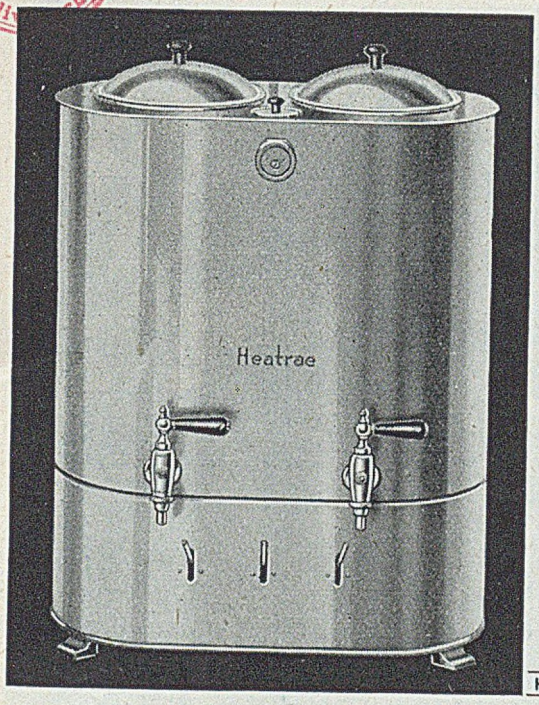
ELECTRICAL REVIEW

VOL. CXLII 28th MAY, 1948 NO. 3679

FOUNDED 1872 NINEPENCE · WEEKLY



True to the **Heatrae** *Tradition..*

We have always believed in the principle of doing a thing "extraordinarily well or not at all."
Hence 'HEATRAE' Milk-and-Coffee Urns represent "all the best" in non-alcoholic toasts.
So — Polished Outer Jacket and both containers in MONEL — which is non-corrosive, self-coloured and requires no tinning.
Both containers surrounded by a water jacket, electrically heated. Inner containers heated by conduction.
Three-heat switching—plus EVERY item "conductive" to utmost efficiency and sound service.

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REGISTERED TRADE MARK

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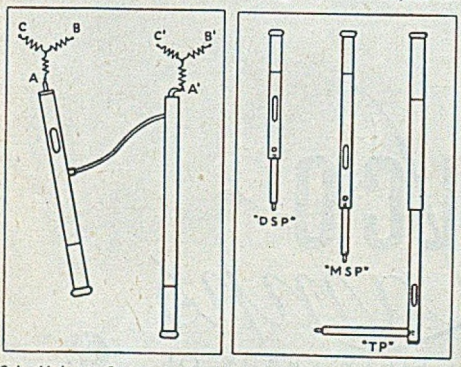
to locate interconnections between two A.C. systems.

VACUUM TUBE DETECTORS
Range 6,600 to 35,000 V.



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No earth Connection required

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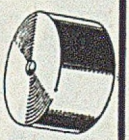

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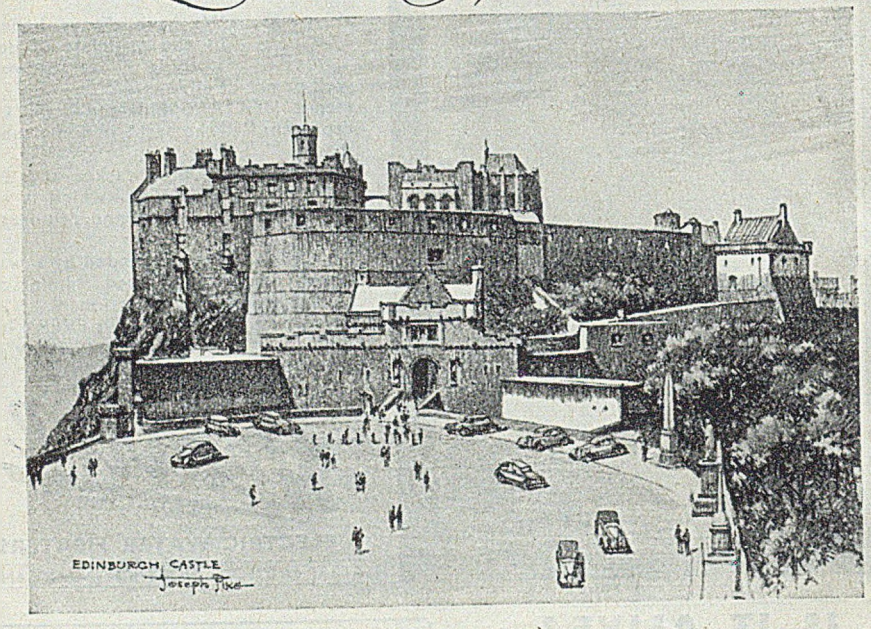
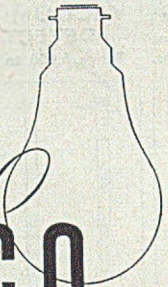
POOL LANE · LANGLEY · BIRMINGHAM

Landmarks of Britain



EDINBURGH CASTLE

The Castle stands on a precipitous height, dominating the capital city of Scotland, and was formerly the seat of the Scottish Kings



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For current insulation and oil sealing we can apply specialised knowledge gained by long experience, constant research and concentrated study of war-time problems.

Let us keep your rubber technique up-to-date. Consult our laboratory!

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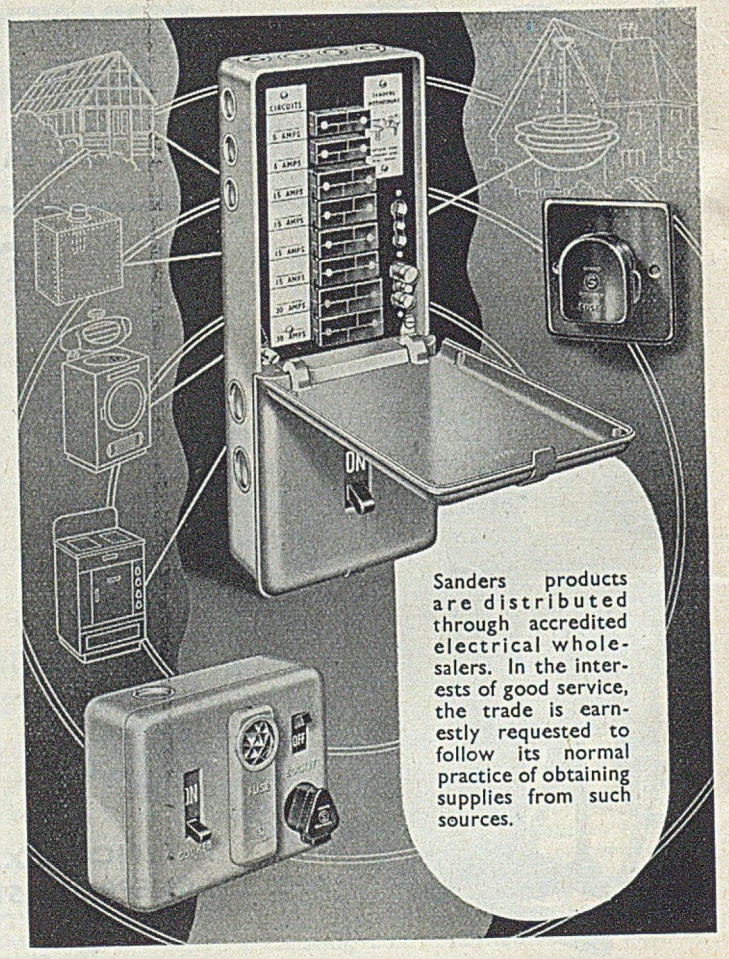
EXAMPLES OF *Up-to-date Equipment* FOR MODERN ELECTRICAL INSTALLATION PRACTICE

Three items in the post-war production programme are illustrated:

The "SANDELLA" Cooker Control Unit. Demand considerably in excess of production, but supplies available from time to time.

The "SANDSBURY" Consumer's Electricity Control Unit. A new and interesting development with many outstanding features. Small supplies available.

Sanders Safety Socket and Fused Plug to B.S. 1363. Supplies available in the near future.



Sanders products are distributed through accredited electrical wholesalers. In the interests of good service, the trade is earnestly requested to follow its normal practice of obtaining supplies from such sources.

SANDERS
WEDNESBURY

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

YOU CAN'T BEAT A Belling

For all kinds of homes all over the world

List No. **29**
TABLE COOKER

List No. **45**
'BABY'

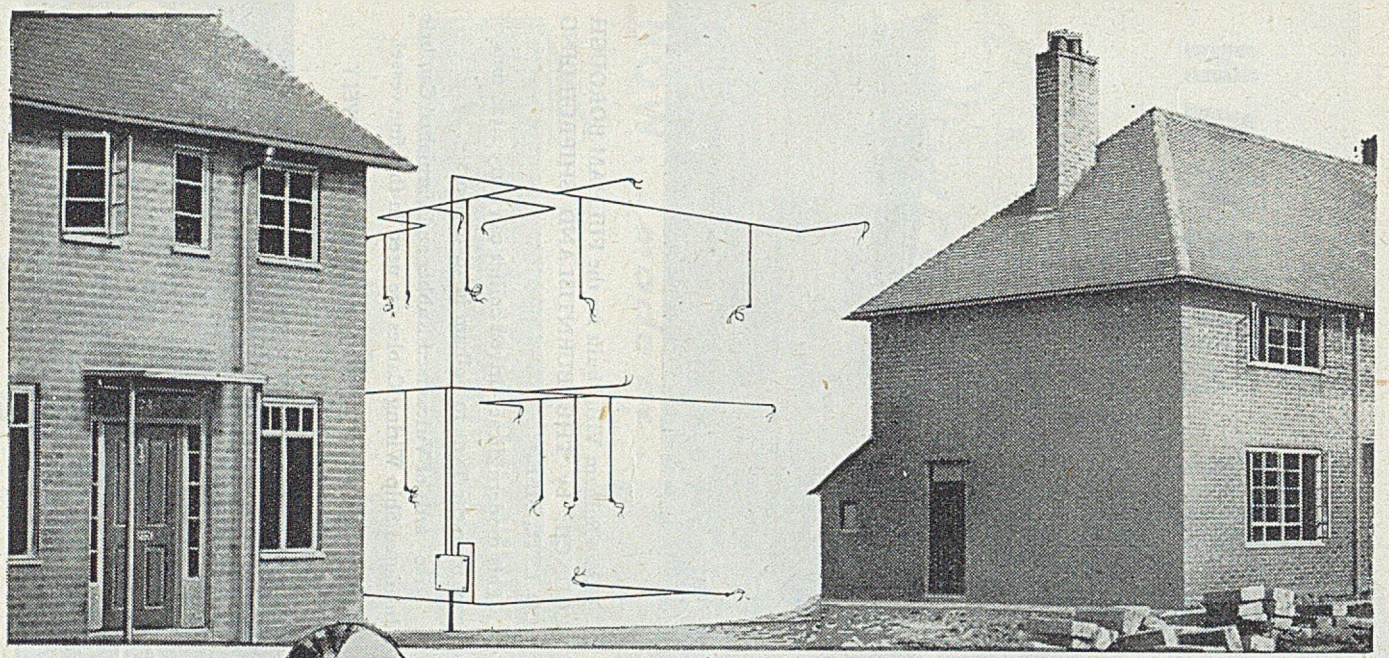
List No. **46/47**
STANDARD MODEL

List No. **64AB**
STREAMLINE

All Cookers now supplied in white enamel with black hobs.

BELLING & CO. LTD., BRIDGE WORKS, ENFIELD, MDDX. HOWARD 1212

CRC 333



"Oh yes, we've plenty of cable on hand, Mr. Chicklewaite— we've run out of walls!"

N.B.—If you've more walls than wires—get into touch with Henley's.


A phone call...
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WARRINGTON WORKS
RANDOLPH AVENUE
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DELIVERY!

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Great Achievements

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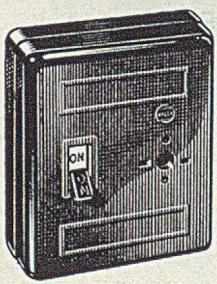
Erected by Shah Jahan for his Empress who died A.D. 1631. A perfect blending of imagination and workmanship.

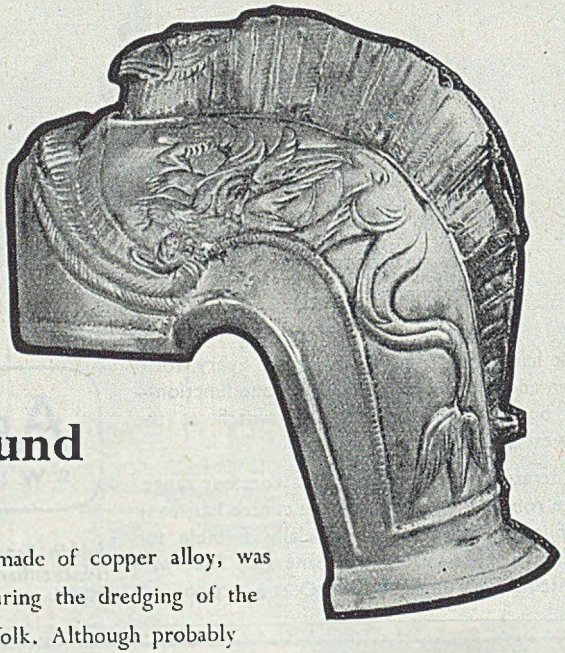


WYLEX

"Wylex must be good"

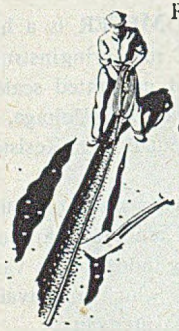
Achievement in Electrical Accessories

GEORGE H. SCHOLES & CO., LTD., WYLEX WORKS, WYTHENSHAWE, MANCHESTER



Copper Underground

THIS Roman helmet, made of copper alloy, was discovered last year during the dredging of the River Wensum in Norfolk. Although probably more than 1700 years old, it is still in excellent condition. Copper also can be expected to give almost limitless service underground. It has for long been employed extensively for earth electrodes, connections and bonds, and is now coming into general use underground for pipes and other purposes.



Results of research investigations and service experience are given in a new publication issued by the Copper Development Association—'Copper Underground: Its Resistance to Soil Corrosion.' A copy of this publication and any further information required will be sent, free of charge or obligation, to anyone having a genuine interest, on request to the C.D.A., Kendals Hall, Radlett, Herts. (Telephone: Radlett 5616)

COPPER DEVELOPMENT ASSOCIATION

G28/48

THE COOKER THAT HAS EVERYTHING..

THE *New* BNE MODEL C.49

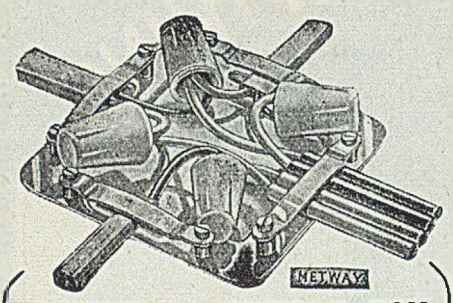
Built to the requirements of leading supply undertakings, the new Model C.49 really has all the features desired by housewife and maintenance man alike ; functional efficiency, beautiful appearance, easy maintenance, and generous capacity. The construction is pressed steel on a cast iron main front frame with cast iron hob, and the finish is 2-tone ivory acid-resisting enamel. All wiring, switches, and fuses if fitted, are easily accessible in one compartment, and—a B.N.E. innovation—conversion from 2 to 3-plate hob is easily effected.

There are many other features fully described in Publication EC3—please ask for it.

- TWO-TONE IVORY VITREOUS ENAMEL
- EASY CONVERSION FROM 2 TO 3 PLATE
- E. D. A. INTERCHANGEABILITY AND B. S. 1195 DIMENSIONS
- LARGE OVEN, HOT CUPBOARD AND DRAWER

BRITISH NATIONAL ELECTRICS LTD.
THE DOMESTIC APPLIANCES SECTION OF
JOHNSON & PHILLIPS LTD.

A BNE Product
OF JOHNSON & PHILLIPS LTD.



UNIVERSAL JUNCTION BOX

A "Metway" product designed for ease and speed in wiring.

Bonding bars are easily reversible. Cables of various sizes can be used without fear of damage.

Ample space provided for connectors.

Covers are of the snap-on type.

Further details including "Table of maximum cable capacity for entry" for this "Metway" Universal Junction Box No. JB7/E.R. will be sent on request.

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King Street, Brighton 1, Sussex

Telephone: Brighton 8366 (7 lines)

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STRATFORD, LONDON, E.15

MANUFACTURERS OF
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EMERGENCY LIGHTING EQUIPMENTS
FOR
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BY APPOINTMENT
TO H.M. THE KING
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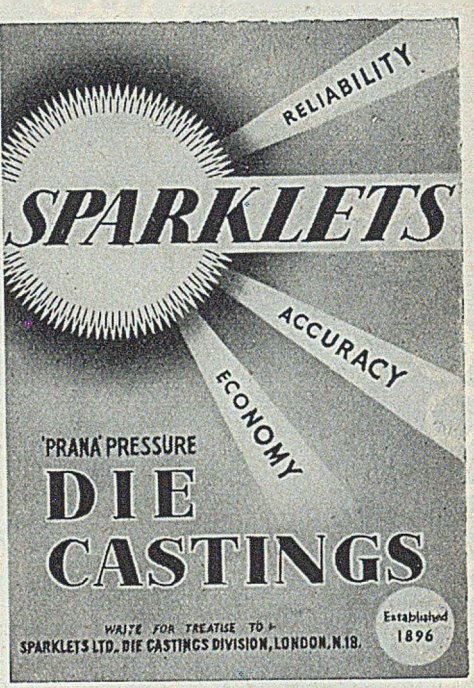
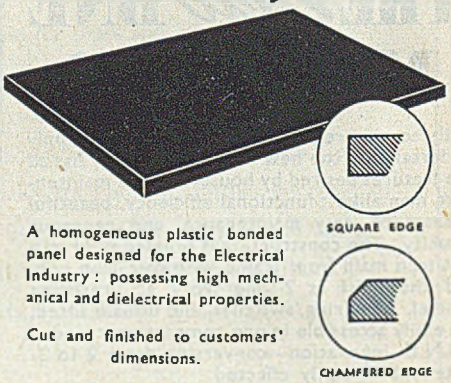


NOW! MONOPLAST

the new insulating material



A homogeneous plastic bonded panel designed for the Electrical Industry: possessing high mechanical and dielectrical properties.

Cut and finished to customers' dimensions.

IMMEDIATE DELIVERY
Full details and samples on request

MONO-PLASTICS LTD.

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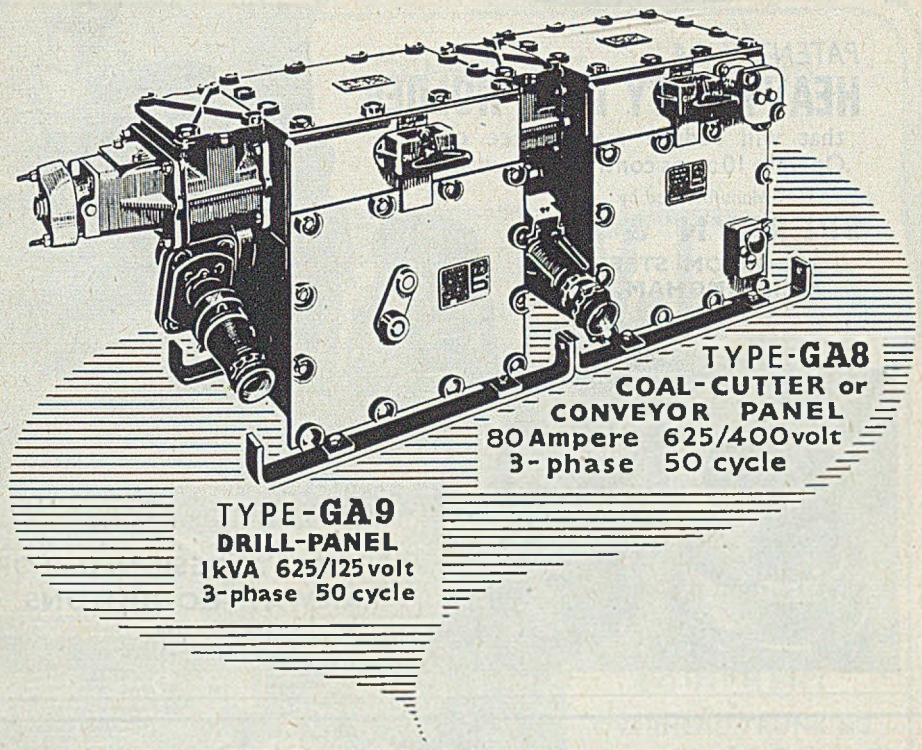
Tel. SLOane 6221



Room-Switches

FOR MECHANISED

mining

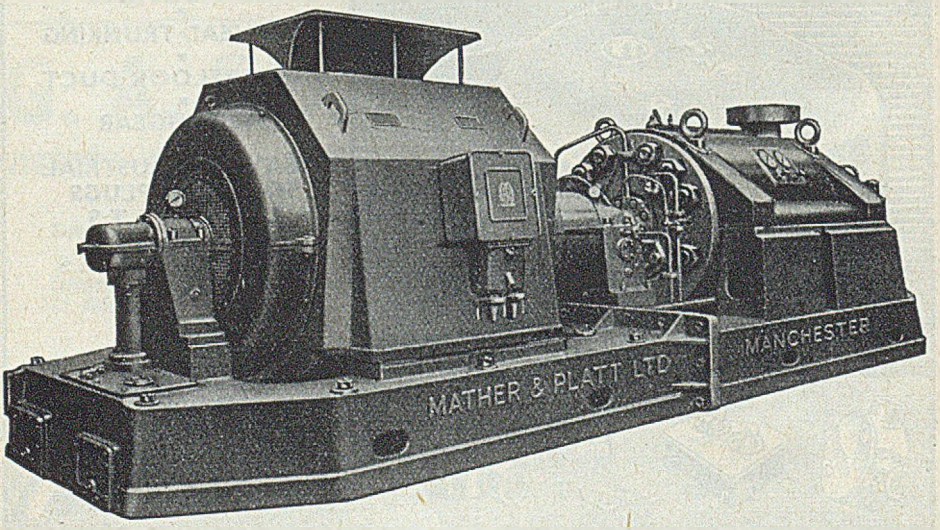
REYROLLE

HEBBURN CO. DURHAM ENGLAND

3,000

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

TAKING NOT MORE THAN 4½ TIMES full load current when started by switching direct on to the supply mains, this Mather & Platt 3,000 H.P. 3,000 Volt, 3,000 r.p.m, Squirrel Cage Motor drives a Mather & Platt Boiler Feed Pump operating at a pressure of 3,000 lb. per sq. inch.

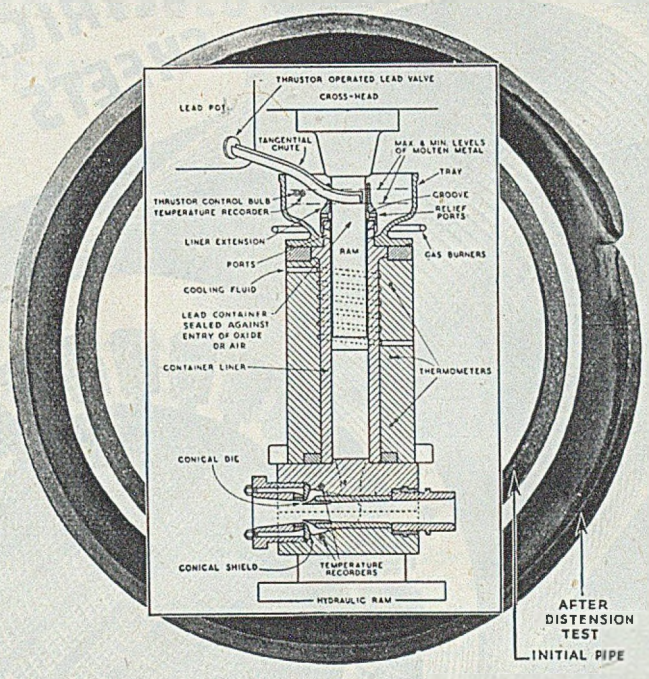


MATHER & PLATT LTD
PARK WORKS MANCHESTER 10

GLOVER'S EXTRUSION METHOD

(BRIT. PAT. 394,427 ; 434,041 ; 561,829 ; etc.)

PRODUCES



PERFECT LEAD SHEATHS

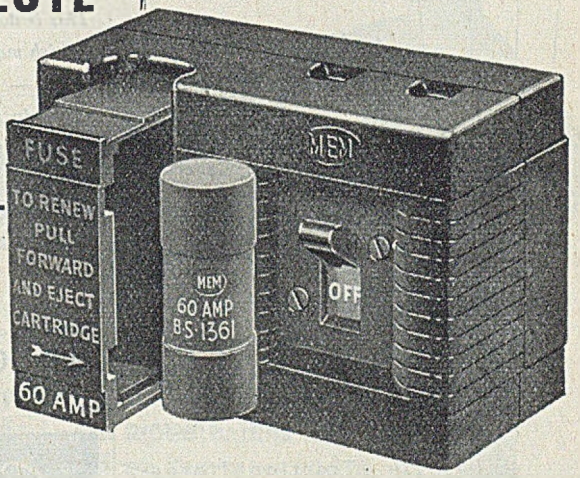
for all cables up to, and including, 132 kV gas-filled

(Write for descriptive brochure)

W. T. GLOVER & Co. Ltd.

TRAFFORD PARK :: MANCHESTER, 17

5-SECOND FUSE RENEWAL WITH ABSOLUTE SAFETY



IT takes just 5 seconds to renew a fuse in the new MEM-AC switch-fuse. No tools are required and it is impossible to touch live metal. MEM-AC has an easy-to-handle cartridge fuse housed in a skilfully designed fuse carrier which can be withdrawn and clicked back into position in a moment.

The MEM-AC switch-fuse meets the need for a compact all-insulated unit for single pole and neutral wiring in domestic applications. The switch matches the fuse carrier in its advanced compact design. It is a simple, robust, slow-break type for A.C. only, with solid silver contacts and the minimum of working parts.

For full details of the new MEM-AC switch and switch-fuse send for folder No. 288.

MEM-AC

the new switchcraft

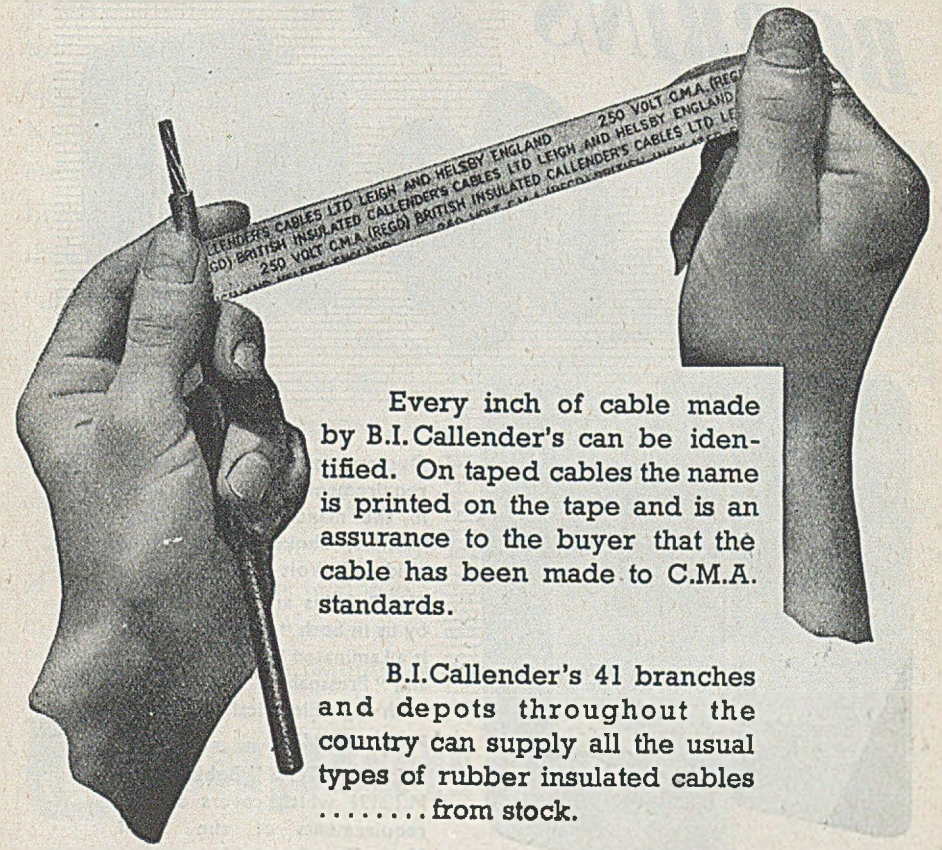
MEM

Switch, fuse and motor control gear, electric fires and localised lighting equipment

MIDLAND ELECTRIC MANUFACTURING CO. LTD., BIRMINGHAM, 11

Branches in London and Manchester

This Tape is your safeguard



Every inch of cable made by B.I. Callender's can be identified. On taped cables the name is printed on the tape and is an assurance to the buyer that the cable has been made to C.M.A. standards.

