Ericsson Tel. (5/-)22*	20*	20*	56/3	..	1 15 7	Tube Investments	20	20	97/6	..	4 2 0
Ever Ready (5/-) .	40	40	44/3	+9d.	4 10 6	Vactric (5/-) . .	Nil	Nil	14/6	..	—
Falk Stadelmann	7½	7½	33/6	..	4 9 7	Veritys (5/-) . .	7½	7½	8/3	..	4 11 0
Ferranti Pref. . .	7	7	32/-xd	+6d.	4 7 6	WalsallConduits(4/-)55	55	55	49/-	..	4 9 7
G.E.C. :						Ward & Goldstone					
Ord.	17½	17½	96/6	+6d.	3 12 6	(5/-)	20	20	27/3	..	3 13 6
Pref.	6½	6½	34/-	..	3 16 6	WestinghouseBrake	12½	14	75/-	..	3 14 9
Ord.	17½	17½	96/6	+6d.	3 12 6	West, Allen (5/-)	7½	7½	7/3	..	5 3 5

* Dividends are paid free of Income Tax.

Stocks and Shares (Continued from page 936)

Canadian shares are better, Shawinigan Power at 16½ and Canadian Marconi at 10s. 3d. showing improvement. Montreal Power, however, lost ½ at 23½. At 29s. Jerusalem Electrics are 6d. better.

Electric Construction

The Electric Construction Co. makes up its books to the end of March and the proposed dividend of 12½ per cent., to be paid next month, repeats the distribution of a year ago, when it was raised from the 10 per cent. paid in each of the three preceding years. Before that the company paid 12½ per cent. dividends in 1938 and 1939, all these payments having been made out of earnings substantially greater than the amount distributed, with the exception of the year 1940, when the earnings came to a shade under 13 per cent. The shares give a yield, at 54s. and at the 12½ per cent. dividend rate, of 4½ per cent., allowing for inclusion of the dividend. In view of present conditions, this is not a bad return from shares in a company with an excellent balance sheet and business. The shares stand higher than they have done for years past and,

as a matter of interest, possibly regretful, it may be recalled that in 1940 and 1941 Electric Construction could have been bought at less than half the present price. Patents and goodwill stand in the balance sheet at £1.

Victoria Falls

The final dividend of 11 per cent., less tax at 5s. 10d., declared by the Victoria Falls and Transvaal Power Co., makes the usual 15 per cent. for the year, a rate paid since 1938 inclusive. The shares take rank amongst gilt-edged ordinary issues, as the price, 83s. 9d., sufficiently demonstrates. The company's 6 per cent. cumulative and participating preference shares receive the full 10 per cent. to which they are entitled and the price is 35s. As mentioned on various occasions, the Governor-General of South Africa has the right, in 1948, to give two years' notice of intention to expropriate the undertaking. If this should materialise, it is a matter for decision as to what amount the preference shares will receive. Their nominal value is 20s. and although efforts have been made on many occasions to obtain a definite ruling as to their expropriation value, the matter has never been definitely settled.

NEW PATENTS

Electrical Specifications Recently Published

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

A. K. T.-GES. Brown, Boveri & Cie.—"Method and arrangement for fixing the blades of gas and steam turbines by welding them to the blade carriers." 3203 43. May 28th, 1942. (561823.)

A. M. Armour and Metropolitan-Vickers Electrical Co., Ltd.—"Detection of faults in parts of magnetic material." 17231. December 3rd, 1942. (561856.)

Automatic Telephone & Electric Co., Ltd., and C. M. Allister.—"Electric switches suitable for operation by the passage of road vehicles." 14925. September 9th, 1943. (561923.)

British Brass Fittings, Ltd., and J. G. Sperry.—"Electric tumbler switches." 1842. February 4th, 1943. (561887.)

British Thomson-Houston Co., Ltd.—"Magnetic induction accelerators." 287 43. January 13th, 1942. (561816.)

Electron-discharge devices particularly suitable for X-ray apparatus. 11034 42. August 18th, 1941. (561837.)

"Electric circuit controllers." 7695 42. June 5th, 1941. (561899.)

"Thermal overload relays." 15684 42. November 8th, 1941. (561915.)

"High-tension transformers and like inductive windings." 15413 42. November 1st, 1941. (5616950.)

Copper Development Association. G. W. Preston and H. G. Taylor.—"Method of and means for connecting overhead transmission lines and the like." 1250. January 25th, 1943. (561859.)

Electric Depot Ltd., and E. A. Lewis.—"Means for detachably fixing a member in a socket." 13249. September 19th, 1942. (561864.)

English Electric Co., Ltd., and E. H. H. Hassler.—"Construction of gear case." 17201. December 3rd, 1942. (561876.)

English Electric Co., Ltd. and G. F. Tagg.—"Speed indicators." 3320. March 1st, 1943. (561826.)

General Electric Co., Ltd., English Electric Co., Ltd. and J. Donkin.—"Fuses for rupturing electric circuits." 16900. November 27th, 1942. (561953.)

E. Harding and Vioroid, Ltd.—"Apparatus for irradiating foodstuffs by ultra-violet rays." 17975. December 18th, 1942. (561858.)

P. S. Harper and Harper Automatic Machine Manufacturing Co., Ltd.—"Electromagnetic delay-action switch." 17208. December 3rd, 1942. (561878.)

Hasler Soc. Anon. Manufacture d'Appareils Téléphoniques et de Precision.—"Apparatus for the electrical evaluation of linear expressions." 2451 42. February 25th, 1941. (561831.)

F. H. Haynes.—"Electrical transformers and like apparatus." 17167. December 2nd, 1942. (561855.)

W. H. Jones and W. H. Lyons.—"Automatic electrical control of metal-cutting or like machine tools." Cognate applications 766 43, 5200/43 and 9680 43. February 8th, 1943. (561818.)

H. G. A. Kay and Benjamin Electric, Ltd.—"Electrical connectors." 15276. October 30th, 1942. (561949.)

Kodak, Ltd.—"Electro-optical systems for the reproduction of multi-coloured originals." 15372 42. November 1st, 1941. (561844.)

"Electro-optical systems for the production of multi-coloured originals." 15373 42. November 1st, 1941. (561845.)

A. Mandl and Metropolitan-Vickers Electrical Co., Ltd.—"Regulation of universally operable dynamo-electric machines." 9299. July 4th, 1942. (561901.)

Marconi's Wireless Telegraph Co., Ltd.—"Electron-discharge devices, particularly for ultra-high frequencies." Cognate applications 15199 42 and 15200 42. October 30th, 1941. (561910.)

"Electron discharge devices." 15290 42. October 30th, 1941. (561911.)

Marconi's Wireless Telegraph Co., Ltd., and H. R. Cantelo.—"Frequency discriminator circuits." 17298. December 4th, 1942. (561954.)

G. D. Mitchell.—"Electric arc lamps." 14982. October 26th, 1942. (561947.)

Nife Batteries, Ltd., A. Levin and W. S. Thomson.—"Electric storage batteries." 1610. January 30th, 1943. (561820.)