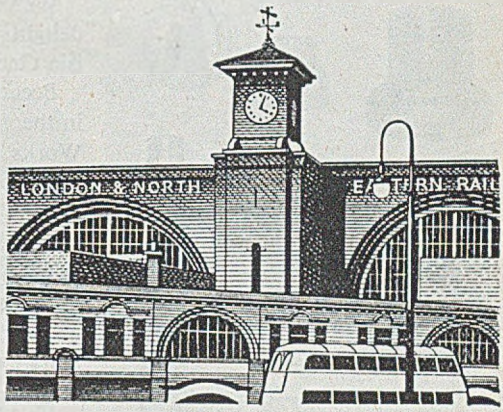
B.I. Callender's 41 branches and depots throughout the country can supply all the usual types of rubber insulated cables .....from stock.

B.I. Callender's

RUBBER INSULATED CABLES

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

Who arrived with a new departure at **KING'S CROSS?**



It was " all change " from gloom to brilliance when Colonel Crompton in 1881 installed at King's Cross Station his new electric arc lamps, giving ten times as much light as the gas jets they superseded. When electric light first began travelling by train it was Crompton who put it there; the same Colonel Crompton who first lighted Buckingham Palace, the Law Courts and the Mansion House. Coal mines and cathedrals, opera houses and floating docks all came within his scope. And many places in the world from Vienna to Calcutta, from America to Tibet had him to thank for the introduction of electric light. The technical precedence that made him a world leader in electric lighting is maintained today in Crompton Lamps and Lighting Equipment and in the planning and advisory service that goes with them.

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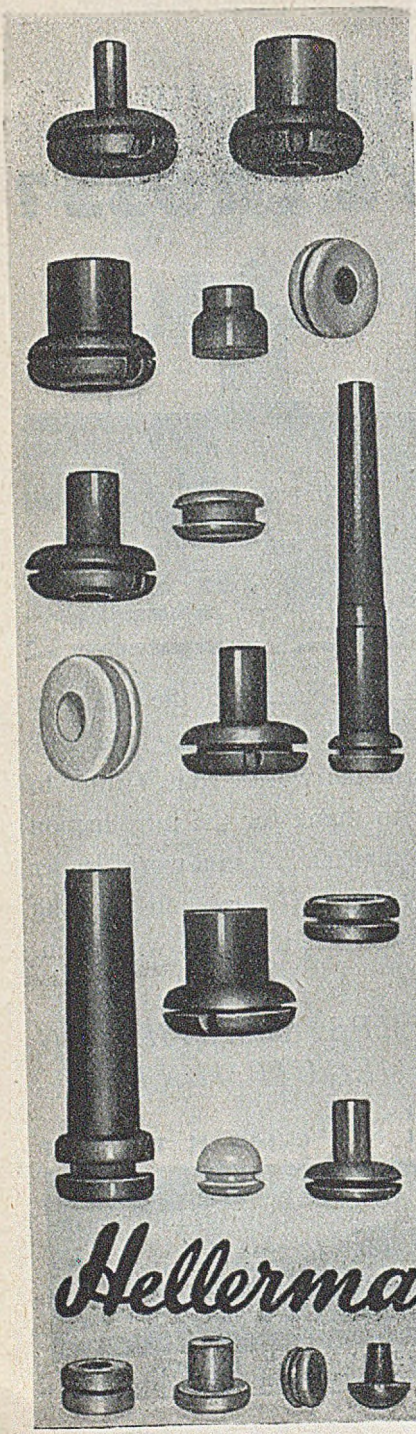
FOR THE LATEST IN LIGHTING

CROMPTON PARKINSON LIMITED. ASTOR HOUSE. ALDWYCH. LONDON, W.C.2
Telephone : CHAncery 3333. *Telegrams : Crompark, Estrand, London*



GROMMET *or* GRUMMET?

We've a bright young office boy who delights in asking awkward questions. "What is a Grommet?" he asked the other day.

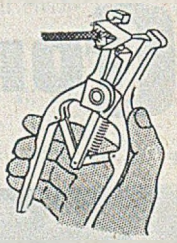
Because we like to encourage this interest in the firm's products, we took him into the Works and gave him the 'gen.' Then he told us that there was no such word as G-R-O-M-M-E-T.

We searched through all the office dictionaries and to our shame found that we have sold millions of little pieces of Hellermann Rubber and Helvin Plastic, described as Grommets, and all the time there is no such word in the English language.

The correct word is Grummet, a nautical expression derived from the 15th Century French word "gromette."

We extend our apologies to the boy in the G.O. and to all our trade friends. We may not be able to spell . . . but we know how to make . . .

HELLERMANN *Rubber Grummets*
HELVIN *Plastic Grummets*



A large range of standard sizes is available to suit all needs. Tension Grummets, fitted by means of a Hellermann Tool, ensure positive location.

Hellermann ELECTRIC LTD.

TINSLEY LANE, CRAWLEY, SUSSEX

Telephone: Crawley 747-748

A14

FROST WARNING

'Possible danger, eh? Shouldn't have thought there'd be frost at tree level tonight, whatever the radio says. Still — better switch on. Silly to take any risks, now that we've got the current . . .'

Not very far ahead of us now lies the Electric Age—with universal, unlimited supplies of electricity. When that age is established, peace will at last begin to count her victories. Farmers will find new weapons against the wasteful treachery of the weather. City dwellers will break free from smoke and dirt and disease. Better days for all. And for us, here in Alton, where we make the batteries for generating stations all over the world, busier days than ever. Hydro-electric, Atomic or what you will, the new generating stations will all need batteries. Good batteries. The kind we have always made at Alton.

ALTON

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THE ALTON BATTERY COMPANY LTD · ALTON · HANTS
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DIRECT RUNNING AND FULLY AUTOMATIC ELECTRIC GENERATING PLANTS • PETROL ENGINES • DIESEL ENGINES • SHALLOW WELL PUMPS • BATTERY CHARGING • ROTARY PUMPS • DEEP WELL PUMPS • DOMESTIC ELECTRIC PUMPS

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DOMESTIC ELECTRIC PUMP

IMMEDIATE DELIVERY

Standard mains voltages 220/230 or 240/250 volts AC single phase. Suction Lift 25 ft. Total head 80 ft.

Raises 250 gallons per hour ... ... £21 0. 0.

Float switch for automatic operation ... ... £2 15. 0.

Can also be supplied for DC voltages to suit private house electric generating plants.

The above prices include carriage paid to nearest Railway Station.

Look at the border and send for lists.

R. A. LISTER & CO. LTD., DURSLEY, GLOUCESTERSHIRE

Branches London, Stamford, Glasgow, Belfast and Dublin

THE SENSATION!

ONE Machine (with interchangeable tubs) that washes and dries clothes and dishes

For work-weary housewives, the most startling, most satisfying news for years—the Thor Automagic Clothes and Dish Washer.

It washes clothes superbly at a turn of the switch. Switch again and it rinses. Another switch and the clothes are better than wringer-dried—without wringing!

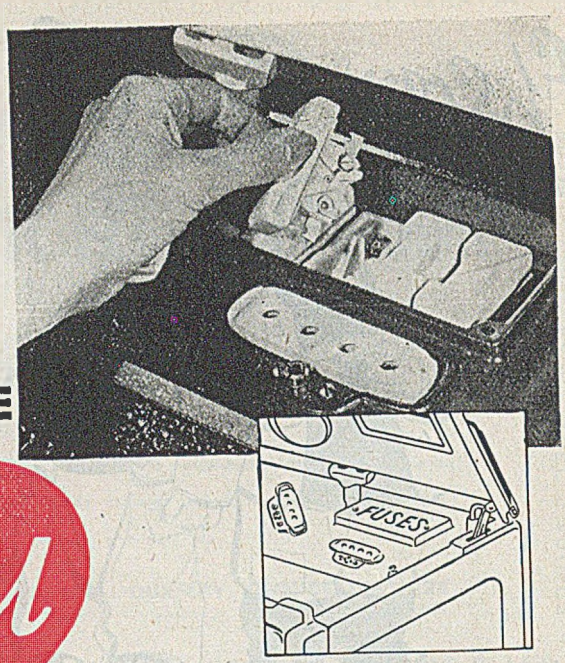
Change the container (1½ minutes), put in the crockery and again just turn the switch and the job is done.

Thor AUTOMAGIC

Combined Clothes and Dishwashing Machine

Hurley Machine Co. (England) Ltd.
55-59 Oxford Street, London, W.1.

EXPORT ENQUIRIES INVITED



TO PLEASE *you*

and thousands of Mrs. Robinsons!

Designed to satisfy both the exacting engineer and the critical cook, the new Creda domestic cooker boasts a wealth of features planned for ease of installation and trouble-free service

An important point, for example—particularly when the EV. 13 cooker is built-in—is the ready accessibility of the sub-circuit fuses. These are conveniently grouped together on a fuse-panel located in a chamber at the back of the grill-space and quickly reached by lifting the hinge-back hob. The fuse chamber is equipped with a cast cover secured by two screws giving protection from any spill-over from the hob. All fuses are easily replaceable

- Plate warming drawer
- Boiling plates and grill boiler to E.D.A. Interchangeability Specification
- All elements 'plug-in'
- Clean modern design — corner and crevice free—vitreous enamelled finish —silver grey mottle or two tone ivory

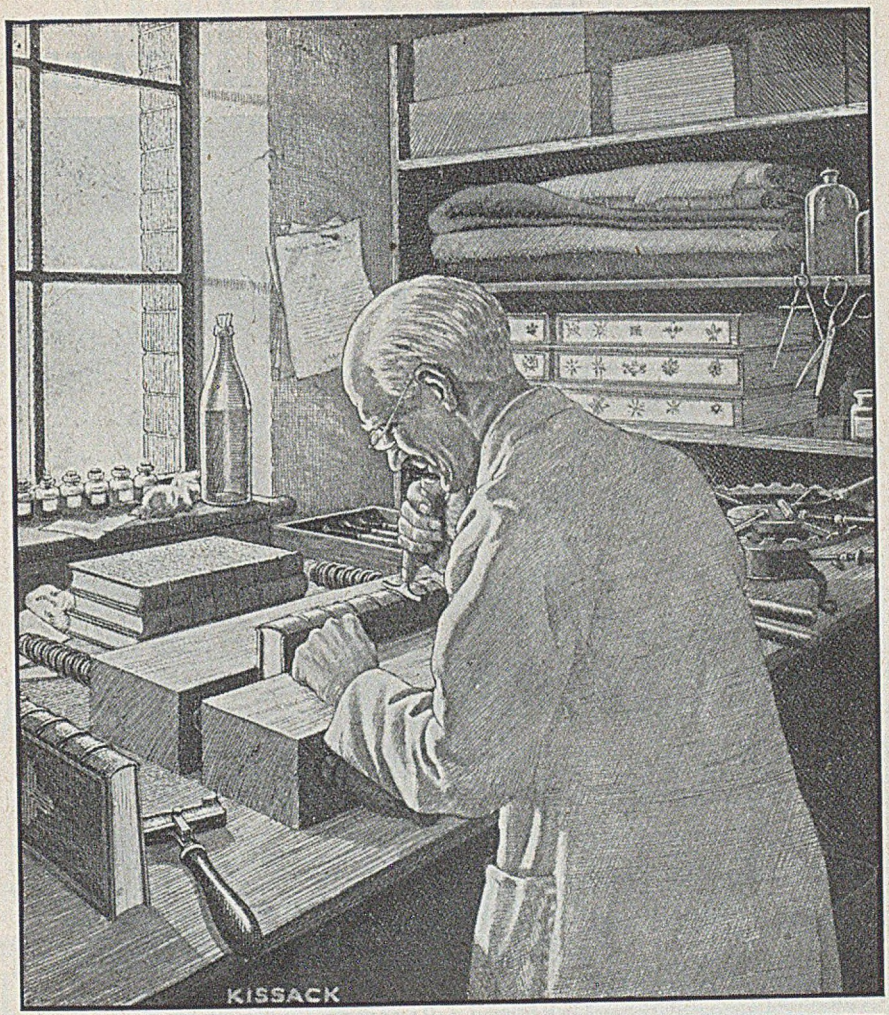
Creda

ELECTRIC COOKERS

Write for full particulars of the E.V. 12 and E.V.13

A COMPANY

SIMPLEX ELECTRIC CO LTD OLDBURY BIRMINGHAM AND BRANCHES



In all ages, the finest recompense for thorough workmanship put into the making of an article is the satisfaction given to the user.

TRADE MARK

GEORGE ELLISON
LIMITED
PERRY BARR BIRMINGHAM 22B

577

ELECTRICAL REVIEW

Managing Editor: HUGH S. POCOCK, M.I.E.E.
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28th May, 1948

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXLII. No. 3679 28th MAY, 1948 9d. WEEKLY

The Gas Turbine

Open- and Closed-Cycle Designs

GREAT advances have been made in gas-turbine development since the principles and possible applications of this form of heat engine were discussed in these columns some four years ago. At that time no unit had been built with a net output (i.e., after deduction of power needed for air compression) that approached the capacity required for a modern public generating station. To-day turbo-alternators of nearly 30,000 kW are being constructed. Two of 15,000 kW are on order for English generating stations; these, which were referred to (together with descriptions of recent installations abroad) in our issue of 2nd May, are of the open-cycle design. A third set, proposed for Scotland, employs the closed-cycle principle, which is the subject of an article in this issue.

High-temperature Steel Development

The theoretical efficiency of the gas turbine, referred to the Carnot cycle, is potentially much greater than that obtainable with steam. The full exploitation of this advantage, however, calls for durable steels capable of withstanding higher temperatures than those in commercial use. The solution of this problem may not be long ahead, as British high-temperature steel is well advanced in technical development and is in demand by other countries.

Overall thermal efficiencies of 35 to 37 per cent are expected by some authorities to become common gas-turbine practice within the next few years, with 40 per cent as a later possibility. Nevertheless it is not high thermal efficiency that counts most at this stage, since any advance over steam would be much more than offset by the high cost and the growing scarcity of fuel oil. For this reason the closed-cycle (hot-air) design would seem to offer more promise for continuous operation, as the products of combustion do not pass through the turbine and bunker C oil can be used. It also lends itself to construction in single-shaft units of greater output, in which case the amount of space taken by its large air heater would be of less moment.

Use of Pulverized Coal

On the other hand, means of using coal in closed-cycle turbines do not appear to have been fully explored, whereas some of the protagonists of the open-cycle design expect that it will be adapted to pulverized coal operation within the next few years. This view receives support from the recent Young Report to the National Coal Board, which refers to encouraging results from full-scale tests in the United States.

Under present conditions open-cycle turbines seem especially suited to peak-load and emergency duties. They occupy relatively little space, need little water and can be quickly run up from cold. Ancillary refinements introduced to improve thermal efficiency can be varied to give the most economical overall cost for the plant load factors and other operating conditions envisaged. Particulars with regard to capital costs, and of the proportion that should be debited to development charges, are meagre at the present experimental stage.

There has perhaps been a tendency in some quarters to expect too much too early from the influence of the gas turbine on electricity generation. It seems certainly to have an immediate but limited field of utility, which will be extended with metallurgical progress (such as that described in the article "Precision Casting" in our issue of 16th January) and lessened selectivity in regard to fuel. It may be that it will find full scope for the purpose in view only when the atomic-energy pile becomes a practicable source of gas at high temperatures. In that event the use of cooling water from heat exchangers should make the combination of district heating with electricity generation on an appreciable scale much more feasible than it is at present.

Plant Shortage

THE widespread stoppage of electricity supply last Sunday as a result of two failures furnished an example of what lack of generating plant may mean. A large proportion of the insufficient plant available was necessarily out of commission, either for the running repairs requisite to avoid the possibility of breakdown during week-days when the industrial load is heavy or else as part of the summer schedule of maintenance that will prevent possibly much worse conditions next winter. It was bad luck that a cold snap should break the warm weather which provided ideal conditions for laying off plant for overhaul, coupled with mains faults that produced unusual combinations of circumstances.

The Right Spirit

MR. C. T. MELLING, the chairman of the Eastern Electricity Board, has adopted a bulletin system by which he maintains contact with the staff of his Area and others concerned. One which we have received expresses the Board's policy towards its staff and consumers—a policy heartily to be commended. Briefly the aim is to build the new organization on the present foundations without undue haste. Proper attention is to be given to the importance of district operations as the basis of consumer relations and no local functions will be centralized unless it is clearly of advantage to do it. No member of the staff will be moved unnecessarily and due regard will be paid to the circumstances, domestic and other, of the individual. This is the right spirit and should preserve harmony within the organization and between the organization and the public, who are being urged by outside influences to regard nationalization of electricity supply with suspicion.

Safety in Mines

IN a foreword to the Review of Flameproof Testing from 1922 to 1947, which Mr. H. Rainford has compiled for the Ministry of Fuel and Power (H.M. Stationery Office, 9d. net), the Chief Inspector of Mines, Mr. A. M. Bryan, emphasizes the need for good maintenance. Electrification, he points out, is nowadays regarded as essential to the economic working of coal mines. If flameproof construction had not been developed, however, the horsepower of motors (which now reaches 1·5 million) would not have doubled within the past twenty-five years. Nevertheless safety ultimately depends upon keeping the electrical installation in its original condition.

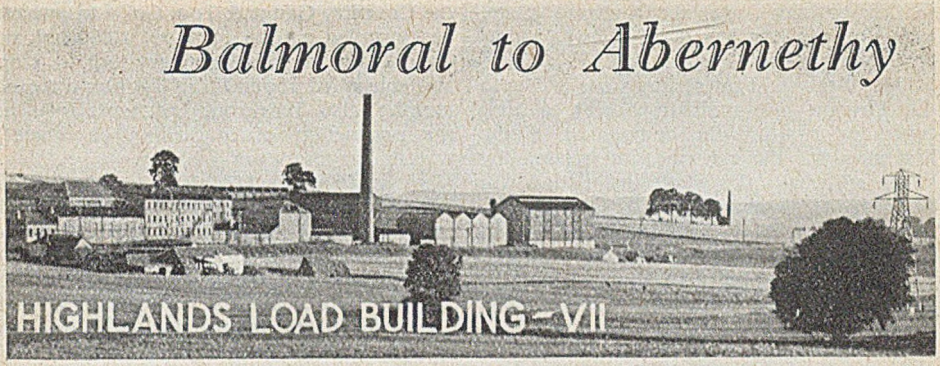
I.E.E. Overseas Members

To engineers abroad technical subjects most nearly related to the needs of the country in which they are living naturally loom largest. Recognition of this inevitable tendency is shown in the encouragement given by the Institution of Electrical Engineers to its overseas members to join sister societies that are based on local ties. The happy consequences of this attitude are evident from the account given by Mr. James R. Beard in the May *I.E.E. Journal* of the cordial reciprocity of good feeling from South African engineers. This dual membership of the senior and indigenous institutions, while allowing scope for concentration on matters of more local importance, enables the participants to be kept in touch with developments of wider significance, which tend to assume greater importance as technology advances.

New Export Record

No one can deny that electrical manufacturers are doing their share in the export drive. The record set up in January was well exceeded in April with a total of £8·4 million. At this rate the target set for the end of 1948 should be easily attained.

Balmoral to Abernethy



HIGHLANDS LOAD BUILDING—VII

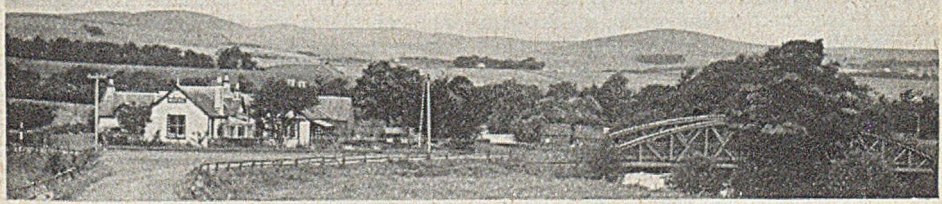
FROM Balmoral (see *Electrical Review*, 23rd April, 1948) we continue along Deeside to Braemar and then turn due south for a drive through Glen-Shee, often at 2,000 to 3,000 ft altitude. For 25 miles or so there is nothing electrical to see on this section, but the compensations in scenery are many. As we approach Dalrulzion to the south, a point on the west-to-east Tummel-Forfar 33-kV line, we see, however, a five-mile section of 11-kV line under construction which will be served by a tapping on the Tummel-Forfar line. Again, after crossing the main line we see another 11-kV line from the same tapping to Persie in the south. We now proceed direct to Perth in readiness for the last stage of the tour, which takes the form of a circular trip through the intensive development in the southern area referred to earlier.

The title picture shows the factory of the Dundee Linoleum Co., Ltd., a new consumer at Liff, and below is seen the Justinhaugh Hotel on the River South Esk

On our way from Perth to Coupar Angus to the north-east we pass at Scone the end of the 11-kV line up from Perth, and further north at Balbeggie the end of another 11-kV line down from Coupar Angus. The gap indicated is barely two miles, and when this is closed in, it will complete a ring, Perth-Coupar Angus - Meigle - Errol - Perth, and this indicates the evolutionary trend of development throughout the major area. The primary feed into this network at Coupar Angus is by an 11-kV line from Blairgowrie where there is a 33-kV spur down from the Tummel-Forfar line at Hill-of-Alyth.

We are now in a rich agricultural and farming country, raspberry growing being probably the principal activity at this particular point, but a glimpse at the industry at Coupar Angus alone emphasizes our earlier comments on the development in the south. L. O. Tractors, Ltd., in Coupar Angus have a demand of about 51 kW and consume 30,000 kWh per year. Now we are on the road to Meigle to the north-east, and turning from the 11-kV ring on the right, but at Meigle itself we meet a spur up from the ring, which is typical of the tentacle growth of this load-builder's "hunting ground."

Veering east we are at Glamis, the Queen's old home, where there is a light rural construction line feeding down from Forfar, serving several farms and the Castle which has a demand of 25 kW. On the way to Forfar, travelling north-east again, we see many other farms supplied from this line. In the town of Forfar we have the opportunity to inspect one of the undertaking's district showrooms. Other showrooms throughout



the major areas are at Dingwall, Elgin, Fraserburgh, Stonehaven, Banchory, Montrose, Arbroath and Perth.

One of the most interesting visits is that to the Lowson jute mills in Forfar, a new consumer awaiting the completion of the first stage of the electrification scheme by which eventually the whole installation will be converted from steam driving. Eighty new looms with ¾-h.p. individual drives have already been put on the new supply. There are forty others awaiting wiring and still a further forty are expected to be on by the end of this year. The engineer expressed considerable satisfaction at the running of the electrically driven looms, the output from which is considerably greater, not necessarily by virtue of the looms operating faster, but rather because of the smoother and more constant driving. A 250-h.p. Carmichael horizontal steam engine is driving 340 looms through underground shafting, and these are to be converted into 7·5-h.p. motor group drives on sections of the same shafts, with five to six wide looms or eight to ten narrow looms on each shaft section. Another steam engine driving the finishing department will also be converted in due course.

Cereal Mills

Now we turn more to the north, and crossing the Tummel-Forfar 33-kV trunk we proceed to Justinhaugh where the Angus Milling Co., Ltd., has a comprehensive milling installation at the Glencoul Mills concerned largely with the manufacture of oatmeal and breakfast oats. The greatest electrical interest in this installation, however, is the new grain-drying plant which embodies an electrically heated drier by which the air, before being passed into the drying chamber, passes through banks of resistors at the intakes of the fans. The total heating load is 343 kW and there is probably 40 h.p. of motors driving the fans, conveyors, etc., on this drying plant. Overall, the mills demand 484 kW and the consumption exceeds ¼ million kWh per year. The mills are supplied from a 600-kW substation on site.

As we leave for Brechin, almost due east, a sight of Justinhaugh Hotel on the River South Esk is another reminder of the Scottish tourist industry and its load. In the vicinity is a completely new agricultural village which includes some Swedish timber houses brought over in manufactured sections. Brechin city, with its historical castle and cathedral, has a population of 6,840 and its 1,300 consumers include industrial concerns such as the Coventry Gauge & Tool Co., Ltd., which has installed a total of about 1,000 h.p. of motors for modern machine-tool driving and consumed about 28,300 kWh in a recent month; also Tecalemit, Ltd., specialists in the production of lubricating equipment, whose processes of casting, machining, plating, welding, etc., make a demand of 250 kW and are responsible for an annual consumption of 438,000 kWh. Brechin is on an 11-kV ring main, Brechin-Fettercairn-Laurencekirk - Montrose - Farnell - Brechin, which is fed at the north at Laurencekirk and at the south at Friockheim, at the ends of the 33-kV trunk from Keith and the 33-kV trunk from Tummel, respectively.

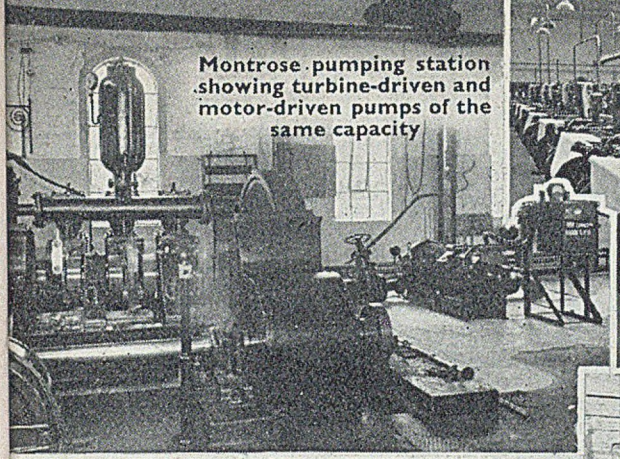
A mile or so due north and we are at Edzell, which is also supplied from the 11-kV ring. It has a m.d. of 40 kW and 200 consumers. Further north at Fettercairn we are in the bustle of a cattle show, having passed a shooting lodge on the supply and the River North Esk. Now travelling due east to Laurencekirk we experience a change in the countryside, rising 1,000 ft in two miles.

A Well-Electrified Farm

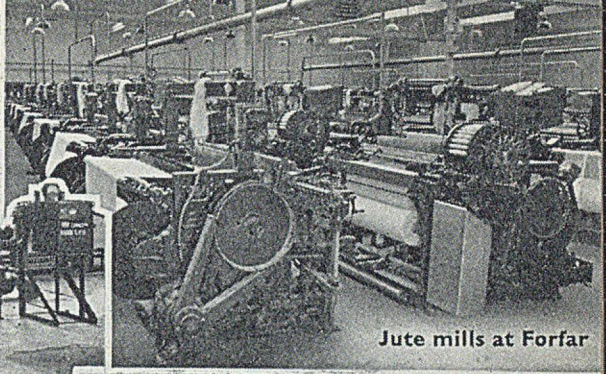
We cannot recall seeing a farm so thoroughly electrified as that of John Mackie in which we now find ourselves at Bent, near Laurencekirk. It is a farm of 730 acres with a dairy herd of 120 cows and followers, and a 200-gal. daily milk yield. In the dairy there are a 2-h.p. motor-driven milking machine, a 1½-h.p. water pump, a 1½-gal. cooler water booster, 30-, 15- and 5-gal. water heaters for tubs and wash basins, a 3-kW immersion heater for calves' mash, a 30-kW electrode steam boiler for sterilizing the milking plant, and the milking parlour which is lit by fluorescent lamps.