J. F. O'Brien.—"Electricity conductor unit." 15185 42. October 2nd, 1941. (561843.)

Philips Lamps, Ltd., and W. O. Julius.—"Electrical transformers." 17301. December 4th, 1942. (561857.)

E. Siegrist and J. H. S. Haas.—"Identification sleeves for use with the harness of electric cables and the like." 3524. March 3rd, 1943. (561830.)

S. Smith & Sons (Motor Accessories), Ltd., and E. C. Klepp.—"Moving-coil electric instruments." 15415. November 2nd, 1942. (561866.)

Standard Telephones & Cables, Ltd., and G. Gilliver.—"Electric measuring instruments." 17055. December 1st, 1942. (561850.)

Standard Telephones & Cables, Ltd., and N. H. Martin.—"Terminal assemblies for electric circuits." 17054. December 1st, 1942. (561806.)

Standard Telephones & Cables, Ltd., and A. M. Searle.—"Manufacture of metal rectifiers." 17192. December 3rd, 1942. (561873.)

Standard Telephones & Cables, E. A. Richards, L. J. Ellison and F. Gray.—"Manufacture of rectifier discs." 17191. December 3rd, 1942. (561872.)

"Manufacture of rectifier discs." 15688 43. December 3rd, 1942. (Divided out of 561872.) (561889.)

A. V. Tomlinson (Union Switch & Signal Co.).—"Electrical rectifiers of the dry surface contact type." 15708. November 6th, 1942. (561952.)

Western Electric Co., Inc.—"Electrode systems for electron discharge devices." 13295/42. October 29th, 1941. (561905.)

Westinghouse Brake & Signal Co., Ltd., and J. P. Coley.—"Track-circuit signalling systems for railways and the like." 15604. November 5th, 1942. (561914.)

Westinghouse Electric International Co.—"Vibration damping means for turbine blades." 4430 42. March 8th, 1941. (561897.)

S. H. Whitelegg.—"Lighting torches." 1085. January 21st, 1943. (561886.)

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.

Barry.—July 4th. Corporation. Supply and erection of street columns for electric lighting, together with a number of lamps. Specifications and form of tender from the borough electrical engineer, Broad Street (deposit £2 2s.); tenders to town clerk, Town Hall.

Orders Placed

Ashton-under-Lyne.—Electricity Committee. Accepted. Renewal of cadmium copper connections and re-sagging of overhead line, Ashton Moss Colliery Co.—Johnson & Phillips.

Darlington.—Corporation. Accepted. Eight trolley-bus bodies (£850 each).—Brush Coach-work.

Eccles.—Electricity Committee. Accepted. Extension of contract for three years.—L.v. Cables.—Callender's; e.h.v. and h.v. cables.—B.I.C.

Glasgow.—Transport Committee. Accepted. Emergency brake additions (£5,625).—Metropolitan-Vickers.

London.—METROPOLITAN WATER BOARD. Accepted. Welding steel plates on boilers (£106).—Anglo-Swedish Electric Co. Electric motor for Sundridge plant (£115).—Allen West & Co. Two 150-HP English Electric motors with starting gear (£810).—George Cohen. Air-cooled transformer (£245) and circuit-breaker (£183).—Yorkshire Electric Transformer Co.

Stoke Newington.—Electricity Subcommittee. Accepted. New shaft for rotary converter at the Wordsworth Road sub-station (£400, including £133 for rewinding armature if necessary).—G.E.C. Repairs to e.h.v. switchgear at the Victorian Road sub-station (£375).—Ferguson, Pailin.

Islington.—Electricity Committee. Accepted. Repairs to auxiliary turbine gearing (£201).—Metropolitan Vickers.

Middlesbrough.—Corporation. Accepted. Cable (£179).—Hackbridge Cable Co.

Contracts in Prospect

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

Billingham-on-Tees.—School kitchen near Holly Terrace; county architect, 34, Old Elvet, Durham.

Brighton.—Remand home, Hurstpierpoint (£6,500); borough engineer.

Flats, 39, Upper Rock Gardens; B. Stone.

Croydon.—Kitchen, Portland School (£498); borough engineer.

Denton.—School canteen kitchen, Taylor Lane, for Lancs. E.C. (£4,444); E. E. Coleman, Ltd., contractors, Washway Road, Sale, Ches.

Douglas (I. of M.).—Club, 2, Fort Street; National Union of Seamen.

Felling-on-Tyne.—Completion of five unfinished houses for the U.D.C.; W. Lamb, housing architect.

Gillamoor (North Riding).—Kitchen and dining room at Gillamoor School; county architect, County Hall, Northallerton.

Glasgow.—Extensions out-patients' department, Southern Hospital (£2,500); maternity units at Southern, Robroyston and Mearnskirks hospitals; city engineer.

Guisborough.—Maternity unit at emergency hospital for the C.C. (£1,350); county architect, Northallerton.

Hamilton.—Completion of 41 blocks of houses for Town Council; burgh surveyor.

Conversion of shops as offices for Britannic Assurance Co.; local agent.

Langley Moor (Co. Durham).—Milk treatment plant; Milk Marketing Board.

Lewisham.—Junior school, Montpelier Row; Girls' Public Day School Trust, Ltd.

Manchester.—School welfare clinic, Collyhurst; G. Noel Hill, city architect, Town Hall, Manchester, 2.

Meriden.—36 houses, Keresley, for R.D.C.; H. Pickering, engineer and surveyor, Town Hall, Coleshill, via Birmingham.

Neston.—Houses for U.D.C.; C. H. James, F.R.I.B.A., architect.

Newcastle-on-Tyne.—A.R.P. shelter, Royal Grammar School and kitchen, Bath Lane School of Building, for E.C.; education architect, Northumberland Road, Newcastle.

New Southgate.—Extensions Friern Hospital (£20,386) for L.C.C.; G. H. Kempster, Ltd.

Purley.—Stores and workshops; Linnards, Ltd.

St. Pancras.—Building completions, Gray's Inn Road and Coley Street; "Daily Sketch."

Stockport.—Houses, shops, schools, Bridge Hall Farm estate; W. F. Gardner, borough surveyor, Town Hall, Stockport.

Stourbridge.—Dining room, Church Schools, Bridgnorth Road, Wollaston; G. N. Maynard, borough surveyor, Council House.

Sunderland.—Thirty houses; borough engineer.

Swansea.—Pre-fabricated huts, Technical College; borough architect.

Warehouse and dairy extension, 3, Martin Street, Morriston; G. D. Smith.

New ward, General Hospital; secretary.


West Hartlepool.—Two specimen post-war houses; borough engineer.

Willington Quay.—Rebuilding, large department of works of R. Hood Haggie & Sons, Ltd., rope manufacturers.



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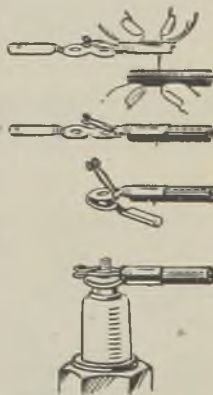
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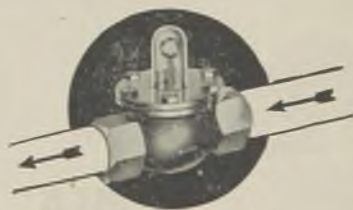
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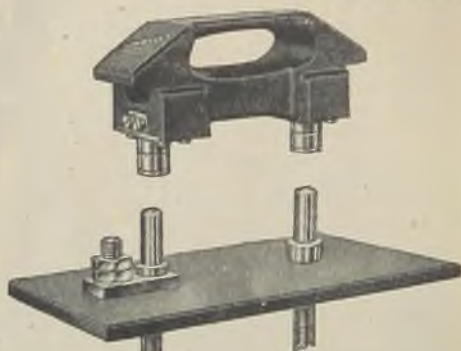


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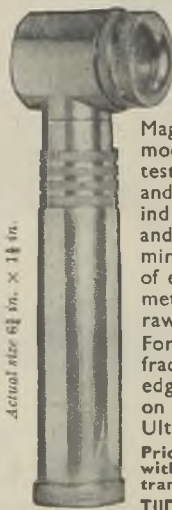
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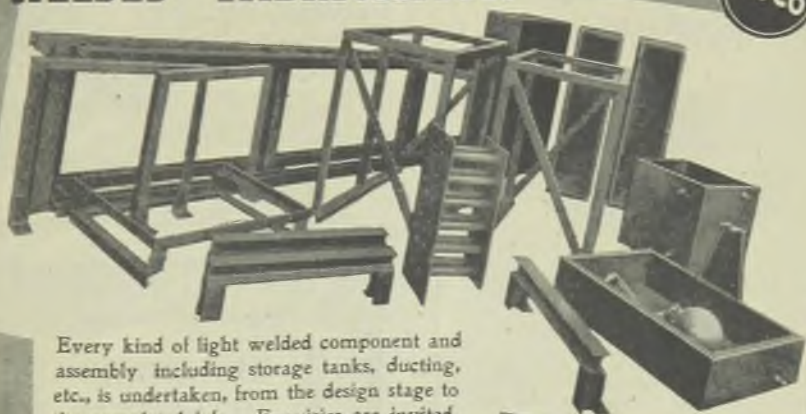
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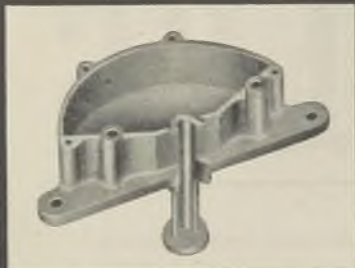


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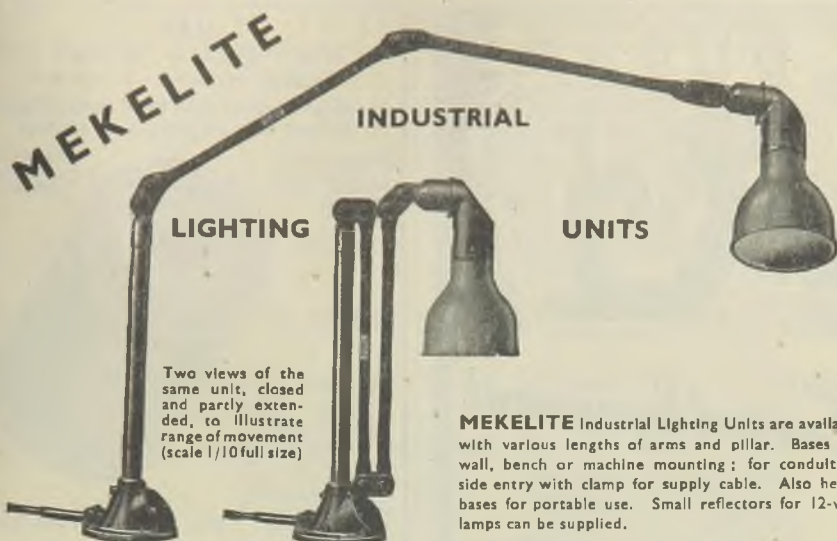
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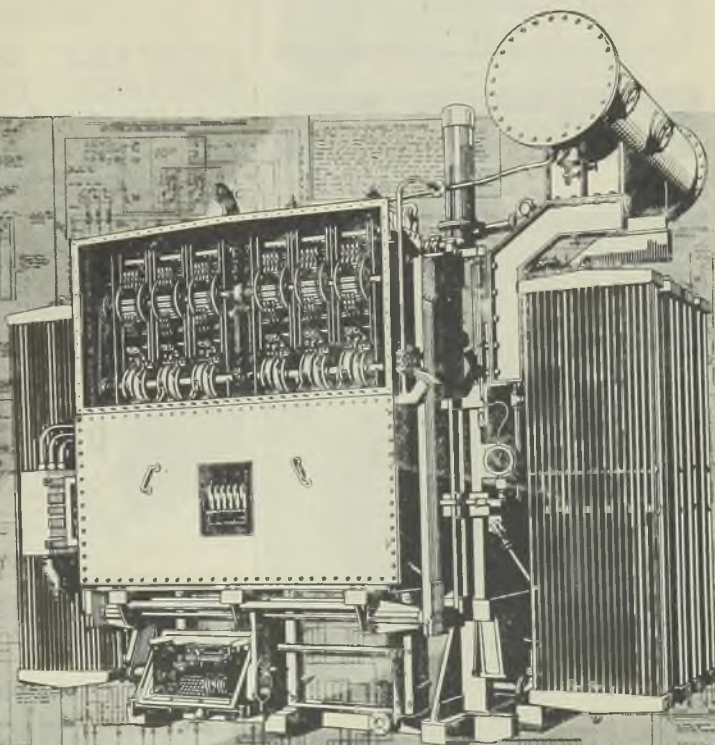
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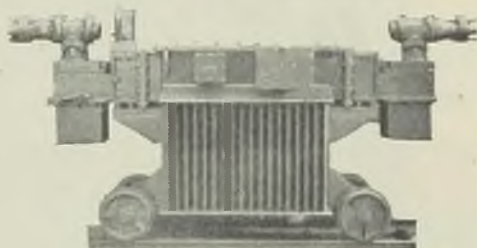
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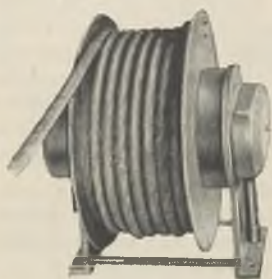


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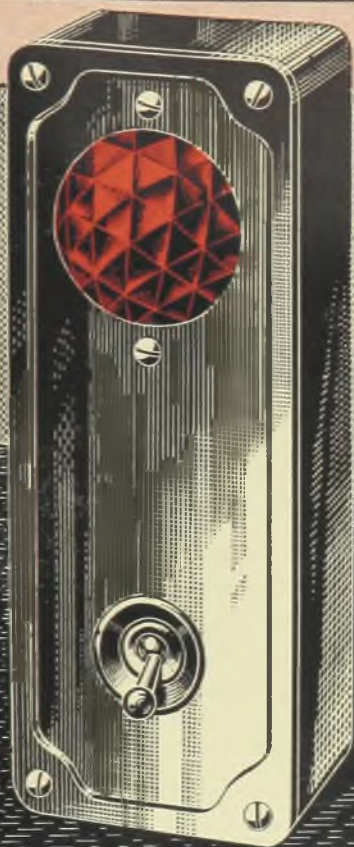
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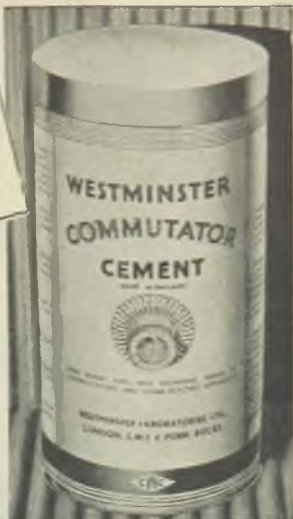
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We strive to use the war as an excuse for doing things a little quicker than usual—as a reason for giving a little better service than in normal times.