In the steading there are a 16-h.p. motor-driven threshing mill, a portable turnip cutter, potato dressers, a motor-driven tyre inflator and a motor-driven fan for the potato store. There is a grass-drying machine in the course of erection, but the *pièce de résistance* is the engineering shop and smithy where we are surprised to see, on a farm, an electric welder, a motor-driven grinder, drill, forge fan, and vertical saw. The courtyards are illuminated by mercury-vapour lamps, and hostels for both men and women are lighted and heated electrically.

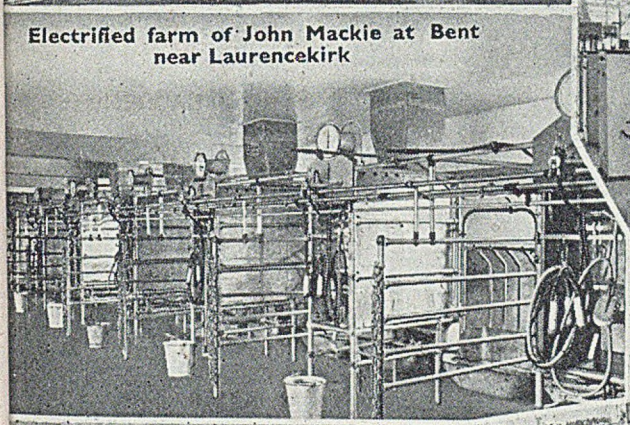
Laurencekirk substation is at the extreme end of the 33-kV line from Keith in the north, and the outgoing feeders to Montrose and Brechin are part of the ring already referred to. The Brechin line is of H-pole



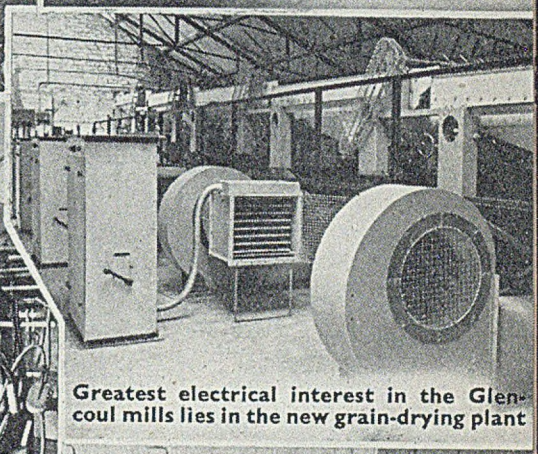
Montrose pumping station showing turbine-driven and motor-driven pumps of the same capacity



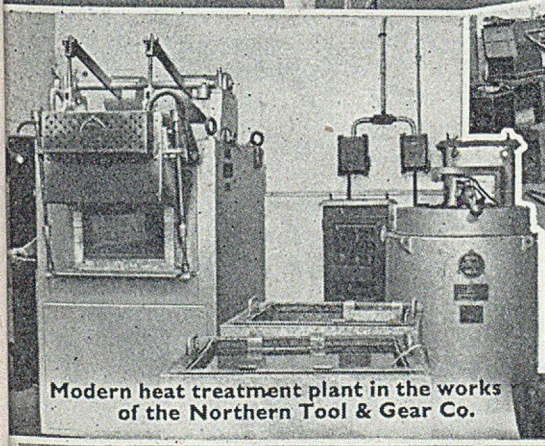
Jute mills at Forfar



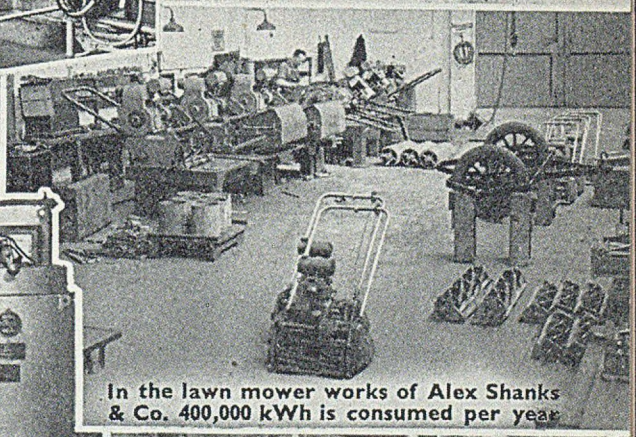
Electrified farm of John Mackie at Bent near Laurencekirk



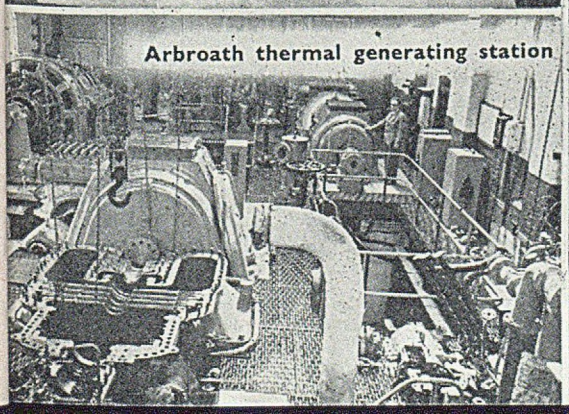
Greatest electrical interest in the Glencoul mills lies in the new grain-drying plant



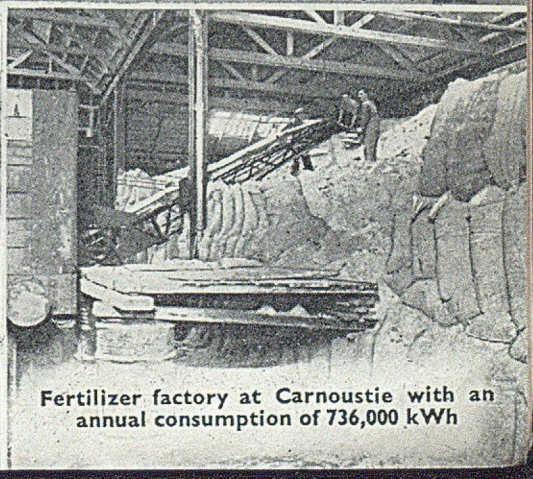
Modern heat treatment plant in the works of the Northern Tool & Gear Co.



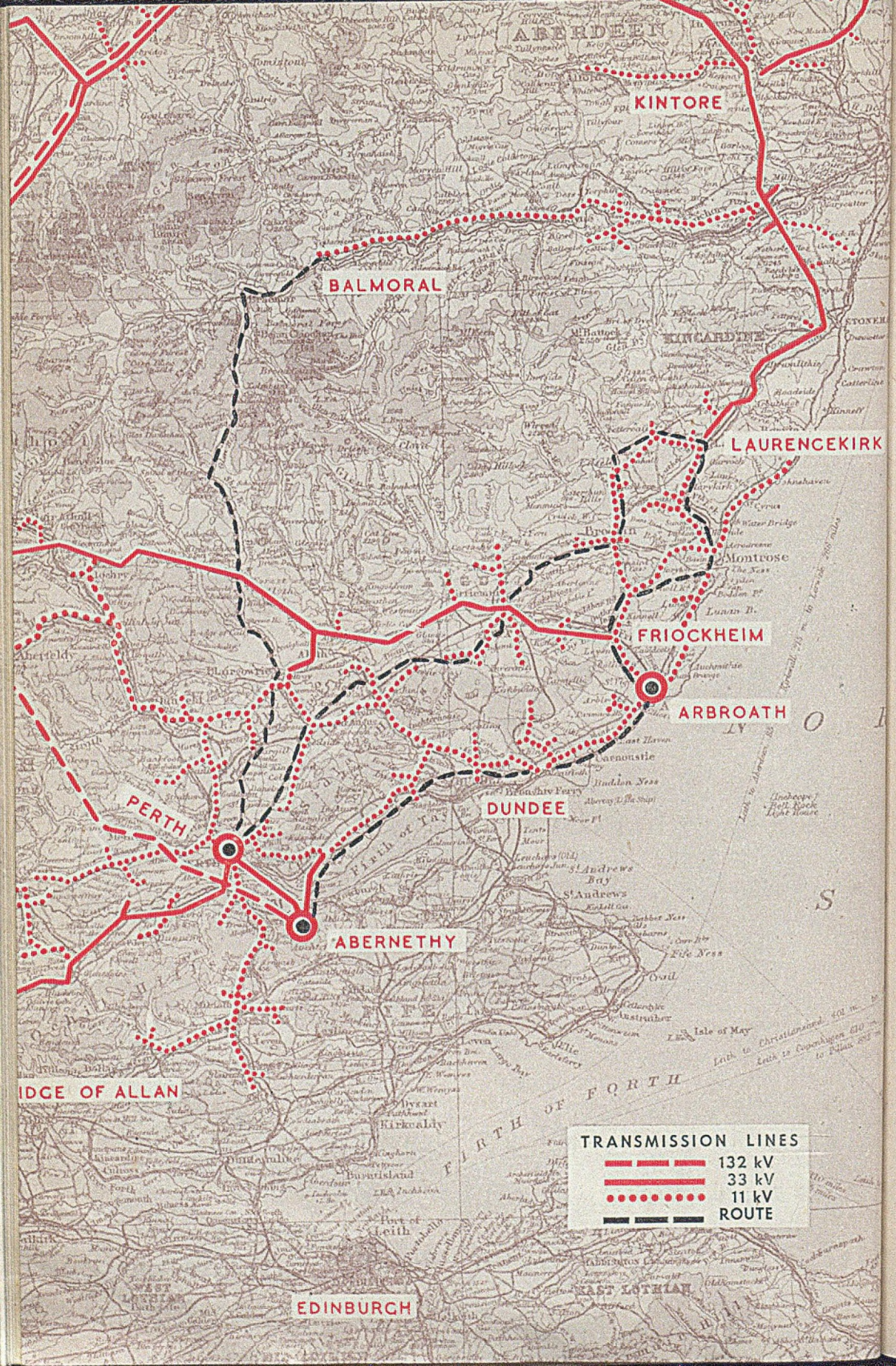
In the lawn mower works of Alex Shanks & Co. 400,000 kWh is consumed per year



Arbroath thermal generating station



Fertilizer factory at Carnoustie with an annual consumption of 736,000 kWh

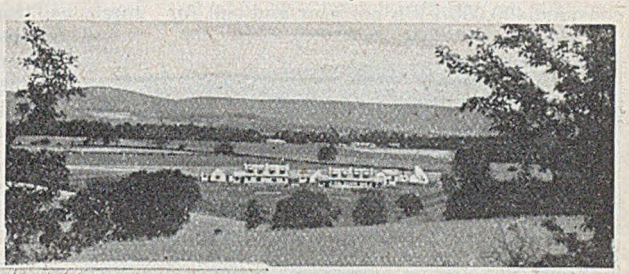

KINTORE
BALMORAL
LAURENCEKIRK
FRIOCKHEIM
ARBROATH
DUNDEE
PERTH
ABERNETHY
IDGE OF ALLAN
EDINBURCH
TRANSMISSION LINES
132 kV
33 kV
11 kV
ROUTE

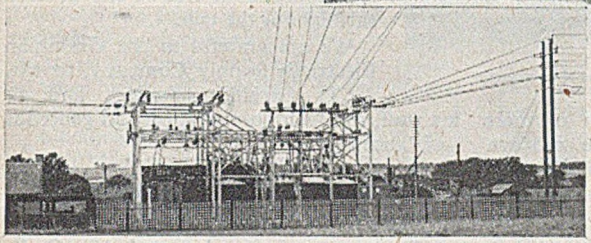
construction with a view to its conversion to 33 kV later on when the Laurencekirk-Friockheim gap is closed. The Montrose feeder, by the way, is underground. The substation capacity is 2,500 kVA. The Laurencekirk town supply is responsible for a m.d. of 100 kW and a consumption of 200,000 kWh per year.

Now we head south for Montrose on the coast, but first there is the Montrose-Kinaber water pumping station to see. It pumps water from the River North Esk to a reservoir from which Montrose is supplied. An interesting contrast in this station is a 35,000-gal. per min turbine-driven pump which occupies a floor area of 540 sq ft, and a 35,000-g.p.h., 65-h.p. motor-driven pump which occupies only 80 sq ft of floor area. The motor-driven pump has replaced a diesel-driven pump of about the same capacity. A second motor-driven pump has a capacity of about 45,000 gal. per hr. There is a very fine industrial load in Montrose, and one of the most interesting consumers is the powdered (dehydrated) potato factory of Chivers & Sons, Ltd. The potatoes are cleaned, washed, cooked, mashed and dried in an installation which incorporates something like 600 h.p. of motors. The m.d. is 600 kVA and a recent full week's consumption was 45,160 kWh.

Turning inland again, this time south-west, we shortly see the 33-kV, 5,000-kVA substation at the end of the Tummel line at Friockheim, with its outgoing lines to Farnell for the Brechin-Montrose ring, and one south-east to the coast at Arbroath, our next port of call. In Arbroath we visit the thermal generating station which is still in use for peak-load service. Its main equipment includes a 3,750-kW and a 2,500-kW B.T.H. turbo-alternators, and a 1,000-kW Allen d.c. turbo-generator all supplied from a 40,000-lb-per-hr boiler plant. There is also 1,000 kW of rotary-convertor plant for the town supply. The maximum load on the station last winter was 4,500 kW.

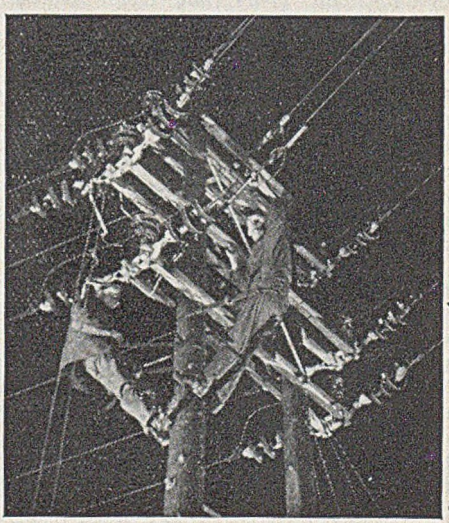
At the main substation at Arbroath there are 11-kV incoming feeders from the Arbroath power station and from Montrose, and 11-kV outgoing feeders to the local substation and the 600-kW of transformers in the substation. The Arbroath swimming pool is an attractive place, and the electrical interest is the 24-h.p. motor-driven pump which is continuously circulating the water through filter plant at the rate of 1¼ million gallons, i.e., a complete refill, in twelve hours. The Elms housing estate at Arbroath has about 120 all-electric houses, but an investigation showed





Above: New agricultural village at Justinhaugh which includes some Swedish timber houses

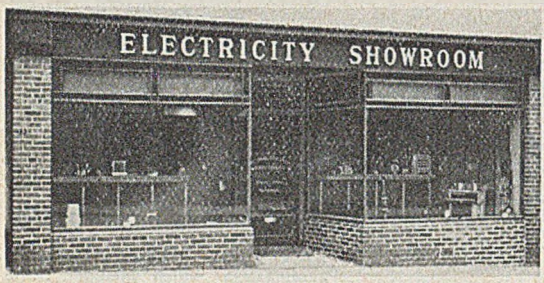
Left: The 5,000-kVA substation at Friockheim is at the end of the 33-kV Tummel-Forfar trunk



Night working on a 33-kV line by light provided by "firework" torches

the unusual diversity represented by an average maximum load per house of only 0·5 kW.

One of the interesting consumers in Arbroath is Alex. Shanks & Sons, Ltd., who consume 400,000 kWh per year and call for 220 kW m.d. for the production of their well-known lawn mowers. Some modern heat-treatment plant in the shape of a 30-kW, 1,000 deg C carburizing and hardening furnace and a 10-kW, 700-deg C hardening furnace in the works of the Northern Tool & Gear Co., Ltd., is an indication of the industrial outlook in this area. The company specializes in gears of all descriptions. In the manufacture of agricultural machinery the Reekie Engineering Co., Ltd., consumes over 13,000 kWh per year.



One of the undertaking's district showrooms

Passing along the coast south-westerly we come to Carnoustie which is served by a double-circuit 11-kV line from Arbroath which continues via Monifieth to outskirt Dundee and travels round to Perth as part of the intensive development of this industrial belt. We stop at Carnoustie to see the factory of Anderson-Grice & Co., Ltd., which consumes over 335,000 kWh a year and has a m.d. of 156 kW, and the fertilizer factory of Scottish Agricultural Industries, Ltd., which consumes over 736,000 kWh a year and has a m.d. of 250 kW.

As we continue south-westerly for the last few miles of our tour we pass through Monifieth, where there is a new discharge street lighting system with concrete poles; the carpet factory at Milton of Monifieth of Wallack & Bauman, Ltd., who consume over 105,000 kWh per year and have a m.d. of 100 kW; the Tay Bridge near Dundee; the most northerly point of the grid at Dundee; the Bonar Long transformer factory; and the works of the Dundee Linoleum Co., Ltd., at Liff, which is in process of being connected.

As we approach Abernethy after dark we witness the interesting spectacle of night working on a 33-kV line by light provided by "fireworks" torches specially developed for the undertaking by Brocks, Ltd. Each torch will burn continuously for over 15 minutes and the engineers and linesmen speak highly of this method of illumination for the conditions peculiar to their work.

At Abernethy we end a 790-mile tour packed with extreme interest, and our hope is that we have expressed in our resulting articles, for the help of load builders everywhere, something of the zeal we encountered throughout the trip.

We are grateful to the Grampian Electricity Supply Company, to Mr. J. J. Cargill, manager, and to his staff, for their co-operation and generous assistance.

Electricity Charges

Proposals of the East Midlands Board

AT a press conference last week Mr. C. R. King, chairman of the East Midlands Electricity Board, said that if charges in the area remained unaltered there would be a deficit of about £570,000 during the current year. Already some of the municipal undertakings in the area had decided to increase charges but the revisions had not become effective by 31st March last.

It was proposed to institute increased charges which in a full year would bring in an extra £400,000, but the whole of this would not accrue before the end of the current financial year. Industrial tariffs under special agreements (normally with a coal clause) would not be affected although some of them might have to be adjusted later when the results of an investigation which was now proceeding became known.

Tariffs for domestic and business supplies had not been materially increased since 1939 (some had actually been reduced) and they had been at an uneconomic level for some time past. In some cases flat-rate lighting charges would be reduced. The revisions would take effect in the autumn and so every consumer would have at least three months' notice.

Schedules issued at the conference gave details of the proposed increases. Following the general practice, the "unit" charge is to be raised to ¾d. In most cases the standing charges are to remain unaltered but in a wide area there is to be a reduction of 25 per cent in the "Rate B" tariff standing charge paid by some consumers (about 10 per cent of the two-part tariff consumers in the Derbyshire and Nottinghamshire Co.'s area, for instance.)

Closed-Cycle Gas Turbines

Operation and Advantages

SOME particulars of combustion gas turbines of the open-cycle type, for which the working substance is provided by gas from atomized oil burned in highly compressed air, were presented in the *Electrical Review* of 7th May. Reference was made also to the closed-cycle design in which the medium is compressed air heated by gases which traverse an independent circuit. As reported in our issue of 20th February last (page 266) the installation at Dundee of such a machine is under consideration for operation on peak loads or at times of water shortage on the system of the North of Scotland Hydro-Electric Board.

Advantages claimed for the closed-cycle gas turbine include the absence of risk of corrosion and abrasion of the interiors of the turbine and compressor, since they are kept free from the products of combustion. This permits the use at present of bunker oil and, as a later possibility, of pulverized coal as a means of securing the requisite high temperatures.

Working temperatures are the same at all loads, variations in which are met by a proportionate change of air density. A conspicuous component of the closed-cycle design is the air heater, which has a function similar to that of a boiler in steam practice, as it supplies the heat of the fuel through heat-transmission surfaces (tubes) to the working medium, which has already picked up the waste heat from the turbine exhaust in a heat exchanger. There is, however, no change in condition of the medium as occurs with evaporation in a steam boiler, and compensation has to be provided only for the drop in temperature through the turbine. The absence of liquid permits the installation of the heater out of doors. After the air has passed through the turbine and heat exchanger, it is cooled to a low

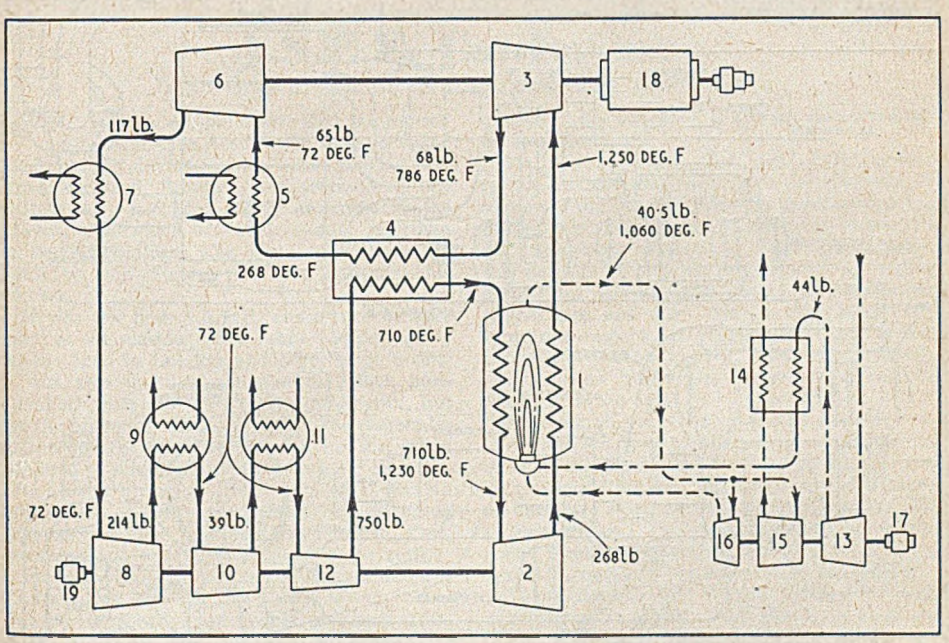


Fig. 1.—Circuit diagram of hot-air turbine (pressures shown in lb per sq in. absolute)
(1) Air heater; (2) h.p. turbine; (3) l.p. turbine; (4) heat exchanger; (5) pre-cooler; (6) l.p. compressor; (7) first inter-cooler; (8) first i.p. compressor; (9) second inter-cooler; (10) second i.p. compressor; (11) third inter-cooler; (12) h.p compressor; (13) combustion air compressor; (14) combustion air pre-heater; (15) exhaust gas turbine; (16) recirculating gas fan; (17) motor-generator; (18) main generator; (19) starting motor

temperature and taken again through the compressor for a continuance of operations. The arrangement of the circuits is indicated in Fig. 1, and a layout for a typical 15,000-kW set is given in Fig. 2.

A 2,000-kW experimental set of this type (Fig. 3), which was built by Escher Wyss in 1935, has run for upwards of 4,000 hours including recent employment as stand-by to generating plant feeding the Zürich network. It was conservatively designed with a low rate of heat release and a charging pressure at the oil burner of 45 lb per sq in (3·16 lb per sq cm).

At present Escher Wyss are building a 13,000-kW unit for the Electricité de France organization which is expected to be running in the Paris district within the next twelve months. A notable feature of this plant is that it is intended for continuous operation on base load with complete means of regulation to meet a fluctuating electrical demand. It was designed two years ago on a basis of 100,000 hours of service with a maximum gas temperature of 1,200 to 1,250 deg F (650 to 676 deg C) and an overall thermal efficiency, including the auxiliaries, of 34 per cent.

The hot-air turbine needs only one-tenth to one-eighth the quantity of water required by an equivalent steam plant. The time taken to run up from cold is one to two hours, depending upon the ambient temperature, but once warm the turbine should be able to carry full load within a few minutes of starting.

At the thermal efficiency stated the fuel-oil consumption is given as 0·55 lb (250 gm) per kWh, but this figure is expected to drop to 0·48 lb (220 gm) with later improved plants with overall efficiencies of about 40 per cent. The capital cost of a unit of 34 per cent efficiency is said to be lower than that of a

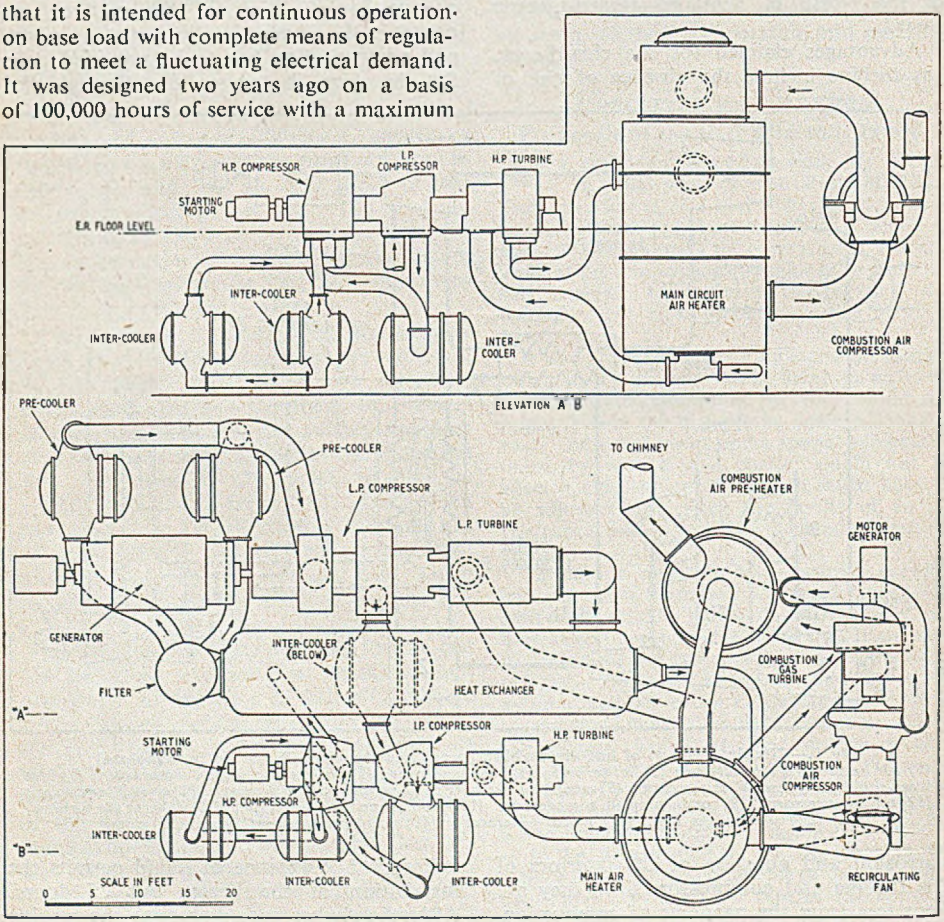


Fig. 2.—Typical layout for 15,000-kW closed-cycle gas turbine

diesel engine but approximately one-third more than that of a steam plant of 26 per cent efficiency. Its weight is only half that of a diesel installation.

The use of gases other than air as a medium is a future possibility. In that case the closed-cycle system should lend itself well to operation by heat generated in an atomic pile. Helium, which serves as a moderator for the fissionable material, would thus offer the prospect of direct instead of indirect heating.

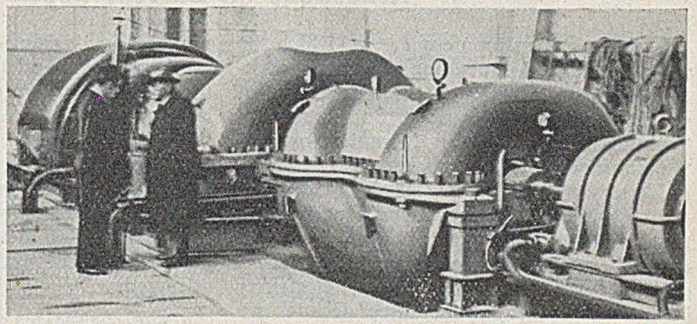


Fig. 3.— Experimental 2,000-kW unit at Zürich

This article is based on information communicated by Mr. G. Geoffrey Smith, author of "Gas Turbines and Jet Propulsion" and a director of Associated Iliffe Press, Ltd., and was obtained during an interview at Zürich with Dr. Curt Keller, chief of Escher Wyss research laboratories, whose collaboration is gratefully acknowledged, and Mr. F. C. Sheffield, who represented the *Electrical Review*.