So although this is not an invitation to you to bring all of your rush jobs for Mica in all shapes and forms to Langley London Limited, just remember that they are reliable and enthusiastic folk who will always strive to do a little more to please.

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CLASSIFIED ADVERTISEMENTS

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

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

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

Original testimonials should not be sent with applications for employment.

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

CITY OF CARLISLE

Appointment of City Electrical Engineer and Manager

APLICATIONS are invited from qualified Engineers who are experienced in the management and administration of an Electricity Undertaking.

The salary will be in accordance with the Agreement made by the National Joint Committee of Local Authorities and Chief Electrical Engineers dated 9th July, 1941.

The present salary according to the scale is approximately £1,800 per annum, subject to the provisions of Clause 10 of the Agreement, i.e., the commencing salary will be 85% of this amount.

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

Application forms with conditions of the appointment may be obtained from, and must be returned to, the undersigned by noon on 12th July, 1944.

Canvassing directly or indirectly will disqualify.

FREDK. G. WEBSTER.

Town Clerk.

10th June, 1944.

323

EAST GRINSTEAD URBAN DISTRICT COUNCIL

Electrical Engineer (Temporary Wartime Appointment)

THE East Grinstead Urban District Council invite applications from suitably qualified persons for the position of Temporary Electrical Engineer at a salary of £600 per annum inclusive of War Bonus. The appointment will be subject to three months' notice on either side.

Candidates must have been engaged in the business of electricity supply and have had practical experience in the generation and distribution of electricity.

Applications endorsed, "Temporary Electrical Engineer," stating age, qualifications, experience and superannuation position (if any), and accompanied by copies of not more than three recent testimonials, must reach the undersigned not later than the Fourteenth day of July, 1944.

Canvassing either directly or indirectly will be deemed a disqualification.

GEORGE E. COLDWELL.

(Clerk to the Council.

Norton House.

London Road.

East Grinstead.

Sussex.

28th June, 1944.

234

A most excellent line for Travellers calling upon electricians and electrical accessories factors, commission basis, most districts. When replying state fullest particulars.—Box 316, c/o The Electrical Review.

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.

APLICATIONS are invited for the following appointments with an old-established engineering company, Midlands, manufacturing industrial and marine steam turbines: (a) First-class Engineer to assist in steam turbine design, research and development. Permanent position with post-war prospects. Salary from £600, according to qualifications and experience. Reference Number C.2166XA. (b) Trained Technical Assistant to be responsible for tenders and contracts for steam turbines and condensing plants. Permanent position with post-war prospects. Salary from £500, according to qualifications and experience. Reference Number C.2188XA. Applicants should write, quoting the reference number of the post applied for, to the Ministry of Labour and National Service, Room 432, Alexandra House, Kingsway, London, W.C.2, for the necessary forms, which should be returned completed on or before 3rd July, 1944.

ASSISTANT in Technical Information Bureau. A technical assistant, male or female, is required for abstracting and preparing bibliographies and summaries of technical articles mainly in electrical engineering and applied physics. Applicants should have experience in electrical engineering and/or physics and a working knowledge of French and German. The possession of a degree will be an advantage. Salary according to ability and qualifications.—British Electrical & Allied Industries Research Association, 15, Savoy Street, London, W.C.2.

ELECTRICAL Wholesalers require a Clerical Assistant, conversant with trade and materials as handled.—London Electrical Co. (Blackfriars) Ltd., Blackfriars Road, S.E.1.

ENGINEERING Sales Assistant required for Glasgow branch of large manufacturing firm making heavy electrical equipment. State age, salary, experience.—Box 283, c/o The Electrical Review.

EXPERIENCED Electrical Salesman required immediately by London electrical wholesalers. Good opportunity for right man. Please write making an appointment.—Stormlight Electrical Co. Ltd., 160/162, Mile End Road, E.1.

GIRL leaving school interested in, and good at, figures required to assist in the accounts department of electrical wholesale distributors. Applicants please write in the first instance giving particulars to—G. S. Peckham & Co. Ltd., 3, 4 and 5, New Compton St., W.C.2.

LADY Assistant required for full-time or part-time to assist with record keeping, filing, typing, etc. Previous experience in library or record work an advantage. Salary according to experience and qualifications.—British Electrical & Allied Industries Research Association, 15 Savoy St., London, W.C.2.

LAMP Sales Representative for Manchester and district. Permanent progressive post with salary, expenses and commission. Previous experience of lamp market and man with connection preferred, but not essential. Write, giving age and full particulars of experience, to—Mr. E. C. Green, E. K. Cole Ltd., 55 Whitworth St., Manchester.

MANCHESTER firm of old-established general engineers and Sales Engineers. Good post-war prospects. Suitable men invalided from the Services or otherwise released from military service are invited to apply by letter with a view to interview in London or Manchester.—Box 325, c/o The Electrical Review.

PERMANENT situation available for senior man to manage small Accounts Staff. Must have good cashier and book-keeping experience, preferably machine accounting, and be familiar with piece work wages calculations, P.A.Y.E., etc. Write full details, age, experience, etc.—Accountant, Arrow Electrical Switches Ltd., Hanger Lane, Ealing, W.5.

321

REPRESENTATIVES wanted by large manufacturer, must have first-class connections with supply undertakings and factors for the sale of non-association rubber cables. Lancashire, Yorkshire and Northumberland areas.—Box 312, c/o The Electrical Review.

SALES Engineer required for London office of firm specialising in high-class radio, telegraph and allied apparatus. Successful applicant would be required to handle sales correspondence and telephone enquiries and take charge of office. Permanency with good post-war prospects. Reserved. Reply, giving full details of age, experience and salary required, to—Box 286, c/o The Electrical Review.

SALES Representative. Permanent progressive position for man with knowledge of power application of A.C. and D.C. Motors. Apply—Higgs Motors, Kingsway, W.C.2, or Birmingham, 6.

STOREMAN required by London office of Wholesale Distributors. Please write, stating experience, age, salary required, etc., to—Box 254, c/o The Electrical Review.

WANTED. Manager or Asst. Manager for mercury switch design and manufacture.—Box 329, c/o The Electrical Review.