A.S.E.E. Conference

Importance of the Supervising Engineer as Intermediary

SOME seventy delegates attended the annual conference of the Association of Supervising Electrical Engineers, which was held at the Royal Pavilion, Brighton, last week-end. The visitors were accorded a civic welcome by the Mayor, after which Mr. E. J. Sutton, chairman of the Association, who presided at both the Saturday and Sunday sessions, delivered his address.

It was the first A.S.E.E. conference to take place at the seaside. The venue has previously always been in London and other large towns. It was also the first occasion on which non-members were admitted to the conference, but for the opening addresses only. The remainder of the proceedings took place in private, being confined to administrative matters.

In his address as chairman, Mr. Sutton commented on the importance of the supervising engineer as the intermediary between chief executive and operative sections of the staff.

Increased productive output necessitated the minimization of factory breakdowns: that security depended upon proper maintenance of plant, especially the electrical services, which were now an integral part of modern productive methods. Efficient electrical installation work reduced the cost of maintenance, which indirectly contributed to cost of production. Yet the significance of electrical maintenance was not always fully appreciated; too often it was classed as a non-productive item. Shortage of man-power added to the responsibilities of the supervising engineer, for he must encourage anything that would help labour to be more efficient. To that end, he must make himself more efficient.

Mr. Sutton hoped that one of the earlier results of the nationalization of the supply section of the industry would be some unification of tariffs, if only to simplify one of the difficulties of supervising engineers. Their Association was actively in support of compulsory wiring regulations and the registration of installation contractors, and they trusted that some real support would be forthcoming from the British Electricity Authority for what Mr. Sutton described as "this long overdue reform, so essential to the interests of users of electricity."

New circumstances necessitated a fresh outlook; the A.S.E.E. had encouraged the employment of competent engineers at adequate rates of remuneration, but there was need for more co-operative effort between allied industries and similar bodies. The co-ordination that might result would improve the status of supervisory grades throughout the engineering industries.

The nationalization of industries employing engineers of all grades meant that large numbers of A.S.E.E. members would become public (not civil) servants, but their duties would be of equal importance and they were likely to be subject to similar regulations. Membership of appropriate trade unions would (at least under the present Government) not be discouraged. If every member played his rightful part, did not miss any opportunity of recruitment and "talked A.S.E.E." on every possible occasion, he would help to consolidate their position for the critical times that lay ahead.

Views on the News

Reflections on Current Topics

AT the press conference at which he announced impending increases in electricity charges, Col. W. M. Lapper, chairman of the Yorkshire Electricity Board, said:—"We are concerned about the rapid growth in the amount of electricity used by householders." I think I know what Col. Lapper meant but I also appreciate a Huddersfield paper's question: "What is electricity for, if not to be used by householders?" After inculcating greater and greater use of electricity in the home for two or three decades we cannot tell the housewife that she mustn't ever do it again. There must be some hope of freedom from restrictions some day, although we shall have to educate consumers to spread their loads or keep down their demand at peak-times.

* * *

Most of the lay press have laid strong emphasis upon the increases which are being made in electricity prices. The *Ilfracombe Chronicle*, on the other hand, mentions only the lighting flat-rate reduction and gives local people the impression that they are going to pay a 1d. per kWh less for their electricity. Those Ilfracombe consumers who are on the two-part tariff will be led to expect a reduction whereas they are to pay the same as before—in itself a good point worthy of stressing. I fear that many journalists will never quite grasp electrical matters.

* * *

A correspondent tells me of something new in the way of "harvest festivals." At St. James's Church, Warrington, an industrial harvest festival has been held at which goods from leading manufacturers—including electrical equipment—were placed alongside the altar rails. Although this form of thanksgiving is somewhat novel it is not inappropriate, as the blessings which electricity has conferred upon mankind are almost as great as those which we derive from the soil.

* * *

If memory serve me truly, it was Kelvin who said (approximately) that not until we can measure something do we begin to know about it. Appropriately the electrical personalities mentioned by Professor J. T. MacGregor Morris in his lecture last week to the I.E.E. Measurements Section were pioneers in devising instruments. Only one is still with us and to most of the audience the others are but revered names, but the lecturer with deserved good fortune had met nearly all of them. That this should have been possible within the lifetime of one who is evidently full of vigour is a reminder of the rapidity of growth of electricity in the service of man and also of the succession of great intellects that its problems have attracted.

* * *

My first thought on hearing of the formation last week of the Ex Johnson & Phillips Association was that the move was long overdue, especially when one considers the tradition of good fellowship that has been so well maintained by the staff. Although many of its members emulate the chairman (Mr. G. L. Wates) in length of service, the number of those who have hived off to take up responsible positions elsewhere during the seventy-three years of the company's existence must be very great. A link between past and present is created by opening membership to existing staff members of twenty years' service and over. Mr. H. J. Shepherd is the first president and Mr. A. J. Shrosbery is chairman of the executive committee of the Association. The honorary secretary, Mr. H. D. Parsons, tells me that he will welcome inquiries from those interested at 43, Blackheath Road, S.W.3.

* * *

Spare-time installation work by electricians, and others, is not unknown in this country. In the United States the position may be even worse for it is reported that electrical contractors in Lexington, Kentucky, have protested to the police authority against its officers doing wiring work in their off-duty hours. Truly the Lexington contractors can ask "*Quis custodiet ipsos custodes?*"

* * *

A South Shields lady managed to make a penny go a long way. She put a penny in her electricity meter just after it had been emptied and then broke the seal, extracted the coin and used it again—and again. The ruse was too transparent; she was fined 10s. and ordered to pay the Corporation £4 7s. 8d. at the South Shields Police Court.

—REFLECTOR.

Royal Society Soirée

Nuclear Physics Exhibits from the Universities

EXPERIMENTAL research exhibits at the annual evening conversazione of the Royal Society, held last week under the presidency of Sir Robert Robertson, numbered about thirty items. They were mainly physical and biological with some optical instruments. Those of electrical interest mostly represented the work of nuclear physicists at the Universities. For instance, a new series of fine grain photographic emulsions of large silver content, which have been specially prepared by Kodak, Ltd., have aided the recording of proton and meson tracks by Dr. C. F. Powell at Bristol.

An ingenious sorting device for measuring the energies of fragments emanating from an atomic nucleus was demonstrated by the Cavendish Laboratory, Cambridge. The fragments were passed through an ionization chamber and the electrons so produced were collected on a plate (screened by a wire grid) to accumulate small current pulses which were magnified by valve amplification. The output pulses, of heights proportional to the energies of the particles which caused them, were lengthened and delivered into a coil moving in the field of an electro-magnet and attached to a " billiards cue." Each time the latter moved it propelled a small steel ball, which described a parabolic path on an inclined plate and eventually landed in one of thirty parallel grooves, depending on the initiating pulse height. Mechanism deposited a fresh ball before the cue after each pulse kick. When sorted in this way the number of balls collected in the grooved tray forms a histogram which accurately analyses the variation of the speed of the fragments resulting from nuclear disintegration.

Induction Method of Measurement

At the Clarendon Laboratory, Oxford, Dr. A. H. Cooke uses the induction method (devised by F. Bloch) to measure the magnetic moments of a nucleus and also the time of relaxation for the transfer of thermal energy, while rotating it at the rate of eight million times a second. A specimen of water in a field of about 2,000 oersted was subjected to a weak alternating magnetic field at a frequency near the Larmor value for protons in the main field. When the frequency was varied through the Larmor value, the magnetic moment was reversed. The effect is detected by the e.m.f. induced in a secondary coil which, after detection and amplification, can be displayed on a cathode-ray oscillograph screen.

There was a full-scale model of the B.T.H. betatron which has been installed in the Clarendon Laboratory at Oxford. The original weighs 17 cwt and accelerates to 16·3 MVe when taking 80 kVA at 50 c/s; its size weight and input rating are low because the orbit space has been made narrow and all other magnetic fields, including the accelerating field, have been confined to iron.

The Cavendish Laboratory, Cambridge, demonstrated how radio-frequency " noise " radiated from the stars is measured automatically. The instrument will record powers of the order of 10^{-16} W, about one per cent of the noise inherent in the receiving amplifier. A feature of its design is ability to follow rapid variation of signal strength, which has made it possible to observe " bursts " of radiation from the sun lasting less than half a second.

Identification of Chemicals in Solution

The Ministry of Supply's Telecommunications Research Establishment, in association with the Medical Research Council, has designed a spectrophotometer (chiefly used in the ultra-violet region) for speedily identifying chemical compounds in solution and determining their concentrations by recording their light absorption curves automatically. Two optical channels are employed, one for the specimen liquid to be tested and the other containing a pure solvent. The emergent chopped light is matched by a servo-mechanism, which is actuated by a photo-multiplier and amplifying systems. A recording drum photographs a galvanometer spot, the movement of which is controlled by the length of liquid needed to equalize the output of light.

The National Physical Laboratory showed how length is measured directly by interferometry. A hot-cathode krypton lamp cooled with liquid air is the source of standard wavelengths and the accuracy is about 0·025 μ (1×10^{-6} in.) in the case of engineers' block gauges up to 300 mm (12 in.) when proper precautions are taken. Another N.P.L. item was a gyroscopic model (electrically driven and magnetically restrained) demonstrating the yawing motion of a gun shell spinning while in free flight, as observed by spark photography.

A novel electronic stop-clock shown by Imperial Chemical Industries, Ltd. (Explosives Division) totals quarter cycles of an oscillator within the interval defined by two events operating a grating circuit. The counter is a special form of split-phase a.c. motor (Scophony) polarized with d.c., the phases being coupled directly to two invertors operated in quadrature by the oscillator. The clock hand geared to the motor thus moves discontinuously four steps per cycle, being locked between steps. The clock, which needs only slight modification for pulse counting, will measure time intervals of up to twelve seconds with an accuracy better than one-hundredth of a second and is being used to

measure the time lapse between pressing an igniter button and the detonation of an explosive charge.

In a "memory system" for the digital computing machine now being built in the University Mathematical Laboratory at Cambridge (EDSAC, electronic delay storage automatic calculator) numbers will be represented in binary form by trains of pulses, each of 1 μs length, which will be passed in the form of ultrasonic waves into a column of mercury about 4 in. long. When they reach the end of the column they will be reconverted into electric pulses and, after amplification and shaping, routed back to the input (so circulating round indefinitely) being available when required.

An oxygen detector shown by the Cambridge Instrument Co., Ltd., depends on the change of paramagnetism of oxygen with temperature. The gas to be tested flows across the ends of a small glass tube, half of which is in the strong field of a small ring electro-magnet. The centre portion of the tube is heated by a centre-tapped platinum resistance, which also forms two arms of a Wheatstone bridge. If the gas contains oxygen, a flow is set up in the tube. This cools the heater wires and causes a relative change of resistance which upsets the bridge balance and is recorded electrically as oxygen content of the gas.

Photo-conductive cells made by the British Thomson-Houston Co., Ltd., for detecting infra-red radiation of wavelengths up to 3 microns consist of thin films of treated lead sulphide deposited on a glass surface and provided with electrodes. The area of the element is 0·1 cm^2 and its resistance is about 100,000 Ω, which varies when the cell is irradiated, the response time being less than 100 μs by from 0·1 to 1 per cent per mW at the maximum portion (2 to 3 microns) of the spectral sensitivity curve. These cells will detect less than 0·001 μW of interrupted radiation with the aid of a high-gain amplifier tuned to the interruption frequency. Semi-conductor bolometers are also available for similarly detecting infra-red radiation of longer wavelengths.

Other B.T.H. exhibits were glasses of various compositions that are "transparent" to ultra-violet rays, special grades that enable metal and mica to be "soldered" to glass and silicone putty that behaves in odd ways; long-time stressing causes it to flow whereas short-time stress makes it an elastic solid, so that a steel ball dropped on the putty will bounce unusually high instead of becoming embedded as it would in substances of similar consistency.

Italian Hydro-Electric Plant

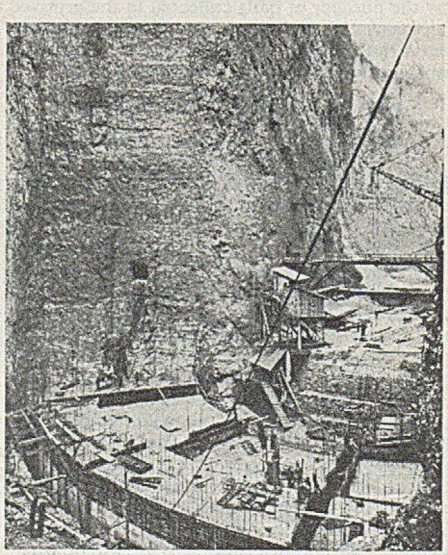
New Projects in Course of Construction

ACCORDING to statistics recently published by the Italian Government the amount of power produced and imported in the first quarter of 1948 was 14 per cent greater than in the corresponding period of 1947. The output of hydro-electric power during this period increased by 31 per cent while steam and diesel power dropped by 28 per cent, but imports from foreign countries were more than doubled.

In spite of the increased generating capacity and although most industries are working at a rate not higher than 60 per cent of their pre-war capacity, power supplies are still below requirements. This is due particularly to the larger employment of electricity for domestic purposes.

Early this year two new hydro-electric generating stations have been put into operation. One of them, at Lumici in the Venice district, was built and is now being operated by Società Adriatica di Elettricità, furnishing an annual output of 500 million kWh. The other plant at Lovera (Sondrio) was built by the Azienda Elettrica Municipale of Milan and will produce 120 million kWh per annum.

At present, another six hydro-electric plants are under construction, which will ultimately yield an annual output of 3,000 million kWh, but will by no means satisfy requirements and it is estimated that further plant will need to be built during the next few years with a total output of approximately 10,000 million kWh. One of these stations, on the River Noce (Alto Adige), will have an installed capacity



Plant under construction on the River Noce

of 105,000 kW, giving a maximum annual output of 346 million kWh, with a storage capacity of 94 million kWh.

According to Piero Ferrerio, chairman of the Edison Electric Co. of Milan, not less than 500,000 million lire must be invested by various private electrical companies in order to carry out the construction of the new plant. This should not be difficult as it is felt that assistance will be given under the European Recovery Plan. The total funds, however, will be insufficient to cover all requirements and it will be desirable to have foreign capital invested in the Italian electrical industry. In this connection it is noteworthy that an agreement has already been reached between the Montecatini and Swiss interests regarding the construction of plant on the Resia Lake in the Bolzano district. The basis of the agreement is that the capital invested by Switzerland will be reimbursed by the supply of electricity to Swiss industries.

Further developments may be expected from negotiations which have been started between the Società Idroelettrica Piemonte and the Electricité de France. The meetings followed the Italo-French agreement recognizing the Italian possession of the Moncenisio hydro-electric plants which should have been turned over to France under the Italian Peace Treaty. These negotiations aim to ascertain the possibility of diverting the waters of the River Arc into the Moncenisio plants. This would raise the capacity of the present reservoirs from 23 to 500 million cubic metres, which would be advantageous to both France and Italy.

Should the present investigations produce satisfactory results an Italo-French electric company is to be formed for the carrying out of this project. The work entailed will be wholly underground, thus greatly reducing the need for metal, since the water conduits will be tunnels in the rocks.

CORRESPONDENCE

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

Car Electrical Equipment

IN reply to Mr. H. J. Hagen's letter in your issue of 21st May, perhaps the following notes will be of assistance to him concerning his car electrical equipment.

The cause of different gravities in the cells is not quite clear, but may be due to some spilt acid from those particular cells. To equalize the cells, fully charge the battery until it reaches a voltage of 2·8 V per cell, the gravity being its maximum and gassing freely. Empty all the acid from each cell and replace with new acid of the correct gravity as specified by the makers of the battery.

It is not necessary, or general practice, to undercut the segments of auto starters, as these are slow running and only intermittently used. If, however, the starter is of the dynamotor type combined starter and dynamo, undercutting will be advised.

Auto ignition condensers may be tested with a 500-V "Megger." Charge up the condenser with the "Megger" and whilst still turning the "Megger" remove one lead from the condenser; then short out the condenser by means of an insulated-handle screwdriver, when a lively spark should be seen and heard showing the condenser is healthy. If there is no spark the condenser is either open or short circuited. This test does not apply to electrolytic condensers. The correct rate at which to charge a battery can be determined from its ampere-hour capacity usually marked on the battery. These batteries are rated at the 10-hr rate. Thus a 30-Ah battery may be charged at 3 A or a 75-Ah at 7·5 A in general.

$$\text{Safe charging current} = \frac{\text{Ah capacity of cells}}{10}$$

Wells, Somerset. W. G.

Lighting at the B.I.F.

ON visiting the British Industries Fair at Olympia, London, I was very disappointed to notice the inadequate lighting. Pearl lamps were fitted in silvered reflectors: clear lamps were fitted in open opal shades, exposing the lamps; some of the pendant shades were closely allied to the Victorian era. In quite a number of cases the actual light was behind the article to be illuminated; ordinary two-pin bakelite plugs and 5-A bakelite tumbler switches on 1-in wood blocks were fitted right on the front of a stand showing high-class electrical products. It looked crude beyond measure, and in my opinion was a very poor example both to the foreign and to the home visitor.

It is a great pity that the people concerned had not consulted with the many authorities on lighting and electrical installations that are available. I do not think that the stringencies of the present times constitute any excuse for a poor and shoddy display at such a national fair.

Walsall. H. F. TRUMAN.

Electricity Failures

Effect of Sudden Drop in Temperature

PARTICULARS of the two interruptions in the public supply of electricity (the worst since 1934) in the London, Eastern and South-Eastern Areas last Sunday were given by the British Electricity Authority. Lord Citrine, chairman of the Authority, emphasized that no change had occurred in system control or operation since vesting day that had any bearing on the failures.

Some technical details were given by Mr. J. Hacking (deputy-chairman), who said that while generating plant capacity was insufficient to cope with winter loads in severe weather, there was also little margin in summer because of the need for maintenance, especially of boilers. Also, immediate repairs had to be carried out during week-ends.

Weather Forecasts and Demand

Decisions had to be made beforehand. Official weather forecasts were received three times a day and were supplemented by long-term forecasts. On Sunday the noon temperature, which the 6 a.m. forecast had anticipated would reach 57 deg F, was only 48·5 deg F, which had caused an increase in the peak of about 200,000 kW. But for the drop in temperature the amount to be imported into the Areas concerned would have been 90,000 kW, but the actual figure was 190,000 kW, most of it through the King's Lynn-Norwich line. At 12.25 p.m., this line tripped out on fault and the other lines on overload. There was insufficient plant in the Areas to carry the peak unaided and the frequency fell below the critical 48 cycles before load shedding could be resorted to, putting power station auxiliaries out of action and causing the stations to be shut down. Most supplies were on again by 2.30 p.m. and the rest by 3.25 p.m.

Second Interruption

The second failure, which occurred at 8.54 p.m., was due to a fault on the Bedford-Luton section of the grid. As a result the grid was split up into several isolated sections, some again with insufficient plant capacity to meet the local loads, and cuts up to 25 per cent were made. No grid point was left completely without supply. The area affected was south-east of a line between Norwich and the Bristol Channel. Supplies were restored between 9.30 and 10.38 p.m.

On Sunday the total generating capacity of the country was 10,943,000 kW, of which 4,383,000 kW was out of commission due to overhaul, breakdown and other causes. At present the amount of plant more than twenty-five years old is 425,000 kW; by running this, the plant deficiency next winter, if extremely cold, will be reduced to 1,800,000 kW. It is hoped that if plant deliveries can be brought up to schedule, risks of load shedding will be removed by 1952.

The British Electricity Authority issued warnings of the need for economy in the use of electricity in all areas between 7.30 and 12.30 on Monday and Tuesday mornings. In the Midlands Electricity Board's Area a 5 per cent load cut was made from 8.27 a.m. to 8.43 a.m. on Monday.

C.I.G.R.E. in Paris

AT the International Conference on Large Electric Systems to be held at the Fondation Berthelot, Paris, from 24th June to 3rd July, twenty countries will be represented and 117 papers will be discussed.

Visits which have been arranged will include some to the 500-kV test line at Chevrilly, near Paris, and to the rebuilt 220-kV transformer station connecting the Parisian district with the Massif Central. After the Conference there will be three-day tours to four hydro-electric stations (with an aggregate capacity of 575,000 kW) and the new Genissiat dam on theRhone (the biggest in Europe after the Dnieper) with its power station which will have a capacity ultimately of 420,000 kVA.

Full particulars of the arrangements are obtainable from Mr. R. A. McMahon, the secretary of the British National Committee, Conference Internationale des Grands Reseaux Electriques, Thorncroft Manor, Dorking Road, Leatherhead.

Works Relations Policy

WE have received some particulars of works relations which Watliff, Ltd., have successfully introduced at their Wimbledon factory. Among the many schemes for improving the relationship between the company and its employees is the operation of the Ministry of Labour's "training within industry" scheme, in which every one from the general manager downwards takes part. The company provides medical attendance for employees at its own expense, and a fully qualified nurse is employed full-time at the factory. Employees in need of rest are sent to the Roffey Park Rehabilitation Centre, of which the company is a founder member, and last year, instead of a Christmas Eve party, employees were given a week's holiday with pay.

By the use of well-planned lighting, and light colour-scheme of decoration, including machines, a bright and cheerful working atmosphere has been achieved.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Caroline Haslett Trust Committee has selected **Miss Dorothy Taylor**, of Watford, as the third travelling exhibitioner, and she will sail for Canada on 27th July. Whilst in Canada Miss Taylor will attend the annual conference of the Canadian Home Economists' Association in Calgary, and will visit electricity undertakings and some of the factories producing electrical equipment. She will also see equipment in use in homes and institutions and on Canada's railways. Her itinerary is being planned by Miss Margaret Hyndman, K.C., president of the Canadian Federation of Business and Professional Women's Clubs. Miss Taylor was showroom assistant and demonstrator in West Hartlepool, Cheltenham, Luton, and Watford.

Sir Frederick Bain, M.C., president of the F.B.I., is on a visit to Canada where, at the invitation of the Canadian Manufacturers' Association, he was to speak at the Association's annual general meeting dinner at Toronto on 27th May. Sir Frederick has also accepted an invitation to attend, on 29th May, the official opening of the Canadian International Trade Fair at Toronto. He will be accompanied by **Mr. Moir Mackenzie**, deputy director-general of the F.B.I. After a fortnight in Canada, Sir Frederick will visit Washington and return home in mid-June.

Mr. R. F. Hield, who as reported in our last issue has resigned from the position of assistant works director for southern factories with Crompton Parkinson, Ltd., to join Veritys, Ltd., as general manager, will be at the factories and head office of the company at Aston, Birmingham. Mr. Hield has been with Crompton Parkinson since 1924, and has held various appointments. From 1930-33 he was in charge of the company's Montreal office, and during the war was from 1940-41 seconded to the British Purchasing Commission in New York as technical adviser for ordnance equipment. He was appointed manager and director of Derby Cables, Ltd., an associated company of Crompton Parkinson, in 1934, and held this position until 1946, when he joined Mr. T. H. Windibank, M.I.B.F., as assistant works director.

Mr. R. F. Hield

E. K. Cole, Ltd., announce a re-organization of their Export Department (which also covers the interests of Ekco-Ensign Electric, Ltd.), and the following appointments became effective from 1st March:—General manager, Export Department, **Mr. A. J. Brunker**; export sales manager (radio and plastics), **Mr. W. W. Syrett**; export sales manager (lighting and heating), **Mr. E. B. Thompson**; in charge of the Shipping Department for all products, **Mr. T. Cleveland.**

Mr. F. Spencer, who has been director and general manager of the Hotpoint Electric Appliance Co., Ltd., since August last year, has now been appointed managing director of the company in succession to Mr. H. A. Lingard who, as we have reported, is retiring from the B.T.H. and Hotpoint boards on account of ill-health.

Mr. F. Spencer

After serving an apprenticeship with the B.T.H. Co., Mr. Spencer joined the Industrial Sales Department (then the Supply Department) in 1924. When it was decided to develop fractional-horse-power motor business, Mr. Spencer was put in charge of sales, later being appointed manager of the F.H.P. Motor Sales Department at Rugby, which position he will now relinquish.

Mr. E. H. Ball, managing director of the British Thomson-Houston Co., Ltd., and a director of the Metropolitan-Vickers Electrical Co., Ltd., has been appointed to the board of Associated Electrical Industries, Ltd.

Dr. F. C. Toy, director of research, with the British Cotton Industry Research Association, was elected as the new president of the Institute of Physics at its annual general meeting on 20th May last. **Dr. T. E. Allibone** was elected vice-president. The honorary treasurer, **Mr. E. R. Davies** and honorary secretary, **Dr. B. P. Dudding**, were re-elected. **Mr. J. H. Awbery** and **Mr. E. W. H. Selwyn** were elected as ordinary members of the Board, and **Dr. G. B. B. M. Sutherland** was appointed by the Faraday Society as its new representative on the Board.

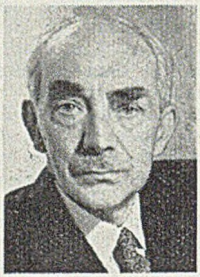
Mr. J. P. Tucker, engineer and manager of the Loughborough electricity undertaking from 1936 until the nationalization of the industry on 1st April, was recently presented with an illuminated address as a mark of the Electricity Committee's appreciation of his services to the town.

Mr. C. L. Woolveridge has been elected a director of the River Plate Electricity and Other Securities Corporation, Ltd., in place of **Mr. R. A. Hamlyn**, who has resigned.

Presentations have been made to **Mr. H. Pointer**, traffic superintendent with Sunderland Corporation transport undertaking, who has left to become traffic manager with the Christchurch Transport Board, New Zealand.

Mr. C. S. P. Mallam has been appointed chief accountant of the General Electric Co., Ltd.

Mr. P. R. Boulton has recently retired from the position of electrical engineer (distribution) in the department of the chief engineer, London Transport Executive, after twenty-four years' service. After a railway apprenticeship Mr. Boulton spent short periods with the Lister Electrical & Manufacturing Co., and the National Telephone Co. He then went to the Mersey Railway Co., and later joined the Birmingham Electric Supply Department. Mr. Boulton later became chief electrical engineer to the Metropolitan Railway Co., changing his title when the London Passenger Board was formed in 1933 to electrical engineer (Neasden). In 1937 he was appointed electrical engineer (new works), and two years later, electrical engineer (distribution). Mr. Boulton was responsible for several innovations, the earliest being the use of spray coolers in lieu of towers, the use of pulverized fuel, with grit washing plant, and the adoption of 22 kV in place of 11 kV for the transmission system.



Mr. P. R. Boulton

Mr. H. Riley, of John Riley & Son (Electrical) Ltd., Sheffield, has been elected president of the Electrical Wholesalers' Federation.

Mr. G. L. Stephens, who has had many years' experience in the Post Office Engineering Department, has been appointed a suppression engineer with Belling & Lee, Ltd.

The **Electrical Industries Benevolent Association** is this year holding a National Golf Championship for all those directly, or indirectly, associated with the electrical industries. The championship is being organized in seventeen areas and is open to any male golfer who has a handicap of 24 or less on any course with a minimum length of 5,000 yd. Eliminating matches in the areas will be played off by 31st July and main finals by 31st August. The national championship will be played on a championship course near London during the week commencing 27th September.

Arrangements have been made by the Southern Centre of the **Institution of Electrical Engineers** for a visit to the Isle of Wight on Saturday, 12th June. Those members wishing to take part are asked to notify the hon. secretary, Mr. W. M. Read, The Oaks, Ashurst, Southampton, by 7th June.

To mark the golden jubilee of Gilmore & Co., electrical contractors, Belfast, **Mr. W. E. Gilmore**, the founder and principal, and Mrs. Gilmore, recently entertained some of the men who had served their apprenticeship with the firm, and their wives. Mr. Gilmore, after reviewing the history of the concern, announced that he was retiring from active business and introduced **Mr. S. W. Crawford**, who was taking over the business, which would retain its present title. Mr. H. Boyd mentioned that Mr. Gilmore had been elected an honorary member of the Electrical Contractors' Association in recognization of his services to the industry.

Obituary

Captain J. Coxon.—The death occurred recently, at the age of seventy-four, of Captain J. Coxon, M.I.E.E., who, after retiring from the position of executive engineer of the North Wales district of the Post Office Engineering Department in 1934, was in practice as a consulting engineer. Captain Coxon joined the Post Office Engineering Department in 1903, after considerable electrical engineering experience at home and in South Africa. He was appointed power engineer of the North Wales Engineering District in 1926 and became executive engineer two years later. During the 1914-18 war he was engaged on signalling instruction duties and later saw service in the Middle East. He was chairman of the South Midland Centre of the Institution of Electrical Engineers in 1934-35.

Mr. J. W. Hobson.—The death has occurred at Jesmond, Newcastle-on-Tyne, of Mr. J. W. Hobson, Tyneside area engineer for the Post Office from 1935 until his retirement in 1942. He was sixty-seven years of age.

Alderman R. Tweedy-Smith.—We regret to learn of the death, on 18th May, of Alderman Robert Tweedy-Smith, LL.D., chairman of the Sun Electrical Co., Ltd., from 1899 to 1946, since when he had been deputy-chairman. He was also a director of other companies, including the Rawlplug Co., Ltd. Alderman Tweedy-Smith was a former mayor of Southend-on-Sea and was for many years solicitor to the Electrical Contractors' Association. He read a paper on "The Law Relating to Electrical Contractors" at the Association's Eastbourne Conference in 1931.

Mr. G. A. J. Lee, A.C.A., secretary of the Sun Electrical Co., Ltd., also died in the same week as Alderman Tweedy-Smith. He had been with the company for thirteen years.

Sir William Murray Morrison, vice-chairman and managing director of the British Aluminium Co., Ltd., until his retirement in 1945, died in London last Friday at the age of seventy-four. He served with the company for fifty years and was a pioneer of the production of aluminium in this country and of the utilization of water power in the Highlands of Scotland.

Overseas Electrical Trade

New High Level of Exports in April

THE record figure for electrical exports set up in January was surpassed in April by no less than £262,184, despite the fact that there was one fewer working day. The April total, £8,442,448, is also equal to a daily rate of £0·325, which is £25,000 higher than the record figure for March. As a further indication of the progress made it may be mentioned that, while being about half as much again as in April last year, the figure is approaching five times the monthly average for 1938.

Of the total of £6,241,178 for goods and apparatus (also a record), over £2 million related to electric cables. Telegraph and telephone equipment reached £925,978, South Africa taking £159,584, Australia £125,154, and

Table I.—Electrical Exports and Imports

Class	Exports			Imports		
	April, 1948	April, 1947	Monthly Av., 1938	April, 1948	April, 1947	Monthly Av., 1938
	£	£	£	£	£	£
Telegraph and telephone wires and cables (submarine)	93,607	3,787	17,289			
Ditto, not submarine	661,685	207,585	71,803			
Wires and cables, rubber insulated	399,252	289,163	117,533			
Ditto, cotton, silk or artificial silk insulated	52,626	49,932	†	13,634	5,782	31,246
Ditto, enamel, glass or asbestos insulated	25,236	19,432	†			
Ditto, paper insulated	729,427	316,077	103,457			
Ditto, other	107,975	81,594	49,799			
Commerical radio apparatus	382,548	78,459	28,296	43,244	87,206	58,018
Domestic radio apparatus	339,746	287,262	36,755			
Telegraph, telephone and signalling apparatus	925,978	476,466	242,716	8,129	2,159	9,243
Other radio, etc., apparatus	205,474	154,709	57,848	—	—	—
Radio valves	169,864	86,380	41,272	10,065	16,575	10,893
Electric carbons, furnace	*	*	*	35,771	23,318	4,054
Ditto, other	*	*	*	6,796	1,936	2,301
Electric lamps, not exceeding 24 V	21,136	19,823				
Discharge lamps	39,614	8,945	49,440	5,617	8,195	10,265
Other lamps	99,759	61,069				
Other lighting apparatus	369,247	210,658	48,565	24,511	2,877	38,662
Primary batteries	35,175	22,290	13,572	*	*	*
Accumulators for motor vehicles	191,046	88,085	16,418	*	*	*
Ditto, traction	11,011					
Ditto, radio	4,218	28,112	12,456	*	*	*
Other portable accumulators	57,504					
All other accumulators	52,034	44,297	19,773	*	*	*
Parts and accessories	54,727	38,236	—	*	*	*
Cooking apparatus and elements	153,261	62,148	16,600	*	*	*
Heating apparatus and elements	75,343	129,991	14,064	*	*	*
Other parts and accessories	34,197	15,342	—	*	*	*
Commercial electrical instruments	83,280	109,342	15,878			
House service meters	202,916	61,017	15,791	33,410	10,704	32,057
Other electrical instruments	88,372	26,202	9,612			
Electro-medical apparatus (not X-ray)	25,675	17,749	3,038	*	*	*
X-ray apparatus, tubes and parts	69,020	92,830	4,881	58,385	6,978	9,734
Insulating cloth and tape	50,838	28,990	7,038	*	*	*
Other insulating materials	95,957	60,733	12,305	*	*	*
Unclassified goods and apparatus	333,432	177,536	108,085	60,281	16,812	56,529
Generators, up to 200 kW	185,348	104,118	38,071	*	*	*
Ditto, over 200 kW	154,821	692,239	119,079	*	*	*
Ditto, parts	135,948	157,423	—	*	*	*
Motors, railway and tramway	20,086	453	15,977			
Ditto, other, up to ¼ h.p.	45,555	30,392	9,001			
Ditto, from ¼ to 1 h.p.	38,949	28,770	2,470	24,708	3,059	26,033
Ditto, from 1 to 250 h.p.	380,380	192,032	96,637			
Ditto, over 250 h.p.	54,333	24,276	20,960			
Ditto, parts	42,094	44,925	—			
Converting machinery	7,306	17,204	101,304			
Transformers, including coils	326,738	340,866				
Rectifiers for power house use	27,528	25,491	3,463			
Motor starting and controlling gear	178,162	83,779	50,866	98,164	4,790	14,455
Switchgear and switchboards (not telegraph or telephone)	374,731	367,179	184,533			
Other electrical machinery	23,904	14,223	15,497			
Vacuum cleaners and parts	152,392	166,711	26,662	3,418	4,759	24,627
Other electrically operated portable appliances	52,995	10,553	10,394			
Total	8,442,448	5,654,875	1,829,198	426,133	195,150	328,117

* Not classified separately. † Not separately distinguished in 1938.

Argentina £102,292 worth. Commercial radio apparatus sales were £50,000 higher than in March, while exports of domestic radio receivers increased by nearly £100,000, Egypt taking £55,781 worth, Brazil £40,872 and South Africa £35,070.

Table II.—Distribution of Exports of Electrical Goods and Apparatus

Destination	April, 1948	April, 1947	Monthly Av., 1938
	£	£	£
Eire	233,417	94,174	37,726
Channel Islands	31,561	26,308	12,177
Malta and Gozo	32,538	4,404	5,873
Cyprus	29,380	6,549	1,373
Palestine	202,697	81,233	6,426
British West Africa	109,288	17,526	12,889
Union of South Africa	912,837	403,542	162,584
Southern Rhodesia	113,946	29,288	9,632
British East Africa	74,826	33,730	7,893
India, Pakistan, etc.	349,895	457,227	123,789
British Malaya	144,583	109,668	32,792
Ceylon	43,412	29,198	15,048
Hong Kong	101,057	36,359	12,939
Australia	695,443	137,067	197,366
New Zealand	170,730	154,393	96,225
Canada	88,175	12,255	12,547
British West Indies	58,088	21,082	12,954
Anglo-Egyptian Sudan	34,585	19,790	2,989
Other British Countries	114,975	31,932	11,030
Soviet Union	15,665	154,152	36,781
Finland	39,819	24,074	5,969
Sweden	348,174	50,582	14,948
Norway	98,898	152,924	12,881
Iceland	13,851	22,670	2,796
Denmark	80,120	49,693	18,907
Poland	77,803	30,659	9,702
Netherlands	133,352	62,616	22,010
Belgium	77,327	113,333	11,208
France	52,480	38,119	16,082
Switzerland	28,005	33,615	3,768
Portugal	127,223	53,628	6,512
Spain	6,657	62,051	3,813
Czechoslovakia	45,976	22,532	7,205
Yugoslavia	49,020	42,048	1,475
Greece	39,689	4,773	4,926
Turkey	91,528	31,045	7,684
Dutch East Indies	9,526	11,839	2,692
Dutch West Indies	6,068	6,896	830
Portuguese East Africa	27,743	19,742	6,942
Lebanon	20,056	9,469	—
Egypt	231,148	26,905	13,176
Iraq	187,736	39,107	5,530
Iran	165,963	67,981	16,345
Burma	28,960	47,425	5,337
China	86,778	51,374	4,116
United States of America	28,389	12,635	5,839
Mexico	1,535	10,550	1,466
Colombia	17,980	23,129	845
Venezuela	38,438	15,525	2,936
Chile	18,528	24,462	6,635
Brazil	113,364	64,382	11,164
Uruguay	19,773	11,504	1,790
Argentine Republic	247,457	156,124	45,452
Other Foreign Countries	124,716	100,953	40,270
Total	6,241,178	3,354,241	1,134,284

Referring to Table II, it will be seen that the two most important buyers, South Africa and Australia, have both practically doubled their purchases. Sweden is becoming an increasingly valuable market and, taking goods to the value of £348,174, now occupies the position of third largest purchaser: in April last year shipments to Sweden amounted to only £50,582, while the monthly average for 1938 was only £14,948. Exports to China at £86,778, though not maintaining the high rate of the previous month, are £35,000 higher than for April, 1947. Shipments to Argentina (£247,457) are very slightly higher than in the preceding month, while the value of electrical goods and apparatus sent to Palestine increased to £202,697.

Of the £476,117 worth of generating plant shipped abroad India and Pakistan received £86,914 worth, Australia £53,501, Iraq £45,282 and Canada £42,558. India and Pakistan were also the largest buyers of motors (£101,946), South Africa taking £69,093 worth. Investigating the markets for other electrical machinery, it is worth noticing that whereas in April last year sales to Russia totalled £315,672, the figure for last month was only £15,910.

Though £51,000 higher than in March, imports of electrical apparatus and machinery last month at £426,133 were £28,000 less than in January. In April, 1947, the corresponding figure was £195,150, the monthly average for 1938 being £328,117.

English Electric in South Africa

THE policy of the English Electric Co., Ltd., and its group of companies in assisting in the development of Commonwealth countries by making available to them its resources in research and technical knowledge was mentioned by Sir George Nelson (chairman and managing director) at a press conference held last week. Sir George, who has recently returned from a visit to South Africa and the Rhodesias, said that he had attended the opening on 26th April of a new works at Benoni by the English Electric Co.'s wholly owned South African subsidiary. Production at these works at present would consist of electric motors and transformers, and Benoni had been selected because owing to mine exhaustion in the area labour was available. Sir George said that development of the Commonwealth countries should bring to this country a demand for the heavier electrical plant which it was not practicable to construct overseas. The mineral resources of South Africa were considerable, and there were also great possibilities for agricultural development in which industry there was a need for mechanization.

Replying to questions regarding American competition, Sir George said that, while America was able to offer better delivery dates for plant, he doubted whether she would be able to deliver on time, in which case that might prove bad business to the buyer. There was a strong Commonwealth feeling in South Africa and the people there were anxious to co-operate with the mother country. Speaking of the position at home, he said that the English Electric Co. was only working to 65 per cent of its productive capacity owing to shortages of labour and materials.

Farm Electrification in U.S.

Influence on Living Conditions

By F. E. Rowland,
M.I.E.E., M.I.B.A.E.
Manager, Agricultural Department,
General Electric Co., Ltd.

THE second National Farm Electrification Conference recently took place at Indianapolis, Ind., the seventeen participating bodies including the U.S. Office of Education, the American Institute of Electrical Engineers and the American Society of Agricultural Engineers. In view of the great expansion in farm electrification in this country, it is of interest to compare the report of this conference with our experience and to draw any conclusions which may contribute towards solving our problems.

The opening remarks of Hassil E. Schenck, president of the Indiana Farm Bureau and chairman of the Conference, predicted that "we will see unveiled during the next decade more far-reaching and revolutionary farm practices, from the standpoint of efficient agriculture, than was achieved during the past fifty years. Electricity applied to the many difficult farm jobs and to the tasks of the farm home will go a long way towards contributing to a prosperous and stable agriculture."

In view of the widespread belief in this country that all American homes are equipped to the high standards of luxury portrayed by Hollywood, it will come as a surprise to many to learn from Ruth Gaffney, *Farm Journal*, New York, that "It's up to the home makers to keep the kitchens of the rural homes up with the modern conditions of the farms. There are too many farm homes where there can be found practices and methods exactly the same as used 150 years ago."

Claude R. Wickard, Administrator, Rural Electrification Administration, Washington, D.C., stated that "Nothing offers more promise than the use of central station electricity to improve the efficiency and also the health and social patterns of farm people. Central station electric service is playing a most important part in the American agricultural revolution. It will play an even greater part in the future."

Frank E. Watts, executive assistant, *Farm Journal*, in a short talk following his installation as chairman of the 1948 Conference said "Farm electrification is the strongest force for good ever to come into the lives of farm people."

Panel members concluded that to do the best job for the farmer, equipment must be carefully selected in order to make certain that it will perform the work expected of it, and correctly installed and adequately serviced. Those entrusted with the task of selling, servicing and installing such equipment should be well informed and expertly trained. Farm dealers were advised to analyse their rural territory to ascertain the requirements of their customers, to understand the farmer's needs and problems and to be familiar with the farm's wiring installation. Adequate wiring was regarded as necessary to permit electrical equipment to perform with maximum efficiency. It was suggested that well-equipped farms should be used as models and that farmers should be invited to see electrically operated machinery in actual use. High pressure selling in the farm market was frowned upon.

Although it was recognized that a shortage of some equipment still existed, panel members stressed the need for disseminating information about all electrical helpers to-day, in order that to-morrow would find industry not only stocked with sufficient products, but farmers educated to their use. Dealers and others were advised to use a simple and direct approach in selling to farmers. Problems confronted by dealers in their present-day job of servicing the farmer were listed as including inadequate wiring of farmsteads, the inability to get sufficient repair parts, and lack of sufficient information about the products offered for sale.

The consensus of the group was that there were too few men selling the idea of farm electrification, and too few individuals in the field working with farmers to help them in solving their electrical problems and in understanding the benefits which electricity can bring to the farm family. Such benefits it was said, included increased profits, greater leisure, higher standards of living and lower production costs.

Mr. Merkel, Director, Agricultural Promotion, United Light & Railways Service Co., Davenport, Iowa, stressed the need for enough outlets, and sample recommendations for typical farm buildings. The principal

difficulties, apart from the present shortage of wiring materials, are that farmers think the cost of good wiring too high and that the contractor's plans are too lavish.

Other speakers said that the three major reasons why there are unsafe, inadequate wiring installations are that farmers do not know that they need good wiring and that inspection and workmanship are poor. Lack of knowledge is at the root of all wiring difficulties. Education in farm wiring is best conducted through meetings of farmers, and demonstration by films and slides, visits to well equipped farms, exhibits at shows and education of farm youth.

Wiring Standards

A delegate who has been in the wiring business for almost forty years remembers when a 25-W lamp in each room "was considered fine." "Adequacy" he said, "is continually changing, and years from now our present standards will be considered hopelessly out of date." The contractors' problems, he said, are mainly the difference in standards between city and farm wiring. He urged the power companies to get together and agree on common standards for urban and rural areas. The contractor now has to carry too many types of wire and other materials, which makes it hard to start off in the business, and thus limits the number of good contractors.

Urban contractors who do farm wiring jobs usually cover present electrical needs, but not the future. The cost is usually too high, and these people do not understand the farmer's needs. Rural contractors know farming but lack training and experience in wiring. Wiring that is now more than adequate will be considered very poor in the future.

In view of the encouragement which has been given in the past to farmers in the States to do their own installation work, the following contribution by J. P. Schaenzer, Rural Electrification Administration, Washington, D.C., is particularly noteworthy. He said one great need was for manufacturers to offer farmers an opportunity to purchase hay-drying and other electrical equipment ready assembled as a single unit, rather than give the farmer the problem of buying each part from a separate manufacturer and then having to assemble the parts himself. Several speakers emphasized the necessity for research and effort directed to helping farmers to find the best uses for electricity, and the supply of plenty of power at reasonable rates.

L. M. Smith, vice-president, Alabama Power Co., said that "It is from the farms and small communities that much of our strength for greater national accomplishments must continue to come. One of the most important reasons for power suppliers taking part in agricultural development activities of their communities is that they thereby will help keep the farm the birthplace of our national greatness. Usually the power supplier's investment in rural communities is much greater than that of any other group except for the farmers themselves. We all know that the revenue that the power supplier can expect from the operation of his rural lines has a fixed and unavoidable relation to the income of the area served. If the consumers make more money, so will the power supplier. Therefore, the power supplier has a continuing and intelligent selfish interest in the development of the rural community, and in its steadily improved economic condition.

Organizations Concerned

"There are many agencies other than power supply agencies that are now working to improve farm conditions. Among these are the Land Grant Colleges with the Agricultural Experiment Stations and Extension Services; State Departments of Education, and particularly the Department of Vocational Agriculture; State Departments of Agriculture; the Soil Conservation Service: the Farm and Home Administration; farmers' organizations, trade associations and civic groups. Many of these agencies have had years of experience and have made great contributions toward the advancement of agriculture.

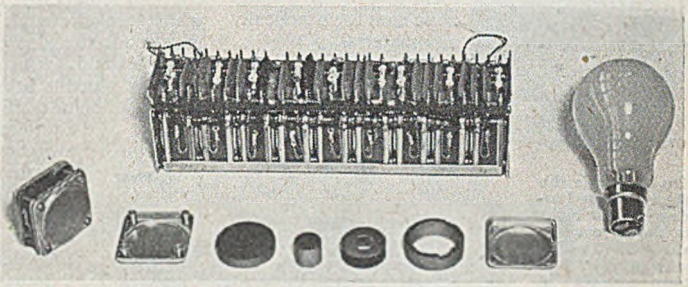
"Therefore, the first prerequisite for the power supplier's development of a programme is to become acquainted with the activities of the agricultural agencies within his area of supply. Thousands of representatives of power suppliers are daily contacting their farm and rural customers. By becoming familiar with the agricultural programme and purposes of the agricultural agencies, these representatives can conduct their work more intelligently and to the better interest of the farmers they serve.

"Generally, the agricultural agencies have such extensive programmes, and are called on for so many things, that they welcome assistance and will be glad to have their activities supplemented by activities of the power suppliers, provided the power suppliers' activities are properly co-ordinated with those of the agricultural agencies."

Telecommunications Development

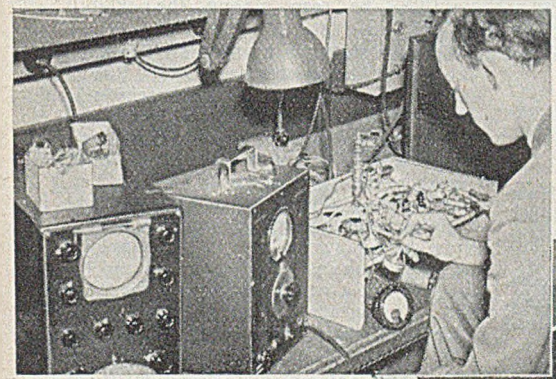
Accurate Control and Measurement of Frequencies

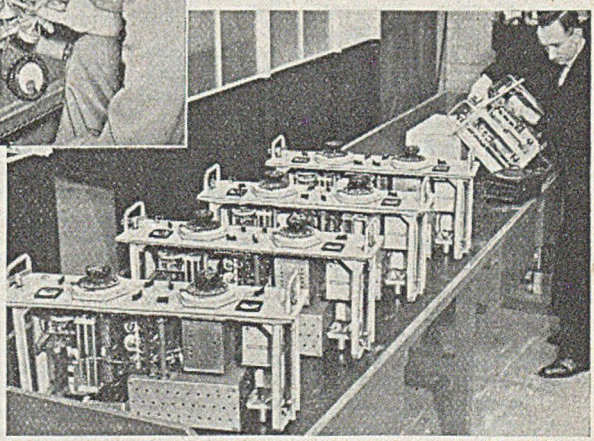
RECENTLY we were invited to visit a highly important, yet comparatively little-known, branch of the Mullard Company's organization. At its works at Wandsworth, Electronic Transmission Equipment, Ltd., undertakes the design and development of various types of communications apparatus and produces prototypes for manufacture in quantity at the parent company's larger factories. Specialized equipments required in small numbers and some of the smaller and more difficult components of standard products are also made here, together with a large amount of special test gear utilized throughout the Mullard organization.



A 60-kc/s channel filter for carrier telephone, and coil used, showing the construction of the latter with its "Ferroxcube" core. Note the small size compared with an ordinary 60-W lamp

A large portion of the company's work is concerned with the accurate control and measurement of frequencies, and for this purpose much interesting apparatus has been developed. To enable radio transmitters and receivers to work on a large range of frequencies with crystal control, from only one crystal, use is made of the company's I.G.O. (impulse governed oscillator) technique of frequency control. This is used in fixed and mobile equipment, and also in the company's own precision frequency standard.





Above: In the laboratory; an "IGO" unit under development

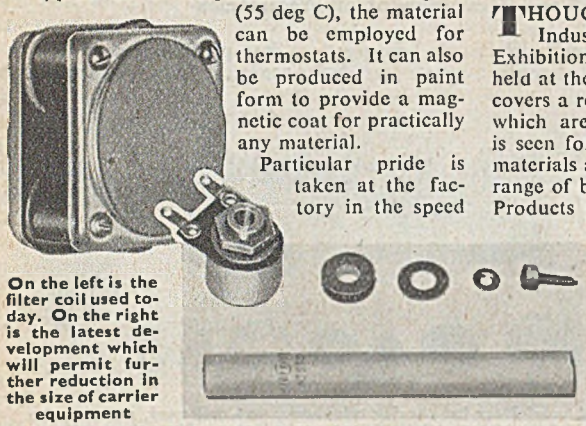
Right: The company makes the standard aerial communications tuning unit for the Royal Navy

In investigations into possible substitutes for quartz crystals for use in carrier-wave apparatus, new magnetic equipment has been developed with a very high magnification factor or "Q" ratio. Filter coils, with cores of "Ferroxcube" material instead of the usual dust cores, have a "Q" of 600 at 60 kc/s. So small are these coils that it is possible to reduce by about one-half the space necessary to house filters for a given number of channels. Besides the saving in space and weight thus achieved, which is always an important consideration in telephone exchange equipment, there is another advantage, namely the ease and lower cost of maintenance.

The "Ferroxcube" material has remarkable properties. Formed of a mixture of oxides of manganese and iron in powder form, it can be moulded or extruded, and then sintered. It can be ground after firing. Apart from its use for

coil cores it has a number of other promising applications. As its magnetic properties disappear at a temperature of 130 deg F (55 deg C), the material can be employed for thermostats. It can also be produced in paint form to provide a magnetic coat for practically any material.

Particular pride is taken at the factory in the speed with which prototypes and the initial small batches of production models are made, there being very close co-operation between the research and production departments for this purpose. Among the special items required in comparatively small numbers and made entirely at this works are aerial tuning units for the Admiralty, and v.h.f. inter-communication radio equipment for the police, ambulance services, taxis, etc.



On the left is the filter coil used to-day. On the right is the latest development which will permit further reduction in the size of carrier equipment

Next Week's Events

Tuesday, 1st June

LONDON.—The Oddfellows' Hall, 186, Hammersmith Road, 7 p.m. Association of Supervising Electrical Engineers (West London Branch). Annual general meeting.

ELTHAM.—Castle Hotel, High Street, 8 p.m. Association of Supervising Electrical Engineers, South-East London Branch. Film "On-load Tap-changing Transformers."

Wednesday, 2nd June

LONDON.—Connaught Rooms. 12.30 for 1 p.m. Electric Vehicle Association of Great Britain. Annual luncheon.

Thursday, 3rd June

SOUTHPORT.—I.E.E. Mersey & North Wales Centre. Golf competition in aid of the I.E.E. Benevolent Fund.

TAUNTON.—Electricity Offices, 2.45 p.m. Joint meeting of the I.E.E. South-Western Sub-Centre and the Western Installations Group. "Rural Electrification; the Use of the Single-Phase System of Supply," by J. S. Pickles and W. H. Wills.

Friday, 4th June

MANCHESTER.—College of Technology, 6.30 p.m. Institution of Electronics. "Television," by L. C. Jesty.

Engineering and Industrial Exhibition

THOUGH quite small, the Engineering and Industrial Equipment (Home and Export) Exhibition, which for the past ten days has been held at the Old Horticultural Hall, Westminster, covers a remarkable range of products, many of which are electrical. Much of the apparatus is seen for the first time, especially installation materials and domestic appliances. A complete range of bakelite fittings shown by A. B. Metal Products includes hinged plugs, specially safe shuttered switches and line cord switches. Besides acting as sole distributors for the small rotary switches made by Crater Products, Alecro (Middlesex) are Southern distributors of the Precision Electrical Products (Stockport) "Steba" switch and fuse gear, several items of which are shown. In addition to standard bakelite electrical accessories the Overseas Engineering Co. is now in the process of manufacturing a Continental type 6/10-A socket to V.D.E. specification. The new "Perram" self-resetting current limiter and the "Tem-con" temperature control sensitive to changes of 0·2 deg C are both to be seen among the exhibits of P.A.M.

What is stated to be the only Scottish-made heat-controlled electric iron, the "Rob Roy," manufactured by the Scottish Precision Engineering Co., is now being introduced to the home market. It has a chromium sole plate, with a cover in pale green or ivory. Another new iron, shown by Clayton Lewis & Miller, has a thermostat at the back with the cord passing through the control knob. The same company is also now supplying its travelling iron in an attractive case and has just brought out a new reflector fire, the "Denis," with a concealed lighting effect. The new "Zephyr" hairdryer, the "Major" electric iron, table and standard lamps and fans are among domestic appliances displayed by the Rockman Engineering Co., which also shows various models of its solder guns, including automatic and two-element types. The "E-Zee" electric arc welder (Miller & Enfield) operates from a 6- or 12-V battery.

Other items of electrical interest are cake and dough machines (Reads & Barrons Mixers), refrigeration and ice-cream-making equipment (Modern Enterprises), floor scrubbers, sanders and polishers (Fraser Tuson Products), fractional-h.p. motors (A. Gould & Co.), high-frequency heating equipment (Radio Heaters), wood planers and hedge trimmers, including a new battery-operated model (Tarpen Engineering Co.) and the "Jaketo" vacuum-type hammermill for grinding cereals, hay, straw, etc. (Emerald Welding Co.).

The Exhibition closes to-day (Friday).

COMMERCE and INDUSTRY

Generation in April. Revised Contract Price Formulæ.

OFFICIAL returns show that 3,744 million kWh was generated (3,532 million kWh sent out) by authorized undertakings in Great Britain during April, as compared with the revised figure of 3,387 million kWh (3,195 million kWh sent out) in the corresponding month of 1947, representing an increase of 357 million kWh, or 10·5 per cent.

During the first four months of 1948 the total number of kWh generated by authorized undertakings was 16.470 million kWh (15,557 million kWh sent out), as compared with the revised figure of 15,722 million kWh (14,853 million kWh sent out) for the corresponding period of 1947, representing an increase of 748 million kWh or 4·8 per cent.

The King and Queen at the British Industries Fair, Castle Bromwich

Arrangements are being made for future figures of electricity generated to be added to the Ministry of Fuel and Power's weekly Press statement giving details of coal output, consumption and stocks and for the present form of publication of electricity generation figures to be discontinued.

North of Scotland Consultative Council

The Secretary of State for Scotland (Mr. Arthur Woodburn) has made the Electricity (Consultative Council) (North of Scotland District) Regulations, 1948 (S.I. 1948 No. 975, H.M. Stationery Office, 1d.). These regulations, which came into operation on 11th May, provide for the appointment of members and the proceedings of the Consultative Council under the Electricity Act in similar terms to the regulations recently made by the Minister of Fuel and Power for Councils in areas other than the North of Scotland (*Electrical Review*, 7th May, p. 728). The chairman and deputy chairman of the Council are to be appointed by the Secretary of State from among the members.

Nickel Company's Conference

Fourteen countries were represented at the International Conference of the Driver-Harris Co., held at Le Zoute, Belgium, from 8th to 11th May.