WELL-educated Woman required for London office of Electrical Engineers. Conversant with terms used in electrical engineering and capable of handling enquiries on own initiative. Details of experience and salary required to—Box 287, 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.

SITUATIONS WANTED

BALKAN DEVELOPMENT

ELECTRICAL Engineer (25 years' experience), with extensive knowledge of S.E. European conditions and a number of important contacts, desires to assist progressive British electrical manufacturers to establish substantial position in the potentially important post-war market of the Balkan peninsula. Direct representation or agency agreements considered. Initial enquiries, in strictest confidence, to—Box 6005, c/o The Electrical Review.

A qualified Production Manager, A.M.I.P.E., A.M.I.W., M.Inst.B.E., free for immediate activity, seeks managerial appointment, labour training, personnel, production, planning, progress, inspection, or if desirable, will act in part-time advisory capacity. Radio, electrical, aircraft or automobile. All replies will be acknowledged.—Box 5970, c/o The Electrical Review.

ADMINISTRATIVE post by Chartered Engineer (49), wide experience electrical, heating, ventilation, contract engineering. Unrivalled personal contacts with leading engineers, good negotiator with personality, conversant Government procedure. London preference. Salary £750. Reply in strict confidence.—Box 5963, c/o The Electrical Review.

ADVERTISER has 30 years' experience of the manufacture of precision electrical apparatus, measuring instruments, f.h.p. motors, radio components, etc., 15 years of above as supervising experience as foreman, superintendent, production manager and works manager, experienced at toolmaking, tool and mould design, rating, planning and estimating with up-to-date plant, desires position as Chief Engineer or Works Manager with firm prepared to offer 4-figure salary.—Box 5998, c/o The Electrical Review.

ADVERTISER having splendid contacts Northern Counties, especially with supply authorities, seeks additional agencies or would represent reputable firm. Specialised knowledge of water heating, cocks and domestic appliances generally over 24 years. Can furnish the very highest credentials as to past record. Alternatively open to consider executive position.—Box 5997, c/o The Electrical Review.

A.M.I.E.E. (30), acting as technical adviser during war, desires post-war appointment with electrical power company, manufacturer, or large scale contractor. Experienced in E.H.T. and L.T. transmission, distribution, and associated maintenance. Experience also in electro-mechanical and electro-acoustic circuits, and instruments.—Box 6003, c/o The Electrical Review.

AGE 43 years, experience electrical generation, distribution and maintenance, 28 years, medium plants, desires change as Foreman, Representative or Service Engineer with post-war prospects.—Box 5989, c/o The Electrical Review.

CONSTRUCTIONAL Engineer (36), holding executive position, desires change. Extensive experience supply companies, electrical contractors, in planning construction, maintenance, etc., of overhead and underground mains, office routine, etc. Supply co. preferred, but not essential.—Box 6004, c/o The Electrical Review.

ELECT. Engineer, Assoc.I.E.E., desires post as tech. asst., sales or maintenance charge. Cardiff or South Wales area preferred, but not essential.—Box 6006, c/o The Electrical Review.

ELECTRICAL Engineer, shortly open to transfer, desires executive post in the repair and maintenance of power plant, personally known to power plant merchants throughout the country.—Box 5985, c/o The Electrical Review.

ELECTRICAL Engineer, university trained, with wide experience, England and abroad, in design and production, seeks responsible executive position.—Box 5996, c/o The Electrical Review.

ELECTRICAL Lieutenant-Commander, area chief of Admiralty engineering department, with 12 years' first-class commercial experience (sales/publicity), seeks directorship in concern preparing to develop in Devon/Cornwall after war. Highest references.—Box 6002, c/o The Electrical Review.

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WORKS Electrical Engineer desires change, present position 25 years. Good reasons.—Box 5965, c/o The Electrical Review.

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A.C. and D.C. House Service Meters, all sizes, quarterly and prepayment, reconditioned, guaranteed one year. Repairs and recalibrations.—The Victoria Electrical Co., 47, Battersea High Street, S.W.11. Tel. Battersea 0780. 19

A.C. and D.C. Motors, all sizes, large stocks, fully guaranteed.—Milo Engineering Works, Milo Road, East Dulwich, S.E.22 (Forest Hill 4422). 5881

A.C. Motors, 1/50th h.p. to 2 h.p., from stock, for essential work only.—Johnson Engineering, 86, Great Portland Street, W.1. Tel. Museum 6373. 15

ALTERNATOR, 500 kVA, 3-p., 50 c., 400/440 c., 750 revs., direct coupled exciter, 2 brgs., on bedplate.—Stewart Thomson & Sons, Fort Road, Seaforth, Liverpool. 21. 58

BELT Grinders or Sanders, 4" wide belt, £5 5s.; 6" wide belt, £10 10s.—John E. R. Steel, Clyde Mills, Bingley, Phone 1066. 52

COLD start Diesel Davey Paxman (1932), 25 h.p., 375 revs., 1 cyl., vert., with or without dynamo.—J. Gerber & Co. Ltd., Wembley, Middx. 308

EXHAUST Fans, new, 14", 1-phase, 200/250 v., 1,800 cu. ft./min., £11 15s.—Southern Ignition Co., Ltd., 190, Thornton Road, Croydon. 75

ELECTRIC Hammers. The Kango Electric Hammer is a necessity for all works. It pays for itself in a few weeks. Write for descriptive pamphlet to—George Cohen, Sons & Co. Ltd., Wood Lane, London, W.12, and Stan-ningley, near Leeds. 25

FOUR identical 150-kW. "Weir Sulzer/E.C.C." Diesel driven Generating Sets, 220 volt D.C.—Stewart Thomson & Sons, Fort Rd., Seaford, L'pool, 21. 74

GENERATING Sets for sale, petrol and crude oil, A.C. and D.C., including 10 kW, 400/3/50, and 24 kW, 230/1/50 petrol set.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 331

HEAVY duty Arc Welding Plants, 200 amps. Price £31 10s. complete. Also Spot Welders, £36 15s.—John E. R. Steel, Clyde Mills, Bingley. Phone 1066. 50

MOTOR Generator Set, input 220 v. D.C., output 15 kW, 230/1/50, with Isenthal regulator and control panels. In first-class condition.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 333

MOTOR Generator Sets and Convertors, all sizes and voltages from ½ kW up to 500 kW in stock.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, City Road, London, N.1. Telephone, Clerkenwell 5512. 5513 & 5514. 28

MOTORISED ½" Bench Drilling Machine, 13 speeds, £11 11s.—John E. R. Steel, Clyde Mills, Bingley. Phone 1066. 51

NAMEPLATES, Engraving, Diesinking, Stencils, Steel Punches.—Stilwell & Sons Ltd., 152, Far Gosford Street, Coventry. 14

NUMBER of I.C. Bells, 6" gong, 12 v., A.C. or D.C.—Box 238, c/o The Electrical Review. 16

QUANTITY single stroke, 6" gong, traction type Bells, good quality.—Box 294, c/o The Electrical Review. 16