It was announced that extensive reorganization is in progress at the Manchester works of the company, under the direction of Mr. R. M. Parry, managing director, and the research facilities of the whole organization are being augmented. Developments include the marketing (in collaboration with the W. M. Chace Co., of Detroit) of a range of thermostatic bi-metals. The British company is also expanding its interests in the marketing of nickel and nickel alloy tubing including cathode tubes.

Their Majesties at the B.I.F.

We are indebted to the English Electric Co., Ltd., for the accompanying picture taken from its stand at the British Industries Fair, Birmingham, during the visit of the King and Queen. In the foreground are Mr. R. A. Clark, the King, Mr. E. B. Banks, the Queen and Mr. H. G. Nelson.

E.V.A. Annual Luncheon

Lord Citrine, chairman of the British Electricity Authority, is to be the principal guest at the annual luncheon of the Electric Vehicle Association of Great Britain to be held at the Connaught Rooms, London, W.C.2, on 2nd June (12.30 for 1 p.m.).

Contract Price Adjustment

Revised formulæ for calculating variations in contract prices according to changes in labour and material costs have been devised by the British Electrical and Allied Manufacturers' Association in consultation with the electricity supply authorities. These provide for the calculations to be made in respect of the first three-fifths of a contract period and the final two-fifths. An adjustment of 0·4 per cent of the contract price is to be made for each 1·0 per cent variation in adult male labour rates and 0·45 per cent for each 1·0 per cent difference between the Board of Trade intermediate-products index before the date of the tender and during the run of the contract. Changes in rates of pay during the last two-fifths of the contract period will be applied only to the unfinished part of the contract.

In view of current discussions with the

British Electricity Authority aimed at producing even more accurate formulæ, it is recommended that provision be made for the later substitution of any new formulæ thus evolved when contracts are entered into.

Purchasing Officers' Association

Mr. W. J. Terry (chairman and managing director of the London Electric Wire Co. & Smiths, Ltd.) was the principal guest at a Purchasing Officers' Association luncheon held at the Connaught Rooms, W.C.2, on 11th May, in connection with the British Industries Fair. In referring to the purchasing officer as a key man in industry, Mr. Terry considered that his principal qualifications should be integrity, personality and tact, technical knowledge, and financial understanding. Mr. Terry mentioned his own experience in the purchasing profession, and said that it had given him a full understanding of the trade of this country. Particularly in these days of sellers' markets, he thought a purchasing officer should take every opportunity of meeting his suppliers, and discussing his requirements with them.

Retail Prices

The Anda Publishing Co., Ltd., 131, Dukes Avenue, Muswell Hill, London, N.10, has published a supplement to "Retail Mark-up," by H. Black, in which particulars are given of maximum margins allowed to retailers by the Miscellaneous Goods (Maximum Prices) Order, 1948, which came into effect on 15th March, including wholesalers' maximum margins. There is also an up-to-date schedule of relative orders and an alphabetical index of the goods covered by the Order. The company has also published an additional supplement giving particulars of the further Order which came into effect on 3rd May. Copies of the supplements can be obtained at an inclusive price of 2s., post paid.

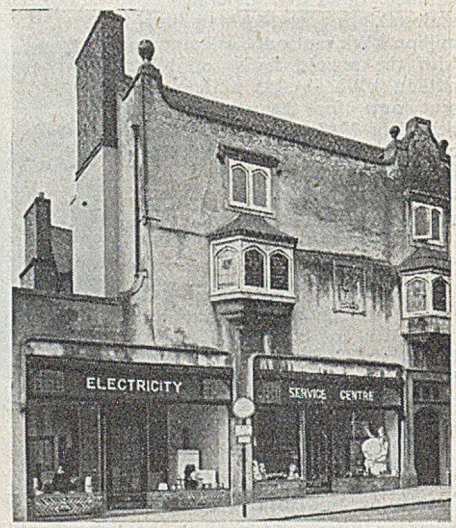
Sutton Coldfield Service Centre

A new service centre of the Midlands Electricity Board at Vesey Buildings, High Street, Sutton Coldfield, was officially opened on 14th May by the Mayor, Councillor Claud H. Dainty, J.P., supported by the Mayoress and Councillor J. W. Mayal, the last chairman of the Corporation Electricity Committee before vesting date. The Board was represented by Ald. W. Lewis, chairman, and Mr. D. H. Kendon, deputy-chairman, officers of the Birmingham Sub-Area of which Sutton Coldfield is a district, and the senior executive officer, Mr. L. Raven.

Councillor Mayal, who presided, drew attention to the value of such centres for the education of housewives and young people. He also emphasized the necessity of maintaining the intimate service which had been given in the past, and referred to the need for consultations from time to time to ensure co-ordination.

The Mayor, in declaring the centre open, said that the occasion confirmed his hope that there would be continuity of service and progress in the electricity undertaking.

Alderman Lewis said that the Board's first duty was to the consumer, and its policy would be directed towards that end. He and his Board would always welcome constructive criticism from local townspeople, and the organization would be such that suggestions of this nature could be made through local managers representing the Board, and such responsibilities would be delegated to the local managers so that decisions could be made on the spot. There were shortages of plant and domestic appliances at the moment, but he believed that such apparatus would be available in quantity much earlier than some people thought. Sutton Coldfield had had the courage to adjust its tariffs to avoid a deficit and would now find that it had reaped the benefit of this when the interim tariff adjustments were announced.



New service centre of the Midlands Electricity Board at Sutton Coldfield

New Crypton Factory

Crypton Equipment, Ltd., opened a new factory at Bridgwater, Somerset, on 12th May. It has a floor space of 75,000 sq ft and is built on a 7-acre site, thus providing ample facilities for future expansion. The frontage of the factory is on the Bridgwater to Bristol main road, the forecourt being attractively laid out with a central fountain, lawns and gardens. The offices are a two-storey structure in brick and stone, the main hall leading into the workshop at the rear of which is an up-to-date kitchen and canteen. The company manufac-

tures a wide range of products including battery chargers and electrical service apparatus for industrial and motor transport requirements.

A luncheon held to inaugurate the opening of the factory was attended by about seventy guests including Mr. H. D. McLaren, Director of Electrical Engineering, Admiralty, and representatives of the Ministry of Supply, Ministry of Labour, Board of Trade, Engineering Employers' Federation, the Mayor of Bridgwater and officials of the Corporation. Mr. J. G. Shaw, chairman of the company, presided, and Mr. H. W. Bosworth, chairman of the L.D. & C. group, also spoke.

Electricity in the Garden

At the Chelsea Flower Show held this week, the British Electrical Development Association has been showing a series of ingenious models representing a greenhouse with a soil-warmed propagating bench and electric tubular heating, and a small tomato house arranged for preheating of the soil. Other exhibits have included three frames fitted with electric soil warming illustrating a hotbed, a propagating frame and the use of a hotbed frame for growing tomatoes after a crop of lettuce has been taken from it, and a row of cloches illustrating the use of electric soil-warming. Full-scale exhibits have included examples of the electrical apparatus used in soil warming.

"Fuel and the Future"

The proceedings of the Conference on "Fuel and the Future" held by the Fuel Efficiency Committee of the Ministry of Fuel and Power in London in October, 1946, and reported in the *Electrical Review* of 18th October, 1946, have now been published by the Stationery Office at 6s. for the first two volumes and 3s. 6d. for the third. Volume I covers generation and utilization of steam, including its use for combined electricity generation and process heating; it also deals with the use of heat for drying, factory heating, air conditioning, agriculture and horticulture. Volume II discusses high-temperature processes, gas producers, oil firing, carbonization, railways, and the coal, chemical and clay industries; it concludes with a section on the sizing and grading of coal. Volume III covers domestic fuel and district heating.

Radio-Frequency Cables Specification

The Committee on the Standardization of Electrical Cables and Wires for Government Services has recently issued the G.D.E. Specification No. 23. This deals with radio-frequency cables used by the Services and other Government departments. Copies can be obtained from the Stationery Office, price 1s. 3d.

Philips-Western Electric Agreement

A message from the Amsterdam correspondent of the *Financial Times* states that Philips' Incandescent Lamp Works and the Western Electric Co., U.S., have agreed to grant each other usage rights regarding patents in the sphere of telecommunications, including radio. Moreover, Philips would obtain the usage of the Western Electric's patents on automatic telephones. The Western Electric in this respect also represents the American Telephone and Telegraph and the Bell Laboratories.

Dissolution of Partnership

Messrs. J. G. W. Fitt and G. P. Pain, carrying on business as electrical and radio engineers at 98, Tontine Street, Folkestone under the style of Raylite, have dissolved partnership.

Building Work Measurement

We are asked to say that copies of "The Standard Method of Measurement of Building Works" mentioned in our issue of 14th May (p. 779) can be obtained (at 10s.) from the Royal Institution of Chartered Surveyors, 12, Great George Street, London, S.W.1.

Linesman's Death

An inquest was held at York last week on Fred Wilson Geldart (50), who died in hospital eight days after he had received a shock at a 132-kV electricity transformer station at Osbaldwick. It was stated that Geldart was carrying an 18-ft ladder which came in contact with a main busbar 16 ft 4 in. above the ground. After the accident he said that the ladder had overbalanced. Medical evidence was given that he died from pneumonia following burns and shock. Recording a verdict of "Accidental death," the coroner said that every possible precaution seemed to have been taken.

Welding Research

Nearly three years ago the British Welding Research Association purchased the Abington Hall estate, near Cambridge, for development as engineering laboratories complementary to the metallurgical laboratories at its headquarters in London. Representatives of member firms and organizations recently paid a visit of inspection to the Hall, being received by Sir William J. Larke (president) and Sir Stanley V. Goodall (chairman) with Dr. H. G. Taylor (director of of research), who addressed the visitors. After senior investigators (Dr. J. W. Roderick, Mr. N. Goss and Dr. R. Weck) had outlined work in progress and the testing equipment installed, the visitors inspected the laboratories, examined the workshops and met members of the staff informally at tea afterwards.

Indian Import Licensing

The *Board of Trade Journal* of 22nd May gives details of revised schemes instituted by the Government of India for the licensing of capital goods and heavy electrical plant as from 20th April last and the period of validity of future import licences for this plant.

A list is given of the electrical plant, machinery

and equipment which is now subject to the heavy electrical plant licensing procedure when essentially required for specific electric power projects both of public utilities and factories. In addition to generators and motors the schedules include wires and cables, control gear, insulators and accumulators. The period of validity of future licences is limited to a maximum of three years.

Engineering Wage Claim

The reply of the employers to the claim put forward by the Confederation of Shipbuilding and Engineering Unions for a minimum rate of £5 15s. for skilled men and £5 for unskilled is to be given on 8th June, states the Labour Correspondent of *The Times*. An announcement regarding the similar claim for shipbuilders is to be made on 18th June. The claims affect some 2,500,000 workers.

Purchase Tax on Radio Apparatus

On Monday last a deputation from the Radio Industry Council which was received by the Economic Secretary to the Treasury, Mr. Douglas Jay, stated the case for a reduction in purchase tax on radio sets from 66⅔ to 33⅓ per cent, and for the exemption of television equipment and valves. The deputation was led by Mr. J. W. Ridgeway, chairman of the Council.

New South African Company

McKechnie Brothers, Ltd., Birmingham, and Bedford Metals (Pty.), Ltd., Germiston, South Africa, announce that a new associated company in South Africa is in course of formation. It will manufacture and handle the two companies' products including extruded solid and hollow rods and sections, and rolled strip in copper, brass, bronze and light alloys, cast phosphor bronze bars, etc.

Glass Buyers' Guide

With reference to our notice relating to the "Glass Buyers' Guide," published in our issue of 7th May, this booklet is published by the Du Mont Publishing Co., Ltd., 123, Pall Mall, London, S.W.1, and not, as stated, by the Glass Manufacturers' Federation. Copies of the guide (3s. 6d. for single copies, or 3s. each for batches of six or more, post free), can be obtained from the publishers.

Change of Name

Waste Heat & Gas Electrical Generating Stations, Ltd., has changed its name to Carliol Investment Trust, Ltd.

Trade Publications

Northern Aluminium Co., Ltd., Banbury, Oxfordshire.—Technical folder on aluminium and its alloys.

Gent & Co., Ltd., Faraday Works, Leicester. —Two illustrated brochures describing industrial and marine controlled clock systems.

C. A. Parsons & Co., Ltd., Heaton Works, Newcastle-on-Tyne, 6.—Brochure A.6, illustrating the manufacture of power transformers.

Sunvic Controls, Ltd., 10, Essex Street, Strand, London, W.C.2.—Technical leaflet on evacuated time delay switches.

Vactite Wire Co., Ltd., 24, Queen Anne's Gate, London, S.W.1.—Three leaflets on eureka, nickel-chrome and molybdenum resistance wires, tapes and rods.

A. P. Lundberg & Sons, Ltd.,491-493, Liverpool Road, Holloway, London, N. 7.—Priced leaflet on the 13-A flush shuttered socket and fused plug conforming to B.S.1363—1947.

Trade Marks

THE following applications have been made for the registration of trade marks. Objections may be entered within a month from 19th May.

ASTRONIC. No. 643,901, Class 9. Electric transformers, coils, bobbins for electric transformers and coils, and electric audio-frequency apparatus and burglar and fire alarms; and parts included in Class 9 of all such goods.—Associated Electronic Engineers, Ltd., Throgmorton House, 15, Copthall Avenue, London, E.C.2.

TELEFUSER. No. B657,071, Class 9. Instruments, apparatus, systems and parts thereof included in Class 9 for the production, transmission, reproduction, control, measurement or indication of signals of sound-wave frequency, of carrier-wave signals, modulated at sound-wave frequency, or of television or other image signals.—Central Rediffusion Services, Ltd., Carlton House, Lower Regent Street, London, S.W.1.

UNIMET. No. 657,712, Class 9. Electric welding apparatus and screens for the use of welding operatives.—United Metal Electrodes & Welding Equipment, Ltd., 14, Howick Place, London, S.W.1.

ORALIX. No. 658,979, Class 10. X-ray apparatus and appliances for dental, surgical, medical and veterinary purposes, and parts and fittings, all included in Class 10.—Philips Lamps, Ltd., Century House, Shaftesbury Avenue, London, W.C.2.

REGLO. No. B655,132, Class 11. Installations for lighting.—C.W.C. Equipment, Ltd., 66, Victoria Street, London, S.W.1.

DOLPHINS (design). No. 655,526, Class 11. Installations for lighting and parts thereof included in Class 11.—J. R. V. Dolphin, Bride Hall, Welwyn, Herts.

YORCALON. No. 658,911, Class 11. All goods included in Class 11.—Yorkshire Copper Works, Ltd., Pontefract Road, Stourton, Yorks.

BUT (design). No. B651,972, Class 12. Mechanically and electrically propelled vehicles and parts, not included in other classes.—British United Traction, Ltd., Hanover House, 14, Hanover Square, London, W.1.

Wiring in West Africa

Overcoming Heat and Humidity Effects

ALONG the Atlantic seaboard of Africa, stretching from the mouth of the Gambia River to the Niger Delta, are over 2,000 miles of generally low-lying, swampy, hot and humid coast on which are situated Britain's four West African Colonies—at one time notorious for their unhealthy climate. To their seaport towns come the produce and mineral wealth from inland for shipment to all parts of the world. Consequently commerce, together with what little industrial life exists, is based on the few major towns along the coast with populations ranging from a few hundred to over 40,000.

Most of these coastal towns have electric power, for which the Public Works Department is usually responsible. Distribution is at 3·3 and 6·6 kV, although plans are going ahead for wider distribution at higher voltages. Supplies are given at 400 V three-phase for industry and 230 V single-phase for domestic requirements.

By G. M. Dunbar, M.Amer.I.E.E.

Methods of domestic wiring acceptable in Great Britain would be unsuitable in West Africa because climatic conditions and general building methods, which largely influence the choice of system, are very different. Temperatures along the West African Coast hardly vary throughout the year. Although not excessively high when compared with the Persian Gulf or Central India during their hot season, they are high enough to affect electrical installations adversely. There is, strictly speaking, no cold season on the West Coast. Humidity is a second adverse factor, being extremely high all the year round; the rainfall, most of which comes between June and September, varies between 90 in. and 150 in. a year for different parts of the Coast.

Domestic dwellings may roughly be divided into three classes:—The lower African type, which in the towns consists of wood or corrugated iron walls on wooden frames with corrugated iron roofs; the older type of European bungalow and better type of African house, usually of wood raised from the ground on pillars; and the modern house, both European and African, built of cement blocks, cement-plastered inside and out, with asbestos or reinforced roof.

The domestic load in the average African house consists, as a rule, of two or three lights. In the better type of African and the European houses, lights, fans, kettles, refrigerators, water heaters and cookers comprise the consumers' apparatus. As there is no cold season, provision for heating is seldom made.

The total cost of an installation must be small, and it must be capable of standing up to arduous conditions, as the standard of living of the majority of Africans is very low, while the cost of materials—mostly manufactured in the United Kingdom—is relatively high. All forms of wiring have in the tropics a much shorter life than in a temperate climate, so the installation must be cheap to replace and yet comply with the established safety rules and permit of easy inspection for damage and wear.

In some of the older buildings the wood-case system is still to be found. This method is not now permitted for new installations owing to the danger of attack by white ants and other pests, with resulting unseen damage to cables, especially if the casing is in contact with plaster. During the rainy season the braiding of v.i.r. cable is attacked by mildew.

Open-cleat wiring is still to be seen, but for domestic use it is very much on the wane. Although any damage can be quickly detected and the braiding of the cable is less liable to attack by mildew, the system is far from ideal. As wallpaper would be quickly destroyed by fish moths and white ants, distemper is invariably used, and semi-skilled local painters play havoc with open-cleat wiring when distempering walls and ceilings. Further, the inhabitants frequently hang articles on the cables, which causes further damage.

Tubing in any form is ruled out for domestic wiring by most local authorities. While this method gives excellent mechanical protection, it is nevertheless most unsuitable. Humidity and heat coupled with the salt sea air cause excessive condensation, which not only damages the cables but also corrodes the tubing. The cost of this system, even were it allowed, would make it prohibitive for the average African.

Lead-alloy covered cables have proved unsuccessful and expensive for domestic

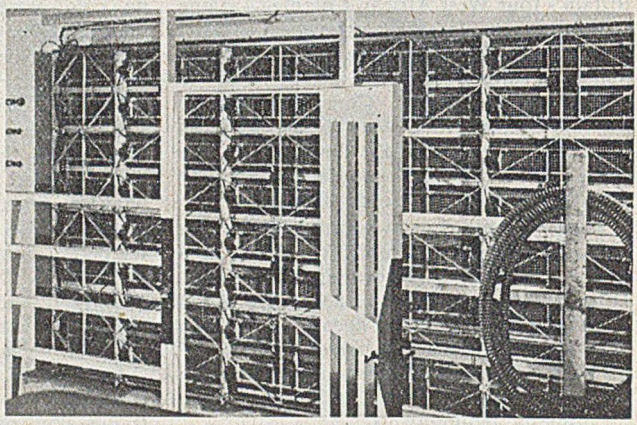
installations. Buried in or clipped to plaster there is the danger of a deleterious effect on the alloy. Where there are long vertical runs of surface wiring there is a tendency for the lead to creep, resulting in unsightly bulges.

In the most satisfactory system, which is now almost always used for new domestic installations, twin flat cab-tyre-sheathed cable is fastened with buckle slips to the surface. This method has proved to be comparatively cheap, neat, and quick and easy to install even by the available semi-skilled labour. It appears to suffer less from local climatic conditions, any damage is easily seen, and renewals or replacements present no difficulty. The whole installation can be distempered along with the rest of the building without damage to the cable.

Air Filtration

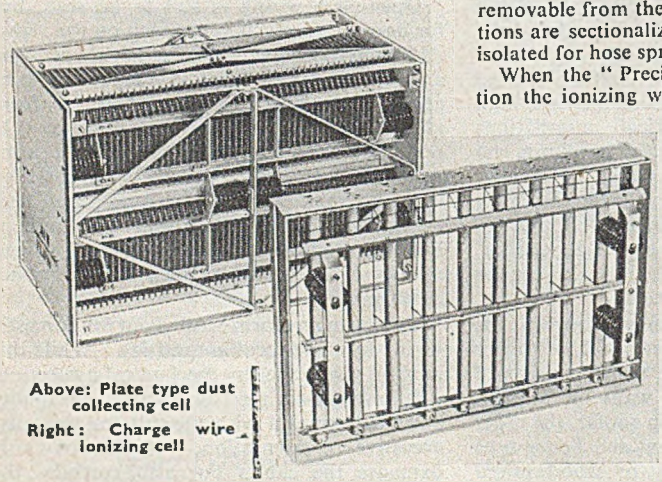
Electrostatic Precipitation Principle

AIR filters named "Precipitron" because they function electrostatically are being made by the Sturtevant Engineering Co., Ltd., Southern House, Cannon Street, London, E.C.4. The dust-laden air enters through an ionizer consisting of earthed tubes in a row between which are stretched fine wires charged at 13,000V.



Clean air side of 32,600 cu ft/m filter with protective barrier in front

The ionic activity between the wires and the tubes imparts electrical charges to the dust particles entrained in the intervening air stream, thus conditioning them for deposition behind the ionizer in a collector cell. The latter consists of multiple parallel plates, flat and smooth, alternately charged at 6,000 V and earthed. The dust particles carried by the air passing through the narrow passages so formed are repelled by the charged plates and caused to adhere to the earthed plates opposite, which are cleaned by periodical washing. Small cells are removable from their casing while large installations are sectionalized so that portions can be isolated for hose spraying in turn.



Above: Plate type dust collecting cell

Right: Charge wire ionizing cell

When the "Precipitron" is used for ventilation the ionizing wires and collector plates are charged positively, to minimize the generation of ozone by the corona discharge. When the cleaned air is expelled into a spacious factory negative charging may improve the effectiveness of the filter. The energy consumed ranges from 20 to 30 W/1,000 cu ft of air filtered and is derived through a step-up transformer and rectifier with smoothing devices, all enclosed in a cubicle that is interlocked with the high voltage cells for safety.

Filter plant of this kind is at present being installed, split into three sections, to deal with a total volume of 238,000 cu ft/m of clean air, in a large motor car body manufacturers' paint works near London.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Crompton Parkinson, Ltd., propose to increase their "A" ordinary capital from £1,150,000 to £2,000,000 and to offer 1,025,932 "A" ordinary shares of 5s. each at 20s. per share to ordinary and "A" ordinary stockholders in the proportion of one new share for every five ordinary and/or "A" ordinary stock units held. The new shares will be converted into stock and will rank for the final dividend and cash bonus as may be declared for the year ending 30th September next. In a circular to stockholders the company states that to finance the programme of re-equipment and expansion both as regards production facilities and working capital, over one and a half million pounds will be required, much of which will be needed in 1948, and almost all by the end of 1949. Previous practice has been to finance normal expansion out of the company's resources, but the continuing rise in costs has caused a recent review of the situation, and as a result additional capital from stockholders is being sought.

The Chloride Electrical Storage Co., Ltd., reports a profit (including profits of subsidiaries to the extent of gross dividends declared and income from other investments) of £1,108,821 for the nine months ended 31st December last, and after providing for taxation, etc., there is a net profit of £255,071 as compared with £297,646 for the year ended 31st March, 1947. General reserve receives £100,000 and £25,000 is set aside for pensions for employees of subsidiary companies. The distribution for the period on the "A" and "B" ordinary stocks is 20 per cent (the same as for the previous twelve months) and £222,626 is carried forward (against £213,847 brought in).

Heatrae, Ltd., reports a trading profit for the year ended 29th February last of £44,365, as compared with £17,743 for the preceding year, and after deducting depreciation, staff bonus fund, staff and employees' pension fund, taxation, etc., there is a net profit of £22,693 (against £11,656), to which is added £7,437 brought in, making £30,130. General reserve receives £7,000, stock reserve £5,000 and deferred repairs reserve £3,000. It is proposed to pay an ordinary dividend of 12½ per cent, less tax (same), leaving £7,380 to be carried forward.

The East African Power & Lighting Co., Ltd.—Under the auspices of the Power Securities Corporation an issue was made on Tuesday last of 800,000 4 per cent cumulative preference shares of Shs. 20 each at Shs. 20/50 cts. per share in Kenya and 20s. 6d. in the United Kingdom. Half the issue will be made available for applications received in Kenya. The shares rank *pari passu* with £300,000 7 per cent preference, and the proceeds, amounting to £785,500 will be used to finance extensions to the generating and distribution systems in Kenya and Tanganyika, estimated to cost £800,000. The Governments of these two territories have decided not to acquire the company's undertakings at present, as recommended in the recent report on East African electricity supplies. The Uganda Government has decided to purchase the undertaking there and the sole proceeds of £363,612 will be used for further development work.

The Victoria Falls & Transvaal Power Co., Ltd., has announced that the negotiations which were mentioned by the chairman at the last annual meeting for the transfer of the ownership of the company's undertaking in South Africa to the Electricity Supply Commission have progressed to the point at which terms of transfer may soon be embodied in a formal contract. This is now being drafted and will, when approved by the Electricity Control Board and executed, provide for the final transfer being made on 30th June next. The directors anticipate, with the information now available, that in the winding-up which will follow the transfer, the ordinary stockholders should receive not materially less than the present market price of their holdings.

Richard Johnson & Nephew, Ltd., announce a trading profit of £389,932 for the year ended 31st March last, as compared with £381,979 for the preceding year; the net profit is £127,930 (against £137,784). After allocating £25,000 to staff and workmen's pension fund, £30,000 to plant obsolescence reserve and £35,000 to general reserve, it is proposed to pay a final ordinary dividend of 10 per cent, less tax, again making 15 per cent for the year, and to carry forward £50,289 (against £48,659).

The Metropolitan Electric Cable & Construction Co., Ltd., records a net profit for 1947, before taxation, of £121,124, compared with £77,624 in 1946. Taxation takes £66,500 (£53,000) and deferred repairs nil (£2,500). The dividend is maintained at 15 per cent and £114,985 (£65,311) is carried forward.

G. & J. Weir, Ltd., report a net profit of £165,052 for 1947, compared with £242,497 in the previous year. No contribution is made to general reserve, to which £100,000 was allocated in the preceding year. A final dividend of 30 per cent again makes 40 per cent for the year, and £256,582 (£239,539) is carried forward.

Scophony, Ltd.—The new board of directors appointed at the end of last year has now prepared a scheme for the financial reconstruction of the company. The scheme, it is stated, will

involve a very heavy reduction of capital. Proposals will be submitted in due course to shareholders, and the appropriate petition will be presented to the Court. The Board considers it essential to raise further capital to improve the liquid position and to make reasonable provision for future requirements. Mr. G. W. Walton, the sole remaining member of the former board, has now resigned and Mr. E. S. Watkins has been appointed in his stead.

Johnson & Phillips, Ltd.—Complaints about the present system for the supply of raw materials were made by Mr. G. Leslie Wates, J.P., chairman and joint managing director, at the annual general meeting. He said that, as they were not allowed to buy for a sufficient period forward to cover their manufacturing programme, they had to offer customers contracts which allowed for the prices to be adjusted to some extent. While one might impose such a clause upon a purchaser in a sellers' market, it was in his view most objectionable, and already they found criticisms of it, particularly as other countries with which they were in competition were able to give firm prices. This was one of many details of trading which would find their level if they could be freed from control.

Siemens Bros. & Co., Ltd., are paying a dividend of 7½ per cent (same). The net profit for 1947 was £344,751, compared with £364,888 in 1946.

Broom & Wade, Ltd., are maintaining their interim dividend at 7½ per cent on increased capital.

New Companies

Braithwaite & Leslie, Ltd.—Registered 17th April. Capital, £3,000. Electricians, electrical engineers and contractors, etc. Permanent directors: S. Braithwaite and K. Leslie. Regd. office: 18, Wilderspool Causeway, Warrington.

Stockdill's, Ltd.—Registered 26th April. Capital, £2,000. To acquire the business heretofore carried on by L. Stockdill, at 30, Carr Lane, Slaithwaite, Huddersfield, as "Stockdill's" and to carry on the business of electrical engineers and contractors, etc. Directors: W. K. Boothroyd and L. Stockdill. Regd. office: 30, Carr Lane, Slaithwaite, Yorks.