REFRIGERATING Equipment for sale. Prestcold ¾ h.p., 230-volt A.C., Model Ar.75 Condensing Unit, with direct expansion coil; Hallmark 1-h.p., 230-volt A.C. Water-cooled Unit; Kelvinator, ¾ h.p., but no motor; 2 Plate Coils, suit 150/250-cf. box; Ice Cream Conservator, no unit.—Fishers, 27, St. Andrew St., Norwich. 6010

ROTARY Converter, "Bull." input D.C. 220 v., output 220/230 v., 1-ph., 50-per.: 1 kVA. perfect.—Southern Ignition Co., Ltd., 190, Thornton Road, Croydon. 76

ROTARY Converters in stock, all sizes; enquiries invited.—Universal Electrical, 221, City Road, London, E.C.1. 16

SELF-Priming Electric Pumps, 300 g.p.h., £11 11s.—John E. R. Steel, Clyde Mills, Bingley. Phone 1066. 53

STAFF Time Checking and Job Costing Time Recorders (all makes) for quick cash sale. Exceptional condition. Write—Box 528, Smiths, 100, Fleet Street, London, E.C.4. 31

SYNCHRONOME (Master) Clock, complete with rectifier and transformer, suitable for a 50-cycle, single-phase supply, £40 or nearest offer.—Box 315, c/o The Electrical Review. 16

TRANSFORMERS, single and three-phase. All types up to 10 kVA.—Woden Transformer Co. (Phone, Bilston 41959), Moxley Road, Bilston, Staffs. 12

75-kVA steam-driven Alternator, Browett Lindley engine. 2 crank compound, coupled to English Electric 3-phase Alternator on self-contained bed.—Thomas Mitchell & Sons Limited, Bolton. 271

75-kW Motor Generating Set, input 400/3/50, output 205 volt D.C., and switchboard; 150-kW Motor Generating Set, input 400/3/50, output 220 volt D.C., complete with control gear. One 50-kW Motor Generating Set, input 400/3/50, output 110 volt D.C., complete with control gear.—Stewart Thomson & Sons, Fort Road, Seaford, Liverpool, 21. 61

80-h.p. Gas Engine, National, 2 cyl., horiz., first class, complete, quick sale.—J. Gerber & Co. Ltd., Wembley, Middx. 309

150-kW Ashworth & Parker/Siemens Steam Generating Set, three crank compound engine, 550 revs., coupled to 460-volt D.C. Generator on self-contained bed, sliprings and third wire for 230 volts, with static balancer.—Thomas Mitchell & Sons Limited, Bolton. 270

200-h.p., 400/3/50, 485 rev., S.R., Mather & Platt, 3-bearing type, with Ellison switchgear.—Greenhalgh Bros., Burton's Field Mill, Atherton. Phone 117. 41

250-kVA Alternator, 400 volts, 3-phase, 50 cycles, 750 revs., with direct coupled exciter.—Midland Counties Electrical Engineering Co. Ltd., Grice Street, Spon Lane, West Bromwich. 36

360-kW steam-driven A.C. Generating Set, Browett Lindley 2 crank compound engine, totally enclosed high-speed vertical, 375 revs., coupled to Westinghouse Alternator, 3/50/400, 650 amps., with direct coupled exciter on self-contained bed, also Hick Breguet Jet Condenser with Extraction Pump.—Thomas Mitchell & Sons Limited, Bolton. 269

400 kW Belliss Steam Set, 460/230 vo. D.C.; 50-kW Hindley ditto; 75-h.p. National Diesel Engine; 35-kW Tangye Diesel Set, 220 vo. D.C.; 3,000-gal. Fuel Tank.—Harry H. Gardam & Co. Ltd., Staines. 30

1,000 h.p. Turbo-Alternator Set, made by Metro-politan-Vickers in 1920, 3-phase, 50 period, 400 volts, steam pressure 260 lb.; Jet Condenser. Apply—Patons & Baldwins Ltd., Halifax, Yorks. 251

ARTICLES WANTED

COPY of Garcke's Manual of Electrical Undertakings previous to 1925.—Harris & Gillow, 80/82, Wardour Street, W.1. 324

ENGINEERING Technical Books (new or secondhand) wanted in any quantity. Attractive cash offers. Call—Third floor, 356, Oxford Street, W.1, or "Stoneleigh," St. George's Avenue, Weybridge. 62

MERCURY (Quicksilver) wanted. Write for packing instructions. Gold, Silver and Platinum also purchased.—Collingridge & Co. Ltd., Riverside Works, Riverside Road, Watford. (Tel. 5963.) 221

WANTED, Motor, 230 volts, 50 cycles, 5 h.p., single-phase, approx. 1,450 r.p.m., suitable for remote control. Price and full particulars to—Craven & District Electrical Construction Co., Skipton, Yorkshire. 330

WANTED, Rotary Converter, 110 volts D.C., 200/230 A.C., with radio filter and sound-proof case. 100-150 watts.—Box 647, L.F.E., 110 St. Martin's Lane, W.C.2. 311

WANTED, Rotary Converters, any size.—Universal, 221, City Road, London, E.C.1. 22

WANTED urgently, Bridge Megger or Ohmmeter for measuring low resistances; also recording Ammeter for A.C.—Box 332, c/o The Electrical Review. 16

WE are licensed by the Ministry of Supply to purchase any used Electrical Machinery up to 1,000 h.p./kW. Please offer your surplus to—J. Gerber & Co. Ltd., Wembley, Middlesex. 310

1 ½-h.p., single-phase, 200/230-volt, 960 or 720-r.p.m. Motor.—Box 6007, c/o The Electrical Review. 16

1/3 rd-h.p. Motor, 240/1/50, 960 r.p.m. (for Intertype composing machine).—Box 6001, c/o The Electrical Review. 16

1/10 to ½-h.p. commutator type A.C. or A.C./D.C. Motors wanted. Suitable for variable speed control by series resistor.—Godfrey Industries Limited, Brundall, Norwich. Telephone, Brundall 70. 319

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REPAIRS of Electrical Motors, Transformers, Apparatus, Domestic Appliances, send to—Peckham Electrical Engineers Co., 16, Moncrieff St., Peckham, S.E.15. Tel. New Cross 3615. 5969

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DESIGNER of world-renowned electrical apparatus and Technical Executive with full knowledge of the market, both at present with well-known firm, are desirous of contacting manufacturer possessing light engineering facilities with a view to post-war development in a market previously covered by foreign suppliers. No investment.—Box 5972, c/o The Electrical Review. 16

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Engineering.

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Lecturer in Electrical Engineering: R. G. Isaac, M.Sc. (Bristol), B.Sc. (Lond.), A.M.I.E.E.
Lecturer in Civil Engineering: A. A. Fordham, Ph.D. (Lond.), A.M.Inst.C.E., M.I.Struct.E.
Lecturer in Mechanical Engineering: J. Selwyn Caswell, M.Sc. (Wales), M.I.Mech.E., A.M.Inst.C.E.
Lecturer: W. E. J. Farvis, B.Sc. (Bristol).

Metallurgy.