Noble & Gregory, Ltd.—Regd. 1st May. Capital, £2,000. Electrical engineers and general electrical installation contractors, etc. Directors: H. J. Noble, G. B. Gregory, W. E. G. James and N. Griffiths. Regd. office: 45. St. Mary's Street, Cardigan.

Dualit Metal & Plastics, Ltd.—Registered 14th April. Capital, £1,000. Manufacturers of, and dealers in, electrical and electronic appliances; plastic substances, etc. Directors: M. Gort-Barten and Mrs. Hannah R. Gort-Barten. Regd. office: 27a, Picton Street, Camberwell, S.E.5.

Frigater, Ltd.—Registered 13th April. Capital, £1,000. Manufacturers and dealers in refrigerators, air-conditioning plants, ice-cream machines, electrical devices, domestic appliances, etc. Directors: W. J. Underwood, J. D. Kerr and H. C. Westwood. Regd. office: 2, Martin Street, E.15.

Electrical Appliances (Birmingham), Ltd.—Registered 15th April. Capital, £2,500. To carry on the business indicated by the title. Directors: E. N. Green, Olive M. Green and E. H. N. W. Green. Regd. office: 314, Shortheath Road, Erdington, Birmingham.

Norman Francis, Ltd.—Registered 16th April. Capital, £2,000. To acquire the stock-in-trade, etc., of the business of electrical equipment distributor and factor lately carried on at 140, Warwick Road, Sparkhill, Birmingham, as Norman Francis. Directors: N. W. Francis and G. Thompson. Regd. office: 61, Cape Hill, Smethwick, 41.

Center Electrical (Loughborough), Ltd.—Registered 16th April. Capital, £1,500. To acquire the business of electrical engineers and contractors carried on by J. Miller and S. A. L. Gould as J. & W. Miller at 1, King Edward Road, Loughborough. Directors: R. W. Mott, J. Miller and S. A. L. Gould. Regd. office: 1, King Edward Road, Loughborough.

Pembroke Electronic Manufactures, Ltd.—Registered 21st April. Capital, £500. Directors: J. Ware and N. B. Wheeler. Regd. office: 4, Pembroke Walk, Kensington, W.8.

Axe Industries, Ltd.—Registered 10th May. Capital, £10,000. Manufacturers of, and dealers in, varnished cotton insulating sleeving, varnished glass and varnished silk insulating sleeving, push back wire and all forms of insulation covered wiring, etc. Directors: J. R. F. Shand, Christine M. Shand and L. D. Shanly. Regd. office: Trinity Square, Axminster, Devon.

Companies to be Struck Off Register

The names of the following companies will be struck off the Register at the expiration of three months from 21st May, 1948, unless cause is shown to the contrary:—Near East Neon Co., Ltd.; W. & A. Electrical Equipment Distributors, Ltd.

Bankruptcies

D. H. Mannion, residing at 129, Blackburn Road, Haslingden, Lancs, electrician, and carrying on business as D. H. Mannion & Son, at 9, Regent Street, Haslingden.—Receiving order made 13th May on debtor's own petition.

W. E. Williams, residing and carrying on business at 5b, Winchester Street, Salisbury, electrical and radio engineer.—Receiving Order made 14th May, 1948, on debtor's own petition.

W. H. Collis, residing at 40, Hulse Street, Fenton, Stoke-on-Trent, and carrying on business at 59, King Street, Fenton, Stoke-on-Trent, electrical engineer.—Last day for receiving proofs for dividend, 4th June. Trustee, Mr. F. C. Ormrod, 12, Lonsdale Street, Stoke-on-Trent, Official Receiver.

STOCKS AND SHARES

STOCK Exchange business has developed a quiet tendency without this, however, causing material change in the steadiness of prices. The effect of the recent repayment of Argentine Railway debenture stocks continues to be felt in the markets for front rank industrial shares, the supply of which shows a distinct tendency to diminish. The fact in so many cases that companies have voluntarily agreed to limitation of their dividends appears to make little difference to the appetite of the investor for such shares as those just mentioned. Moreover, company results are on the whole very satisfactory. The annoying part to the shareholder is that he or she fails to benefit in the way of increased income. The company does well, but the only result is that the Government receives a generous slice of the profits and the company puts away, where it can, sums to various reserve-accounts which serve to fortify its financial position.

Nationalization Stocks

British Electricity 3 per cent stock advanced to within 5s. of par during the week, and the Transport "Threes," at 97⅜, also consolidated this month's rally. Both prices receded from the best, on sales induced by the Palestine news. The impression is that the ranks of unwilling holders have been thinned out by the completion of reinvestment business, or by resolutions to await more settled conditions before making changes. Even so, the issues are credited with reasonable powers of recovery, for they created huge new supplies of stock at a time when demand was naturally cautious, and when capital became further discouraged by the levy on savings.

Siemens Dividend

Siemens Brothers £1 stock units, at 34s., have hardly been affected by the announcement of the usual 7½ per cent dividend—on which they yield £4 8s. 0d. per cent—or of the net profit of £344,800 for 1947. In advance of the full report, it is assumed that comparison with last year's corresponding figure underrates substantially the latest result, since the previous accounts brought in an E.P.T. credit of over £400,000. Since then, a million 4 per cent second preference shares have been issued at 21s. (the present price is 22s. 6d.) in connection with the equipment of the company's new factories.

New Capital

Crompton Parkinson's issue of 1,026,000 new 5s. "A" ordinary shares at 20s. is being made at a price about 8s. below that of the existing 5s. units. Shares are being offered to holders of the ordinary stock in the proportion of one new share for every five 5s. units held. With the latter quoted at 28s., the "rights" are worth 1s. 4d. per unit. The new issue will not qualify for any interim dividend for the current year, which ends in September. Public subscriptions were invited this week to the offer of 800,000 East African Power & Lighting 4 per cent 20s. cumulative preference shares at 20s. 6d. to yield £3 18s. 1d. per cent. They rank equally with the existing 300,000 7 per cent preference, which stand at 38s. 6d. Figures in the prospectus showed an almost continuous expansion of profits, the latest being about three times the cost of the dividend on both classes of preference capital.

Price Changes

The majority of alterations in prices over the past week have been in the upward direction. Cable & Wireless ordinary, after dipping to 201, recovered to 204½. Thomas Tilling have at length reached £5 and shares have changed hands at a little over that price. British Electric Traction deferred gained 40 points at 1855. Oriental Telephones continue their advance, with a rise to 55s. In the miscellaneous groups, Associated Electric at 76s. 3d. are 2s. 6d. higher: so, also, are Greenwood & Batley at 52s. Smaller improvements have occurred in Automatic Telephone, 64s. 9d., De La Rue, 48s. 3d., Ever Ready, 39s. 6d., British Aluminium, 51s., Crabtree, 43s. 6d., and London Electric Wire, 46s. 3d. Jerusalem Electrics hardened to a guinea, but Palestine Electrics, 31s. 6d., are 1s. lower. Small declines include Johnson & Phillips, 72s. 6d., Lancashire Dynamo, 5 7/16, Canadian Marconi, 12s. 6d., Cawnpore Electrics at 55s. are 2s. 6d. down. The radio group is rather better, with Cossor 12s. 6d. and E. K. Cole 13s. 9d.

Victoria Falls Take-Over

Victoria Falls and Transvaal Power £1 ordinary have fallen half-a-crown to 7⅜ on a measure of disappointment with the terms on which the undertaking, which supplies power to practically the whole of the Rand goldfields, is to be taken over by the South African authorities on 1st June next. The purchase price of £14½ million represents exactly £5 per ordinary share after allowing for the repayment of the £2 million preference capital at par. Other assets shown in the last balance sheet include £9,834,000 gilt-edged securities (at or under market values) and £3,288,000 in cash and tax certificates. Against these have to be set various liabilities, so that stockholders' expectations will remain a matter for speculation until resolved finally by the winding-up of the company. They were chilled to some extent by the directors' estimate that stockholders should receive "not materially less" than the present market value. The final dividend for 1947 has yet to be declared. The participating preference shares, which are quoted now at 21s. 6d., are due for a half-year's dividend on the day of the take-over.

ELECTRICITY SUPPLY

Increased Charges Criticized. Water Power in Fiji.

Dundee.—ESTATE LIGHTING.—Street lighting to cost £9,000 in the first development of Dundee's Industrial Estate has been approved by the Home Department.

Gateshead.—FLUORESCENT STREET LIGHTING. The Town Council has decided to use fluorescent lighting on the first stage of its street lighting conversion. The first stage comprises 176 lamp standards and the additional cost of the scheme, by using fluorescent lighting, instead of sodium lighting, will be £3,015, raising the cost to £18,000. The amended plan is being submitted to the Ministry of Transport for approval.

Sark.—POWER SCHEME REJECTED.—An offer by Mr. Alec Avis, electrical engineer, of Flookburgh, near Windermere, Lancs, to supply the island with electricity for the first time in its history has been rejected by Sark's Feudal Court of Chief Pleas. Mr. Avis planned to give the island domestic light, power and street lighting at a cost of £10,000 but on monopoly terms. The court may, however, accept the scheme of a resident of Herm, Mr. Upton, to give Sark electricity on a non-monopoly basis.

Southport.—CRITICISM OF HIGHER CHARGES.—Alderman W. H. Barber, chairman of Southport Finance Committee, criticizing the increased electricity charges, stated that if the Southport Corporation undertaking had not been nationalized it would have gone on for a considerable period supplying electricity at the old price. They were, he asserted, only on the fringe of what would prove, over a period of years, to be a costly business to electricity consumers of Southport. The cost of collecting accounts and everything else would be much higher than under the Corporation. Hitherto, Corporation meter readers had dealt with electricity, gas and water. In the future the Board would employ its own meter readers.

Overseas

Fiji.—HYDRO-ELECTRIC RESOURCES.—An investigation of the hydro-electric development possibilities in Viti Levu, the principal island of the Fiji group, was recently carried out by Vickerman and Lancaster, consulting engineers, Wellington, N.Z. In a report to the Director of Public Works at Suva the engineers state that conditions in the Suva area and also along the north-west coast warrant the early provision of a general supply of electricity. The two main industries, sugar milling and gold mining, have established their own power supplies, so that no big industrial demand is likely, unless relatively cheaper hydro-electric power can be made available. On the Navua river an initial installation of two 6,000-kW units is recommended, the estimated cost, including transmission to Suva, being £923,000. Other power sources worth consideration include the Monasuva Falls on the Wainanuka river, using a head of 550 ft (168 m) and the Nadi river on which a fall of 750 ft (228 m) is available 15 miles (22 km) from the coast.

TRANSPORT

Brighton.—VOLK'S RAILWAY REOPENED.—Volk's Electric Railway, which had not operated since the beginning of the war, was restarted on 15th May.

Gateshead.—COUNCIL AND TRAMWAYS.—The Town Council is being urged by Felling-on-Tyne U.D.C. to approach the Ministry of Transport about the possibility of Felling and Gateshead Councils taking over the undertaking of the Gateshead & District Tramways Co., Ltd. The proposal that the Councils should take over the undertaking has been made as a result of a deadlock over the replacement of the trams by trolley-buses. The tramways company, before embarking on the change-over, asked the Ministry of Transport for an assurance about the amount of compensation which would be given if the tramways company was taken over by the State. The Minister of Transport refused to give any assurances, and the company has not taken any further steps to bring about the change-over.

St. Helens.—FLUORESCENT BUS LIGHTING.—A trolley-bus with fluorescent interior lighting was put into service last week.

Increased Demand for Telephones

THE great demand for telephones since the end of the war is shown by the fact that in the past three years the numbers installed have been 389,553, 697,579 and 624,809, respectively, but the applications outstanding at the end of each year have risen from 299,843 in 1945 to 350,332 in 1946 and 423,152 last year. Compared with these figures, the total number of telephones installed in 1936, 1937 and 1938 was 1,170,459, and at the end of each of those years the applications outstanding numbered 925, 6,053 and 4,123, respectively. At 136,000 cable distribution points all wires are in use and at 1,500 telephone exchanges the equipment is fully employed. The Post Office is reducing its orders for equipment to permit of increased exports, but additional cables and new or extended exchanges will be provided within the limits of its restricted resources. More than 50,000 people are on shared telephone service and there have been few complaints.

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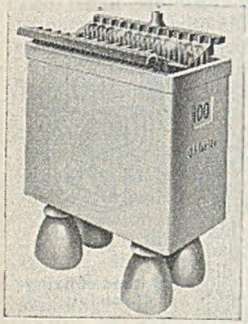
RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Battery Cell Containers

OWING to the prevailing shortage of timber, from which the conventional lead-lined wooden boxes for stationary cells are manufactured, a practical alternative has been developed by the CHLORIDE ELECTRICAL STORAGE CO., LTD., Exide Works, Clifton Junction, nr. Manchester.



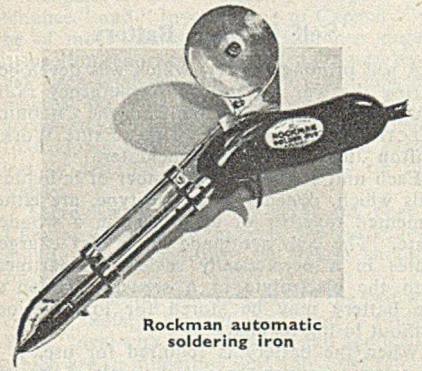
Stoneware container for a 1,200-Ah battery cell

These containers are fabricated from a chemical grade of vitreous stoneware and mounted on combined insulator and pedestal supports of the same material. The plates are supported from the top edge of the container itself, thus avoiding the use of glass hangers. The absence of lead lining has enabled the overall dimensions to be reduced.

Automatic Soldering Iron

A pistol-grip soldering iron incorporating a trigger-actuated mechanism for feeding solder to the bit is an addition to the manufactures of the ROCKMAN ENGINEERING CO., LTD., Woodstock Mills, Meek Street, Higginshaw, Oldham.

This appliance has been developed in order to meet the requirements of industrial concerns who are engaged on high-speed mass production work. Up to 6 ft (1·83 metres) of resin-cored solder may be loaded on to the spool which is attached to the handle. The element is of the ceramic air sealed type and it raises the temperature of the bit to 400 deg C in four minutes.



Rockman automatic soldering iron

Although it may have a somewhat unwieldy appearance, this iron is perfectly balanced and no undue strain is experienced when it is used over long periods. All metal parts are chromium plated and the handle is of a black moulded material with the feed trigger coming easily to the index finger.

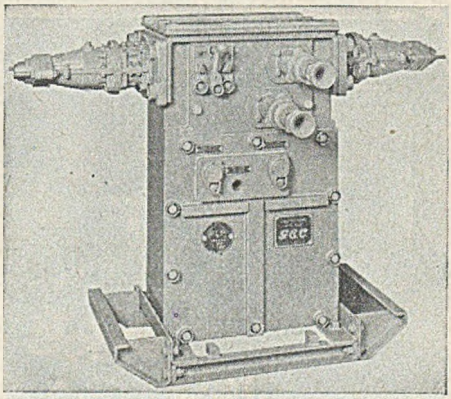
Axial Flow Fans

Medium pressure axial flow fans without guide vanes manufactured by Woods of Colchester are available from the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, in nine different sizes with diameters ranging from 6 in. (15·25 cm) to 48 in. (1·22 m).

The number of blades varies from four to twelve. Buxton tested flameproof motors can be supplied for fans with diameters from 12 in. (32·2 cm) to 38 in. (96·5 cm).

Coal Face Lighting Equipment

A flameproof panel for the control of fluorescent lighting in coal mines or other inflammable atmospheres has been developed by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2. Its output is 2·5 kVA at 110 V with inputs at 440, 500, 550 or 600 V.



G.E.C. flameproof fluorescent lighting panel

The upper portion constitutes a separate flameproof busbar chamber containing a fully interlocked isolating switch. In the lower compartment is a removable chassis on which are mounted the transformer, contactors, protective relays and fuses which will operate at a maximum inclination of 15 deg to the vertical.

The lighting fittings themselves may be of the fluorescent or tungsten filament type. They are connected together in pairs through a 5 yd

(4·57 metres) length of four core trailing cable, each fitting being connected to a 2·5 yd (2·85 metres) length complete with half of a flameproof coupler, thus forming a self contained 10 yd (9·14 metres) continuous lighting section.

Heavy-Duty Smoothing Iron

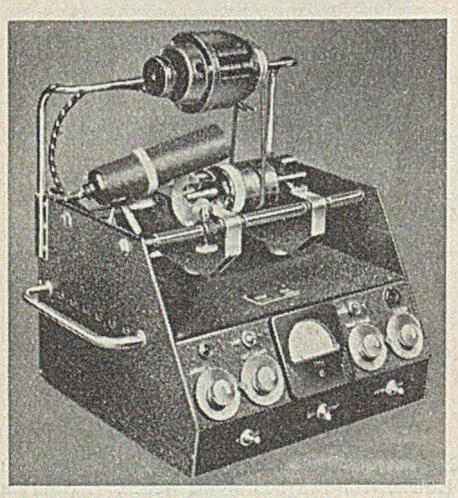
Thermostatically controlled smoothing irons for industrial or heavy-duty work are now manufactured by WILKINSON & TOLHURST, 115, Venner Road, Sydenham, London, S.E.26. At present two models are available weighing 8 or 10 lb (3·63 or 4·54 kg) with loadings of 700 and 800 W.

Switched Socket Outlets

The manufacture of three-pin switched socket outlets and plugs rated at 5A is announced by CLAYTON, LEWIS & MILLER, LTD., Manilla Road, Southend-on-Sea. These "Clem" accessories are of modern appearance and have been designed to conform to BS.546. They are fabricated from a moulded material and incorporate a see-saw actuating lever.

Dynamic Balancing Machine

An instrument designed to determine the quantity and position of out-of-balance masses in small armatures and rotors during rotation



Scophony dynamic balancing machine

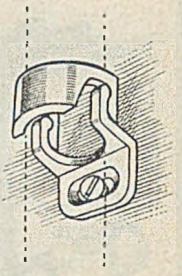
is now being manufactured by SCOPHONY, LTD., Wells, Somerset. This "Strobodynamic" machine will take rotors up to about 5 lb (2·27 kg) in weight with maximum lengths and diameters of 11 in. (27·9 cm) and 4 in. (10·2 cm) respectively.

The body to be balanced is placed in the half bearings of the cradle and belt driven by a motor attached to the rail above. The bearings are supported "elastically" and can swing independently one from another. Dynamic transducers pick up the vibration from each bearing, converting it to a varying potential, which is utilized in the measuring circuits.

The sensitivity of these machines depends upon the mass and type of rotor being balanced, but in general an out-of-balance of 50-60 milligramme-centimetres (0·0007 ounce-inches) will produce an easily visible change in reading. In favourable cases, one fifth of this amount can be detected. The approximate dimensions of this device are 14 in. (35·6 cm) wide, 12 in. (30·5 cm) deep and 15 in. (38 cm) high.

Conduit Clips

Die-cast alloy conduit clips requiring one fixing screw only are manufactured by THAMES DIECASTING (PRODUCTS), LTD., Bridge House, Hamlet Road, Southend-on-Sea, and distributed by ELECTROWARES, LTD., 231, Waterloo Road, London, S.E.1. When the lower half of the clip has been screwed to the wall and the conduit placed in position the upper half may be tapped or sprung into place, the two sets of claws locking firmly together and securing the conduit. These clips are available for ½, ¾ and 1 in. conduits.



Method of fixing conduit

The "Babykit"

For keeping babies' bottles warm and so make it possible to prepare two or three feeds at a time THERMOLECTRICS, LTD., Chapel Works, Church Street, Hampton-on-Thames, have just introduced an electrically heated soft leather container called the "Babykit." Shaped like a large handbag it holds five 8-oz bottles and in an inside pocket three napkins or spare night-dress. The loading is 40 W.

Self Priming Battery

A self priming battery, which was developed during the war for use with emergency radio equipment, is now available from the CHLORIDE ELECTRICAL STORAGE CO., LTD., Exide Works, Clifton Junction, near Manchester.

Each unit consists of a number of individual cells which, depending on the type, are either cemented together or assembled in a wooden crate. The cells are made up of dry charged plates in a hermetically sealed compartment with the electrolyte in a separate section so the battery may be stored for long periods without losing its charge.

When the battery is required for use, it is necessary to punch through the seals of the acid compartments. Subsequent cycles of charge and discharge can then take place in the normal manner.

NEW BOOKS

Electrical Machinery Repairs. Care of Accumulators.

Generators and Motors and their Applications. By D. J. Duffin. Pp. 210; figs. 411; index. McGraw-Hill Publishing Co., Ltd., Aldwych House, London, W.C.2. Price in U.K. 24s.

This book, which is the first volume of a series of three "working manuals" for those who repair motors, first explains in a simple manner and with little mathematics the elementary principles and general construction of the various classes of electrical machinery. The treatment is largely descriptive; little attempt is made to go into detail or to deal critically with the various methods of construction, but any weakness in this respect is largely offset by the fact that there are over 400 line drawings and photographs.

The section of most value to the practical electrician is the chapter on "Maintenance and Trouble Shooting," which gives detailed instruction for periodic inspection, testing, dismantling and overhauling. Brush operating faults are tabulated and a comprehensive "trouble shooting chart" is included for each type of machine described in the earlier chapters. An appendix sets out the fundamental steps to take in selecting motors.—S.F.P.

Electric Accumulator Manual. By T. C. Elliott. Pp. 166; figs. 123; index. George Newnes, Ltd., Tower House, Southampton Street, London, W.C.2. Price 16s.

The sub-heading describes this book as a practical work for the user. The first two chapters will give the student and battery attendant, somewhat briefly, useful information regarding the early development of the secondary battery and the construction of the plates, with a description of the chemical changes occurring during charge and discharge of both the lead-acid and steel-alkaline types.

Chapters 3 and 4 under headings "Maintenance" and "Investigation of Capacity" will be of most interest to practical men since an inspection report on an actual stationary battery has been analysed and the various items commented on and extended; also the various accessories are described and their uses explained. In Chapter 4 the method of taking a capacity test is described, with some notes on initial charge.

There seems to be an error on page 31, Chapter 3, in the example of the correction of gravity for temperature; the figures should be reversed.

The remaining chapters, except the two which cover "Safety Precautions" and "Charging Plant," deal with developments and applications, which are so numerous that only brief reference can be made to each. It would have been better if the available space had been devoted to a fuller description of a few of the modern main applications, and a certain amount of matter which occurs in the latter chapters dealt with in the first three.

The book is a useful addition to the literature of storage batteries.—S.H.C.

The Electrical Appliance Sales Handbook. By L. Wray. Pp. 231. McGraw-Hill Publishing Co., Ltd., Aldwych House, London, W.C.2. Price 21s.

This book by the managing editor of *Electrical Merchandising* is factual, largely statistical, but very readable. Some of the figures quoted are remarkable, emphasizing the difference between the United States market and that in the United Kingdom, where data have never been compiled in such detail or presented in quite the same way. Apart from figures, there is other information in this handbook that will assist the "selling process" here as well as there; analysis of product and prospect, relative to buying motives, is one way of providing assurance that the product will satisfy the need.—W.O.F.

Operation and Maintenance of Industrial Electric Motors. By G. W. Stubbings, B.SC., A.M.I.E.E., F.INST.P. Pp. 176; figs. 53. Third Edition. E. & F. N. Spon, Ltd., 57, Haymarket, London, S.W.1. Price 10s. 6d.

The two previous editions of this small book were called "Diseases of Electrical Machines." The former brief outline of basic principles has been extended to one chapter on d.c. machines and another on transformers and a.c. motors; hence the new title. Three-quarters of the book is devoted to defective operation and the rectification of faults with 17 pages to control gear. Apart from a short explanation of the arithmetic of power factor correction (misspelt in the preface) mathematical treatment has been avoided, since the book is intended for electricians and apprentices.—W.O.F.

Books Received

Radio Mains Supply Equipment. By E. M. Squire. Pp. 182; figs. 166; index. Sir Isaac Pitman & Sons, Ltd., 39, Parker Street, London, W.C.2. Price 12s. 6d.

Workshop Yearbook and Production Engineering Manual (2). Edited by H. C. Town. Pp. 567; figs. 477; index. Paul Elek Publishers, Ltd., 38, Hatton Garden, London, E.C.1. Price 35s.

Newnes Electrical Pocket Book. Edited by E. Molloy. (9th Edn.) Pp. 376; figs. and index. George Newnes, Ltd., Tower House, Southampton Street, London, W.C.2. Price 7s. 6d.

The Inventor and His World. By H. Stafford Hatfield. Pp. 256; index. Penguin Books, West Drayton, Middlesex. Price 1s. 6d.

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.

1939

E. K. COLE, LTD., and M. V. Callendar.—"Resonant electric artificial lines." 25068. 1st September, 1939. (601514.)

1942

W. W. Triggs (Patelhold Patentverwertungs- & Elektro-Holding Akt.-Ges.).—"Apparatus for the reception of oscillations." 16806. 26th November, 1942. (601583.)

1944

National Carbon Co., Inc.—"Electrical contact brushes." 7197. 12th May, 1943. (601306.)

Westinghouse Electric International Co.—"Method of treating carbon or graphitized carbon bodies." 9179. 8th February, 1943. (601377.) "Dynamo-electric apparatus and brushes therefor. 9180. 8th February, 1943. (Cognate application 9181/44.) (601378.) "Dynamo-electric apparatus." 10893. 10th June, 1943. (601446.)

D. Sciaky. "Electric resistance welding devices." 9550. 31st January, 1944. (601379.)

Boucher Inventions, Ltd.—"Transformers particularly adapted for use with luminescent lamp loads, and electric lighting systems." 15046. 25th June, 1942. (601380.)

Marconi's Wireless Telegraph Co., Ltd.—"Methods of preparing luminescent materials." 17349. 31st January, 1942. (601593.)

L. C. Saxe. "Electric razor head assembly." 20820. 26th October, 1944. (601595.)

R. W. Williams, E. M. Langham, J. H. Askew and C. S. Wright. "Systems for the electrical transmission of angular data." 21781. 6th November, 1944. (601518.)

Standard Telephones & Cables, Ltd. "Radio obstacle detectors." 22632. 5th September, 1942. (601597.)

W. H. Wilson.—"Electrically controlled slide action machines for weighing goods to a predetermined net weight." 24464. 13th December, 1943. (601311.)

J. E. Bolus.—"Electric meters." 25585. 20th December, 1944. (601312.)

Philco Radio & Television Corporation.—"Two-temperature refrigerator." 26023. 28th December, 1943. (601448.)

1945

K. W. Couse. "Variable speed electric drives." 3111. 1st April, 1944. (601519.)

Landis & Gyr Soc. Anon.—"Current transformer of the bushing type." 5722. 13th March, 1944. (601383.)

Philco Radio & Television Corporation.—"Controlled humidity refrigerator." 6527. 29th March, 1944. (601455.)

Soc. Le Carbone-Lorraine.—"Protection of electrodes in electric batteries of the alkaline electrolyte and electrolyte regeneration type." 8534. 18th September, 1943. (Addition to 587470.) (601315.)

Marconi's Wireless Telegraph Co., Ltd.—"Frequency measuring devices." 8621. 27th February, 1941. 601385.)

Waygood-Otis, Ltd.—"Electrical control circuits for electronic tubes." 15143. 24th June, 1944. (601613.)

Soc. Francaise Radio-Electrique.—"Signalling ultra-short waves." 16029. 6th April, 1943. (Cognate application 16030/45.) (601391.)

Marconi's Wireless Telegraph Co., Ltd.—"Electro-mechanical signal translating apparatus." 17108. 31st October, 1940. (601525.)

Linde Air Products Co.—"Electric welding control system." 17505. 15th August, 1944. (601466.)

Westinghouse Electric International Co.—"Electric elevator control systems." 20539. 10th August, 1944. (601470.)

Standard Telephones & Cables, Ltd.—"Radio direction finding systems." 20647. 20th February, 1943. (601532.)

Philips Lamps, Ltd.—"Systems for modulating high-frequency oscillations." 21463. 12th June, 1940. (601397.)

L. C. Barber.—"Radio control systems for aircraft and other vehicles." 22916. 5th September, 1945. (601401.)

Standard Telephones & Cables, Ltd.—"Radio locating systems." 23453. 26th October, 1943. (601536.)

Union d'Electricite Soc. Anon.—"Apparatus for the experimental study of stability or other characteristics of electric machines and electrical energy distribution systems including such machines." 23569. 2nd December, 1943. (601537.)