Professor: C. A. Edwards, D.Sc. (Manchester), F.R.S.
Assistant Professor: R. Higgins, Ph.D. (Glasgow).
Lecturers: R. Griffiths, M.Sc. (Wales); T. E. Wilkinson, Ph.D., B.Eng. (Liverpool); D. W. Hopkins, B.Sc. (Wales).

THE College offers a number of exceptional advantages to students who aim at entering upon professional careers in Engineering or in Metallurgy. It is situated in the heart of an industrial area which includes a large number of works of very varied character, and presents an unrivalled variety of metallurgical practice. The manufacturers of the district, who contribute largely to the support of the College, give the staff and students of the Applied Science Departments every access to the works, and the managers, engineers and technical officials co-operate with the staff of the College in making visits to works of practical educational value to the students. Courses of study are provided (1) for the B.Sc. Degree of the University of Wales in (a) Civil Engineering; (b) Mechanical Engineering; (c) Electrical Engineering; (d) Metallurgical Engineering; (e) Metallurgy; and (2) for Diplomas of the College in (a) Civil Engineering; (b) Mechanical Engineering; (c) Electrical Engineering; (d) Metallurgy.

Persons who are not desirous of studying for Degrees or Diplomas may attend selected College classes, provided they satisfy the authorities of the College that they are qualified to benefit by such classes.

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Particulars concerning admission to the College, and of the Entrance Scholarships, may be obtained from the undersigned.

EDWIN DREW, Registrar.

Singleton Park, Swansea. 305

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MANUFACTURERS' Agents, covering the whole of Great Britain and Colonies, are desirous of contacting manufacturers with a view to sole selling rights (either commission or buying), post-war arrangements considered.—Box 23, c/o The Electrical Review.

MANUFACTURERS of Electrical Measuring Instruments require an Agent for each of the following areas: Newcastle, Manchester, Leeds, Birmingham and Cardiff. Must be technically qualified and have connections in the industrial and radio field. Give full details stating territory covered and agencies held.—Box 302, c/o The Electrical Review.

PATENT NOTICES

WELL-known electrical manufacturers of anode rotary converters and high tension batteries for wireless wish to acquire British or American rights for manufacturing well proved electrical vibrators in England. Please submit proposals to—Box 328, c/o The Electrical Review.

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URGENTLY wanted, Factories in Central London or Suburbs. Floor areas from 5,000 to 100,000 sq. ft. Rent or buy. Premises requisitioned would be entertained. Send particulars in confidence to—Leopold Farmer & Sons, Factory Specialists, 46, Gresham Street, E.C.2. 320

BUSINESS OPPORTUNITIES

OLD-established firm of Gear Cutters would like to hear from firm of electric motor manufacturers with the object of co-operating in a post-war programme of geared motors.—Box 303, c/o The Electrical Review.

MISCELLANEOUS

DON'T Disclose Your Plans. Produce blue prints and black line copies, etc., in your own office, without glass frame, privately and economically. "Arcoflex" Copiers from 25 shillings. As supplied to H.M. Government.—W. A. Boughton, 53, Kenley Road, Merton, S.W.19. 4883

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LESLIE Dixon & Co. for Dynamos, Motors, Switchgear, Chargers and Telephones. 214, Queenstown Road, Battersea, S.W.8. Telephone, Macaulay 2159. Nearest Ry. Sta.: Queen's Road, Battersea (S.R.). 18

STAFF Identity Passes that Embody the Photographs of S. employ, now being supplied to firms on Government contracts. Utility Installations. Forgery proof; Celluloid Encased; Inexpensive; any size staff; anywhere; distance no object. Any kind of photographic work undertaken. Write for particulars and specimens from—Miles & Kaye, Ltd., Pass Specialists, 9 Southampton Place, High Holborn, London, W.C.1. Est. over 50 years. 186

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this Journal should not be taken as an indication that they are necessarily available for export

COMPANY MEETINGS

LONDON ELECTRIC WIRE COMPANY

& SMITHS LTD.

Output Maintained at High Level

THE Annual General Meeting of the above company was held on June 22nd in London.

Mr. W. J. Terry (chairman and managing director), who presided, said: The credit balance of the profit and loss account at £97,491 is lower than last year by £2,867. A further amount of £25,000 has been brought in from investment reserve as no longer required—arising from surplus on realisations—which with your approval it is intended to add to the superannuation fund instituted last year.

Plant and machinery have been maintained in working order, and full provision has been made for depreciation and obsolescence.

The home sales were slightly lower during 1943, but output was maintained at a high level. The export sales were still further reduced for reasons quite beyond our control. Every effort has been and will be made to maintain our overseas connexions, and when possible to increase our company's exports.

Provision to meet the heavy demands of taxation to December 31, 1943, has been made on the best available information. The promises of concessions made in the recent Budget speech respecting war and rear and research expenditure are extremely welcome. The E.P.T. concession to small undertakings does not, however, afford any relief to the small subsidiary mentioned in the profit and loss account, which is working at a loss solely due to the incidence of taxation, although it is engaged in the manufacture of essential products.

The initiation of a superannuation scheme for the benefit of the staff has been delayed owing to the temporary absence of the necessary professional assistance and because it was found that a further sum was necessary to launch the scheme on a satisfactory basis. After receiving the approval of this meeting to the additional contribution of £25,000 every endeavour will be made to implement the scheme before the end of 1944.

The fixing of selling prices to-day is causing considerable difficulty owing to the attitude of some Government departments who are still pursuing a policy of elaborate cost investigation which at times almost amounts to an inquisition, thus placing a further strain upon depleted and overworked staffs.

It was recommended by the Select Committee on National Expenditure that a principle of fixed prices should be adopted, thus avoiding this extra work, but the fixing of profit margins on a capital employed basis—unnecessary and unreasonable in the case of established industries—is still persisted in. The pursuit of such a policy carried to the extent of attempting to depress profits to a lower level than existed prior to the outbreak of hostilities, when conditions of world competition prevailed, is surely open to question, and the ultimate effect must be to undermine the financial structure of industry.

Relaxation of war restrictions and controls at the earliest possible moment is highly desirable.

Export trade must be regained and enhanced in order to maintain the existing standard of living, which will be difficult to achieve in face of world competition.

Future prospects will be largely affected by legislation yet to be enacted and by agreements which may be entered into with our allies, and without some indication of such Government action it is difficult for industry to plan its future progress.

I should like to say in conclusion that this company is in a strong position, particularly in respect of liquid resources, to take full advantage of any opportunities of expansion which the future may offer.

The report was adopted and a final dividend of 5½ per cent., making 7½ per cent., less tax, for the year, was approved, and the Chairman announced that an interim dividend of 2 per cent. in respect of the current year would be paid in the same warrant.

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BRITISH ELECTRIC TRACTION COMPANY LTD.

THE Forty-eighth Ordinary General Meeting of the above company was held on June 23rd in London.

Mr. Richard J. Howley, C.B.E. (the chairman), who presided, said: The accounts for the year ended 31st March, 1944, which are submitted, have been prepared in a somewhat altered form. The new form accords with modern practice, and the directors hope that the stockholders will find that the accounts now give a clearer picture of the company's business.

Our gross revenue for the year amounted to £767,962, an increase of £7,669 over the previous year. Practically the whole of this figure is represented by increased revenue from investments. The expenses, including income tax, showed little change at £372,042. The sum remaining for appropriation is £316,441, compared with £309,915. The directors recommend the payment of the same dividends as for the previous year, leaving £56,961 to be added to undivided profits account.

Our investments in subsidiary and associated companies are shown in the balance sheet at £4,995,034, an increase of some £14,000. On the other hand, our general investments show a reduction of approximately £63,000. Our cash position is strong, cash at call and at bankers amounting to £510,832, as compared with £396,607.

The B.E.T. group of omnibus companies now owns some 8,500 omnibuses operating throughout the provinces, and, in addition to the normal public services, provides special transport services for many thousands of war workers.

Our electricity supply companies continue to develop. A notable advance in the recognition of the value of electricity for general purposes is shown by the number of large farms which are being connected to our mains in some areas.

We are watching carefully references to post-war planning of public utility services. There seems to be growing among the public a better appreciation of the dangers to the community of rushing into experiments in public ownership. This is especially appropriate in the case of road passenger transport, which is shown to be operated with great skill and consideration for the public convenience.

I should like to tell you how well our short-handed staff of officers has worked during the year. They deserve your thanks for their efforts to maintain as far as possible the high standard at which this company has always aimed.

I move that the report of the directors and statement of accounts for the year ended 31st March, 1944, are received and adopted and that the dividend recommended be declared and paid, less income tax.

Mr. H. C. Drayton seconded the resolution, which was carried unanimously.

The retiring directors (Mr. R. J. Howley and Mr. P. D. Tuckett) were re-elected, and Messrs. F. W. Smith Riches & Co. and Messrs. Deloitte Plender Griffiths & Co. having been re-appointed auditors, a hearty vote of thanks to the chairman, directors and staff concluded the proceedings.

337

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COMPANY MEETINGS—Continued**CALLENDER'S CABLE & CONSTRUCTION****Good Results**

THE 48th Annual General Meeting of Callender's Cable & Construction Co. Ltd. will be held on July 3rd next in London.

The following is extracted from the statement of the Chairman (Sir Malcolm Fraser, Bt., G.B.E.), which has been circulated in full to stockholders, with the directors' report:—

It will be observed that the profit, after making provision for taxation, is £566,363; and that, when we have debited depreciation at the same figure as last year (£80,000) and directors' fees, there remains a balance of £465,115.

After adding the balance brought forward from the previous year, £306,552, we have a total available of £771,667. Dividends paid during the year upon both classes of Preference stock, and an interim on the Ordinary stock, amount to £112,196, and leave us with a figure of £659,471.

Your directors have given careful consideration as to how to deal with this amount and have decided to transfer to reserve for War Contingencies, etc., the sum of £175,000, earmarked as a Contingent Reserve for Reinstatement of employees in the fighting services, under the Reinstatement in Civil Employment Act, 1944, to pay a final dividend upon the Ordinary stock of 10 per cent., absorbing £112,391, and, in addition, a cash bonus of 5 per cent. (both less tax) on all the issued Ordinary stock, which would take another £56,196.

These altogether total £343,587, leaving a balance to be carried forward of £315,884—an increase of £9,332 on the preceding year. As the figures show, the general trade of the company has been satisfactorily maintained. Stockholders will, I believe, regard the results of the year with considerable satisfaction.

The Callender Group has 1,355 men and women serving in the Forces. Provision has been made for allowances to men on active service. Finally, let me express in the warmest possible terms the directors' appreciation of the efforts of the employees at home and overseas in the extremely difficult circumstances under which the operations of the company and its branches have had to be carried on.

314

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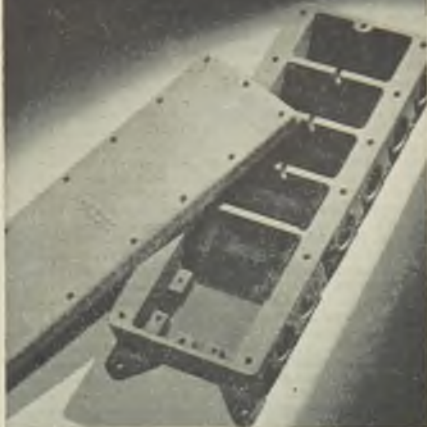
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No. 10 in a series of advertisements issued by the Zinc Alloy Die Casters Association, an organisation formed by the industry to improve the technique of zinc alloy die casting and to promote a fuller appreciation of the properties and applications of the castings. The Association's Technical Committee will be pleased to advise on the design and properties of zinc alloy die castings.

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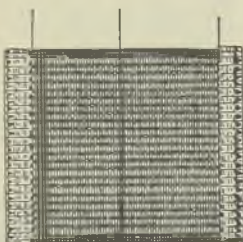


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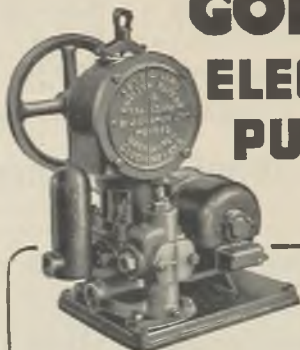


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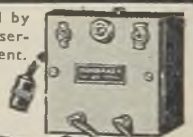
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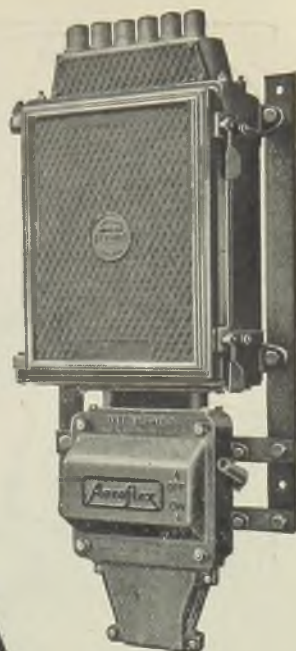
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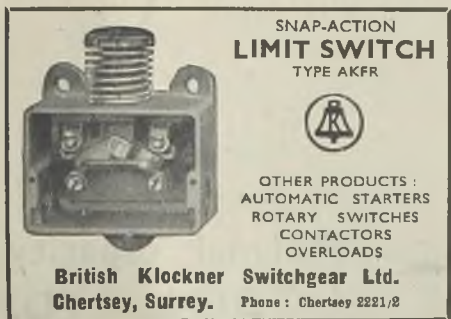
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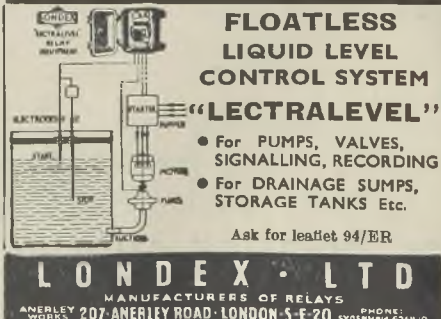


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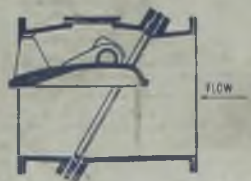
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