Cooke & Ferguson, Ltd., and R. Drucker.—"Socket fitting for a fluorescent lamp starter unit." 23647. 13th September, 1945. (601412.)

Scophony, Ltd.—"Visible reproduction of signals." 24292. 27th September, 1944. (601626.)

Allmanna Svenska Elektriska Aktiebolaget.—"Washing apparatus." 24797. 28th November, 1944. (601538.)

C. E. Every (Titanium Alloy Manufacturing Co.).—"Dielectric compositions." 24872. 25th September 1945. (601477.)

A. H. Stevens (Electronic Laboratories, Inc.).—"Voltage modifying system." 24934. 26th September, 1945. (601478.)

Sigma Instrument Co., Ltd., and F. R. Boosey.—"Galvanometers." 25015. 26th September, 1945. (601540.)

Pyrotenax, Ltd., and J. G. Lewis.—"Electric cables." 25083. 27th September, 1945. (601630.)

N. H. N. Ward.—"Structures for holding electric lamps." 25533. 2nd October, 1945. (601343.)

Babcock & Wilcox, Ltd.—"Fluid-fuel burning means." 25545. 11th October, 1944. (601406.)

Westinghouse Brake & Signal Co., Ltd.—"Remote control systems." 25563. 15th November, 1944. (601409.)

Standard Telephones & Cables, Ltd., and P. K. Chatterjea.—"Thermionic valve arrangements for coupling balanced and unbalanced electric circuits." 25569. 2nd October, 1945. (601410.)

General Electric Co., Ltd., English Electric Co., Ltd., G. J. H. Bignell and J. W. Gibson.—"Fusible electric cut-outs." 25699. 3rd October, 1945. (601489.)

General Electric Co., Ltd., H. C. Turner, G. W. Hartland and J. L. Leonard.—"Apparatus for measuring the thickness of non-magnetic coating on magnetic articles." 25700. 3rd October, 1945. (601490.)

Westinghouse Electric International Co.—"Elevator systems." 25705. 4th October, 1944. (601491.)

Evershed & Vignoles, Ltd., and W. T. Marchment.—"Electrical remote indicating or repeating systems." 25740. 3rd October, 1945. (601541.)

Metropolitan-Vickers Electrical Co., Ltd., A. Hamilton and R. W. Sillars. "Electric surge-diverters and the like." 25747. 3rd October, 1945. (601543.)

Omes, Ltd., and G. Mora.—"Electric upsetting apparatus." 25761. 3rd October, 1945. (601546.)

Landis & Gyr Soc. Anon.—"Bottom bearings for sensitive metering apparatus, such as electricity meters." 26353. 18th October, 1944. (601503.)

General Electric Co., Ltd., and S. H. Dale.—"Direct current motor systems." 26477. 10th October, 1945. (Cognate application 21826/46.) (601633.)

Crompton Parkinson, Ltd., and P. Freedman.—"Electrical discharge lamps." 26736. 12th October, 1945. (601504.)

Marconi's Wireless Telegraph Co., Ltd.—"Electronic switching system." 27398. 16th September, 1943. (601508.)

Compagnie de Produits Chimiques et Electro-Metallurgiques Alais. Froges et Camargue.—"Oxide layers obtained upon aluminium and its alloys by electrolytic means." 28064. 11th November, 1943. (601636.)

General Electric Co., Ltd., N. A. Wooster and W. A. Wooster.—"Artificial manufacture of quartz crystals." 28960. 31st October, 1945. (601552.)

E. P. Newton (Butler Bros.).—"Electro-deposition of iron." 29411. 5th November, 1945. (601553.)

Taylor Electrical Instruments, Ltd., and D. Rich.—

" Multiple position rotary electric switches." 30191. 12th November, 1945. (601640.)

Standard Telephones & Cables, Ltd.—" Semi-conductor." 30788. 20th November, 1944. (Cognate application 30789/45.) (601430.)

British Thomson-Houston Co., Ltd. " Starting arrangements for electric discharge devices." 31025. 21st November, 1944. (601360.)

Sadir-Carpentier.—" Radio beacon systems." 31093. 18th October, 1943. (601641.)

Marconi's Wireless Telegraph Co., Ltd.—" Pulse communication system." 31407. 5th January, 1944. (601644.)

Brookhirst Switchgear, Ltd., and J. S. Davies.—" Snap action mechanisms for electric switches, switchgear and the like." 31726. 24th November, 1945. (601361.)

R. F. Oxley.—" Electric heating devices." 31978. 4th October, 1946. (601431.)

British Thomson-Houston Co., Ltd.—" Dynamo-electric-machines." 32910. 6th December, 1944. (601565.)

English Electric Co., Ltd., and K. F. Barlow.—" Electric-arc welding apparatus." 33136. 7th December, 1945. (Addition to 584695.) (601567.)

Standard Telephones & Cables, Ltd., and P. K. Chatterjea.—" Arrangements for selecting electric pulses of given width." 33144. 7th December, 1945. (601650.)

British Thomson-Houston Co., Ltd.—" Polymers of vinyl compounds and their preparation." 33153. 11th December, 1944. (601568.)

British Thomson-Houston Co., Ltd.—" Insulating and dielectric compositions." 33656. 18th December, 1944. (601572.)

Ferranti, Ltd., M. K. Taylor and I. N. Vaughan-Jones.—" Super-regenerative radio receivers of the type associated with transmitting means." 34825. 21st December, 1945. (601574.)

Marconi's Wireless Telegraph Co., Ltd.—" Radio frequency power network." 35132. 30th December, 1944. (601575.)

1946

E. F. Matthews (Krebs & Co., Akt.-Ges.).—" Electrolytic cells." 1994. 21st January, 1946. (Convention date not granted.) (601439.)

Dubilier Condenser Co. (1925), Ltd.—" Apparatus for the electrical treatment of fluids." 3274 and 3767-8. 5th June, 1945. (601576 and 601578-9.)

Dubilier Condenser Co. (1925), Ltd. (W. Dubilier).—" Apparatus for electrically treating fluids." 6680. 4th March, 1946. (Addition to 601579.) (601580.)

Chicago Pneumatic Tool Co.—" Low inertia induction motor." 9470. 5th April, 1945. (Cognate application 9471/46.) (601370.)

Amended Specifications

Pirelli-General Cable Works, Ltd., and anr.—"Electric cable insulation." 558033.

English Electric Co., Ltd., and anr.—"Free piston type internal combustion compressors." 594764.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where " Contracts Open " are advertised in our " Official Notices " section the date of the issue is given in parentheses.

Australia.—9th July. Brisbane City Council. Three 11-kV, 800-A, three-phase metal-clad switchboards.*

Benfleet.—5th June. U.D.C. Vertical-spindle centrifugal pump, complete with motor and wiring, at the Council's Rushbottom Lane sewage pumping station. Surveyor, Council Offices, Thundersley, Essex.

Birkenhead.—3rd June. Corporation. Installation of electric lift at Municipal Hospital. (21st May.)

Lincolnshire.—4th June. County Council. Electrical works at Stoke Rochford Hall, Kesteven Training College. (21st May.)

Newcastle-on-Tyne.—City Council. Electric lighting installations in thirty-two houses, Longbenton housing estate. City architect, 18, Cloth Market, Newcastle.

Portuguese East Africa.—15th June. Portuguese Directorate-General of Colonial Development. Two turbo-alternaters, two boilers, switchgear, etc., for new power station at Lourenço Marques.*

South Africa.—Bloemfontein.—1st July. City Electricity Department. Overhead line material.*

Spain.—Seville.—Compania Sevillana de Electricidad. 10,000-kW turbine, 18,200-kVA generator, 18,200-kVA transformer, switches and measuring instruments for a hydro-electric scheme. Manufacturers should communicate direct with the Seville firm and notify the Export Promotion Department of the Board of Trade (reference 33566/48) of any action taken.

Uruguay.—Montevideo.—9th July. Usinas Electricás y Telephonos des Estado. Supply of 62 transformers ranging from 600 kVA to 5,000 kVA.*

21st June. 125,000 insulators for h.v. lines. 19th July. Equipment for 30/6-kV, 50-cycle transformer substations.*

West Riding.—2nd June. County Council. Electrical installation in connection with the adaptation of decontamination stations at Dalton, Poplar Avenue, Thrybergh, and Aughton Main Street. West Riding architect, County Hall, Wakefield.

* Specifications may be inspected at the Export Promotion Department, Thames House North, Millbank, S.W.1.

Orders Placed

Glasgow.—Corporation Transport Committee. Recommended. Rectifier equipment, Dalhousie substation (£50,341).—Metropolitan-Vickers.

Newcastle-on-Tyne.—City Council. Accepted. Installation of a secondary lighting system at the recreation hall, St. Nicholas' Hospital (£150).—G.E.C.

Northumberland. — Education Committee. Accepted. Electric heating at Whitley Grammar School (£182).—Watson Norie & 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.

Argyllshire.—Restoration of Lochgair Hotel, Lochfyneside, after fire (£13,000); proprietor.

Banbury.—Houses (40), Warwick Road; borough surveyor, Municipal Buildings, Marlborough Road.

Brackley.—Dwellings (42); G. F. Lawson, architect to R.D.C., 30, Horse Fair, Banbury.

Buckingham.—Houses (25) for agricultural workers; Scherrer & Hicks, architects to R.D.C., 10, Dover Street, London, W.1.

Bury.—Works at the Town Hall, including completion of Council chamber, committee rooms, and offices (£40,000); borough engineer.

Camborne-Redruth.—Traditional houses (56); surveyor, Urban Council Offices, 3, West End, Redruth.

Clowne.—Dwellings (50) on four sites; J. Haslam & Sons, architects to R.D.C., Ryton Chambers, Newcastle Avenue, Worksop.

Coventry.—Civic laundry (£28,000), Foleshill; D. E. E. Gibson, city architect, 1a, Warwick Row.

Dundee.—Houses (100) for disabled ex-servicemen (£130,000); city surveyor, Town Hall, City Chambers.

Duston.—Works extensions for British Timkin, Ltd.; Henry Martin, Ltd., builders, Thenford Street, Northampton.

East Barnet.—Houses (70), Bevan estate, for U.D.C.; surveyor, Town Hall, Station Road, New Barnet.

Eccles. — Houses and bungalows (100); Masseys, builders, 305, Chorley Road, Swinton.

Essex.—Two schools, Saffron Walden and Rainham (about £100,000 each); H. Conolly, county architect, Chelmsford.

Felling (Co. Durham).—"Airey" houses (50) at Heworth; D. W. Green, U.D.C. housing architect.

Heanor.—Houses (50), Marlpool Farm estate; R. Archer, U.D.C. surveyor, Council Offices.

Hertfordshire.—Police houses (25) (£42,000); county architect, Castle Street, Hertford.

Jarrow-on-Tyne.—Factories for Meredith & Drew (£45,585) and Steel & Co. (£12,129); North Eastern Trading Estates, Gateshead-on-Tyne.

Lancashire.—Nurseries at Padiham, Great Harwood, Walkden and Droylsden (£50,000); A. T. Nicholson, county architect, County Offices, Fishergate Hill, Preston.

Leeds.—Houses (70), and flats (12), Mount estate, Moortown, and houses (30), on the Iveson House estate; city engineer, Civic Hall.

Lincoln.—Houses (52), Boultham Moor estate; city surveyor, Municipal Offices, Silver Street.

Liverpool.—Factory and offices for John Mathews & Co., Ltd., Philip Street; A. Neville Holt, architect, 20, Exchange Street East.

London.—BRIXTON.—Flats, Bonham Road; Gollins, Melvin & Partners, architects, 21, Russell Square, W.C.1.

CITY.—Reinstatement of Central Criminal Court, Old Bailey; city surveyor, 55, Moorgate, E.C.2.

NORWOOD.—Out-patients' dept., Norwood and District Cottage Hospital; Harold Crane, architect, Parliament Mansions, Abbey Orchard Street, S.W.1.

Portsmouth.—Houses (102), Leigh Park; city architect, 1, Western Parade, Southsea.

Rochester.—Houses (64); borough engineer, Council Offices, King Edward Road.

Salford.—Flats (64), Regent Road; houses (16), Devonshire Street; W. A. Walker, city engineer, Town Hall.

Sheffield.—Additions to Pond's Forge, Sheaf Street and Pond Hill; Geo. Senior & Sons, Ltd., Pond's Forge.

New works, Coleford Road; Harper & Schofield, Ltd., Progress Tool Works, Sheffield.

Shildon (Co. Durham).—Houses (30) for U.D.C.; M. Turnbull, surveyor, Urban District Council Offices.

South Shields.—Houses (86); borough engineer, Town Hall.

Stockport.—Houses (152), Houldsworth estate, Reddish; W. F. Gardner, borough surveyor, Town Hall.

Stretford.—Houses (40), shops, flats and bungalows, Moss Park housing site; A. H. Perry, borough surveyor, Town Hall, Talbot Road.

Sunderland.—School, Blue Allotments site, and residential school for subnormal children at Milton Hall, Brampton; C. A. Murray, education architect, Ryhope Road.

Surbiton.—Factory, Alpha Road, Hook; Associated Building Construction Developments (Raynes Park), Ltd., 37, West Barnes Lane, S.W.20.

Swindon.—Houses (110), Moredon; borough architect, Civic Offices.

Wisbech.—Conversion of Bowthorpe Hall to Maternity Home, for Isle of Ely C.C.; R. D. Robson, county architect, County Hall, March.

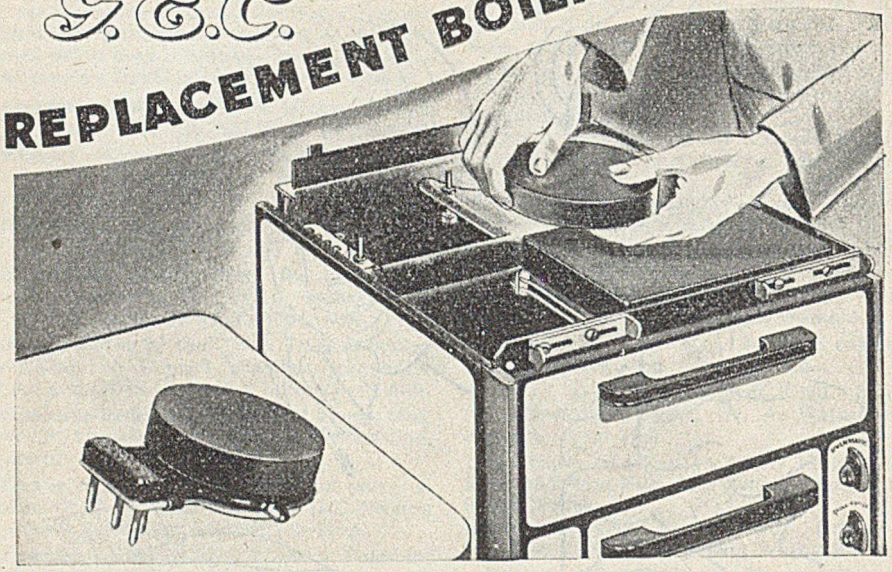
Wolverhampton. — Extensions to works, Ettingshall, for Joseph Sankey & Sons, Ltd.; Lavender, Twentyman & Perry, architects, Waterloo Chambers.

Worthing.—Block of ten shops and flats, Palatine Road; D. J. Read, architect, 580, Christchurch Road, Boscombe.

Wrexham.—Factory (£2,000,000); British Celanese, Ltd., 22, Hanover Square, W.1.

G.E.C.

REPLACEMENT BOILING PLATES



FOR ALL MAKES OF ELECTRIC COOKERS

Hotplates manufactured by the G.E.C. may be used in most makes of electric cookers. Some of the features that contribute to their popularity are given below. Further information will gladly be given upon request.

- Special iron castings to resist distortion, cracking and corrosion.
- Refractory insulating material which is relatively porous and non-hygroscopic, ensuring high thermal conductivity and maximum insulation resistance under all conditions.
- Patented double rim construction which eliminates the possibility of spilt liquids reaching the refractory insulating material (British Patent 459570).
- Fast boiling due to low heat absorption and high thermal conductivity of the cast iron top and to the well bonded refractory.

AVAILABLE FROM STOCK NOW!

REPLACEMENT

G.E.C.

BOILING PLATES

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

CLASSIFIED ADVERTISEMENTS

ADVERTISEMENTS for insertion in the following Friday's issue are accepted up to **First Post on Monday**, subject to space being available, and should be addressed to Classified Advertisement Department, Dorset House, Stamford Street, London, S.E.1. **THE CHARGE** for advertisements in this section is 3/- per line (approx. 7 words) per insertion; ***ONLY OFFICIAL AND GOVERNMENT ANNOUNCEMENTS CAN NOW BE DISPLAYED***:—42/- per inch. Where the advertisement includes a Box Number this counts as two words and there is an additional charge of 1/-.

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

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

Original testimonials should not be sent with applications for employment.

SITUATIONS VACANT

Vacancies advertised are restricted to persons or employments excepted from the provisions of the Control of Engagement Order, 1947.

BRITISH ELECTRICITY AUTHORITY
(South-East Scotland Division)

APPLICATIONS are invited for the following appointments:—

AT PORTOBELLO POWER STATION, EDINBURGH (149-MW Capacity).

Power Station Superintendent, Class J, Grade 3, commencing salary £839 p.a. This officer will co-ordinate the operation and maintenance of the power station under the Generation Engineer (Operation) to the Division.

Power Station Operation Engineer, Class J, Grade 5, commencing salary £699 p.a. This officer will be directly responsible to the Superintendent in all matters relating to operation of the station and will deputise for the Superintendent in his absence.

Junior Charge Engineer (Shift), Class J, Grade 8a, commencing salary £526 p.a. This officer will be directly responsible to the Senior Charge Engineer for operation and operation personnel control in the boilerhouse.

It should be noted by intending applicants that a new 60-MW turbine and unit 540,000 lb./hr. P.F. boiler are being installed at the moment with steam conditions of 1,350 p.s.i.g. and 950° F. steam temperature. This plant should be steaming by late 1949 and will raise the classification of the station to "K."

For the posts of Power Station Superintendent and Operation Engineer extensive previous experience of steam electric power plant is essential, including detailed working knowledge of the operation of steam turbo-generators, modern boiler plant (preferably pulverised fuel), and of high tension electrical switchgear. For the post of Junior Charge Engineer the above type of experience is also preferable, although certificated engineers with extensive marine experience would also be considered.

AT BONNYBRIDGE POWER STATION, NEAR FALKIRK.

Charge Engineer (Shift), Class H, Grade 8, commencing salary £520 p.a. Qualifications as above.

AT FALKIRK POWER STATION.

Charge Engineer (Shift), Class E, Grade 8, commencing salary £449 p.a. Qualifications as above.

AT SOUTH-EAST SCOTLAND DIVISIONAL HEADQUARTERS (EDINBURGH).

Senior Assistant Engineer, Generation (Operation), commencing salary £838 13s. p.a. This officer will be a principal assistant to the Generation Engineer (Operation) and must have the highest technical qualifications in electrical and/or mechanical engineering. He should preferably have a first-class degree or the equivalent in electrical or mechanical engineering, together with Corporate Membership of the Institutions of Electrical and/or Mechanical Engineers, and some experience in the design, operation and maintenance of steam electric power stations.

Coal Supplies Officer, salary £750 p.a. This officer will be an assistant to the Generation Engineer (Operation), and his duties will comprise the purchase and supply of coal for the various generating stations in the Division, the arrangement of transport therefor, and liaison with the Divisional Coal Board and with Headquarters in London. He will generally be expected to see that the fuel supply arrangements for the Division are carried out to the best economic advantage. Experience of bulk purchasing of commodities of some kind would be an advantage for this post.

Senior Assistant Engineer, Generation (Construction), commencing salary £838 13s. p.a. This officer will be a principal assistant to the Generation Engineer (Construction), and must have the highest technical qualifications in electrical or mechanical engineering. He should preferably also have a first-class degree or the equivalent in electrical, mechanical or civil engineering, together with Corporate Membership of the Institutions of Electrical, Mechanical or Civil Engineers, and some experience in the design of either machinery, ferro-concrete buildings or steel structures.

Senior Assistant Engineer, Generation (Construction), commencing salary £838 13s. p.a. This officer will be a principal assistant to the Generation Engineer (Construction), and must have the highest all-round qualifications in civil engineering and building construction. Experience and knowledge of architectural design and the internal equipment of buildings are also essential. He should preferably also have a first-class degree or the equivalent, with Corporate Membership of the Institution of Civil Engineers or the Royal Institute of British Architects.

Senior Assistant Engineer (Technical), commencing salary £838 13s. p.a. This officer will be principal assistant to the Technical Engineer of the Division, who is responsible for the planning, design and maintenance of the substation equipment and protective gear on the Authority's main 132-kV system and for the metering of bulk supplies passing between the Authority and the Area Board, and for co-ordinating the electrical interconnection between the power stations and grid substations and grid substation circuits owned by the Area Board.

This officer should have the highest technical qualifications in electrical engineering, with a first-class degree or the equivalent, followed by some works training with an electrical manufacturer, and Corporate Membership of the Institution of Electrical Engineers.

Divisional Chemist, commencing salary £838 13s. p.a. This officer should have a first-class degree in Industrial Chemistry with some subsequent industrial experience. An important part of the work will be the chemical analysis and control of feed water supply to high pressure, high temperature P.F. steam boilers, and the chemical analysis and quality control of fuel for the five power stations of the Division. Some knowledge of corrosion chemistry, metallurgy and metalography as applied to steel alloys for high temperature steam power purposes would be an advantage.

The appointments will be subject to superannuation under terms and conditions approved by the British Electricity Authority.

Applications, stating age and experience, should be addressed to the Divisional Controller, British Electricity Authority, c/o 1, Dewar Place, Edinburgh, 3.

J. F. FIELD, Divisional Controller.

3303

APPLICATIONS are invited for the appointment of Works Manager for a large electrical engineering works in the Midlands at a salary commensurate with qualifications and experience. Candidates should be fully qualified engineers having ample experience of the manufacture of electrical machines up to the largest sizes. A considerable practical knowledge of modern management, production methods and equipments is essential. Applications should state age and give full particulars of education, training, qualifications, positions held, and salary required.—Box 3377.

BRITISH ELECTRICITY AUTHORITY
(South Wales Division)

APPLICATIONS are invited for the following appointments:—

(1) RESIDENT ENGINEER for the civil engineering works connected with the new Uskmouth Generating Station, near Newport, Mon.

(2) ELECTRICAL ENGINEERING ASSISTANT (Construction).

Applicants for the appointment of Resident Engineer should have had control of the erection of large civil engineering works, preferably a generating station having river intake works. The appointment is likely to last for approximately 4 years, but will be determinable, at any time on either side, by one month's notice. The salary will be in the range of £850 to £1,000 per annum.

Applicants for the appointment of Electrical Engineering Assistant (Construction) should have had experience in the layout of power station electrical plant and cable-work, drafting of specifications, and supervision of the installation of such plant. The appointment, subject to satisfactory service for a probationary period, will be a permanent one, and the salary in the range of £650 to £750 per annum.

Commencing salaries for both appointments according to qualifications and experience.

The appointments will be subject to the conditions of service to be determined by the British Electricity Authority, and will be superannuable under the regulations or scheme, as the case may be, to be made under the Electricity Act, 1947.

Forms of application may be obtained from the undersigned, to whom completed applications should be sent, to arrive not later than 14th June, 1948, in envelopes endorsed with the appointment sought.

H. V. PUGH,
Divisional Controller.

168, Newport Road,
Cardiff. 3238

BRITISH ELECTRICITY AUTHORITY
(South-Western Division)

APPLICATIONS are invited for the following appointments to the Technical Department Staff.

Technical Assistants (Telecommunications Section). Applicants should have had a sound general education and practical experience of communications equipment. They should be either Graduates of the Institution of Electrical Engineers or possess the City and Guilds final certificates in telecommunications. Starting salaries, depending on qualifications and experience will be in one of the following ranges:—

£392 8s. to £523 13s. per annum.
£534 3s. to £665 8s. per annum.

Technical Assistants (General Technical Section). Applicants should possess an engineering degree and preferably should have had practical training in a manufacturer's works. A genuine interest in technical matters is essential. Starting salary depending on qualifications and experience will be in the range of £392 8s. to £523 13s.

Applications, stating full particulars of age, education, training, qualifications, experience and positions held, should be addressed to the undersigned so as to be received not later than 5th June, 1948.

R. C. BARRETT,
Divisional Secretary.

26, Oakfield Road,
Clifton, Bristol, 8. 3302

BRITISH ELECTRICITY AUTHORITY
(South Wales Division)

Power Station Chemist

APPLICATIONS invited for appointment of Power Station Chemist at Llynfi Power Station, near Bridgend, Glam. Salary, Class II, Grade 8, of N.J.B. Schedule (£520 to £547 per annum).

The appointment will be superannuable under the conditions of the scheme or regulations to be made under the provisions of the Electricity Act, 1947.

Candidates should be not over 45 years of age unless already in service of B.E.A. or an Electricity Board; must have had experience in laboratory of modern power station with high-pressure boilers. A.I.C. or university degree an advantage.

Forms of application may be obtained from undersigned, to whom completed applications should be returned not later than 14th June, 1948, in sealed envelope endorsed "Llynfi Station Chemist."

H. V. PUGH,
Divisional Controller.

168, Newport Rd., Cardiff.
20th May, 1948. 3349

BRITISH ELECTRICITY AUTHORITY
(London Division)

Bow Generating Station

APPLICATIONS are invited for the position of Switchboard Attendant. Salary and conditions in accordance with N.J.B. Schedule, Class H, Grade 9a.

Candidates should possess good technical qualifications and be fully conversant with the operation of modern E.H.T. and L.T. switchgear and parallel running of alternators.

Applications, stating age, qualifications and experience, should be sent to the Divisional Secretary, Ergon House, Horseferry Road, S.W.1.

J. N. WAITE,
Divisional Controller.

Aldwych House, Aldwych,
London, W.C.2. 3348

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

APPLICATIONS are invited for the following appointments at the Board's Area Office, Elgin, Morayshire:—

(1) ASSISTANT MAINTENANCE ENGINEER. Candidates should have had sound technical knowledge and have had experience in the construction and maintenance of high tension and low tension overhead lines, underground cables, substations and associated gear, including planning of construction programmes, preparing schedules of materials and supervising the carrying out of the work. Commencing salary £505 per annum.

(2) JUNIOR MAINTENANCE ENGINEER to assist with the work described above. Candidates should have had sound theoretical training, and preferably some practical experience of the work. Commencing salary £330 per annum.

(3) ASSISTANT CONSUMERS' ENGINEER. Candidates should have had a general knowledge of E.H.T. and L.T. systems and be familiar with all rules and regulations appertaining to consumers' installations, and previous experience of correspondence with prospective consumers regarding agreements for supply. A good general education and ability to express views clearly and courteously in discussing requirements with prospective consumers is essential. Commencing salary £450 per annum.

(4) ASSISTANT SUBSTATION CHARGE ENGINEER for the Board's Transforming Substation of 20,000-kVA capacity at Keith, Banffshire. Candidates should have sound technical knowledge and have had some experience in H.T. switching operations. Commencing salary £330 per annum.

Applications, stating particulars of age, training, qualifications, etc., to be forwarded to the Area Manager at West Villa, South Street, Elgin. 3347

NATAL UNIVERSITY COLLEGE, DURBAN

Two Lectureships in Electrical Engineering

APPLICATIONS are invited for the above posts at a salary on the scale: Men, £550 × £25 — £725; Women, £425 × £25 — £600; plus cost-of-living allowance. The initial salary will depend on qualifications and experience.

Membership of the University Teachers' Pension and Provident Fund is compulsory.

The appointments will be in the first instance for a probationary period of two years. The successful candidates will be expected to take up duties in February, 1949, or as soon thereafter as possible.

Further particulars and information as to the method of application may be obtained from the Secretary, Universities Bureau of the British Empire, 8, Park Street, London, W.1. The closing date for the receipt of applications is 20th July, 1948. 3275

KENT COUNTY COUNCIL

APPLICATIONS are invited for two appointments in the Buildings Department for Engineering Assistants (Electrical) in the A.P.T. Division, Grade IV (£480-£525). The posts are superannuable and the successful candidates will be required to pass a medical examination.

Candidates should be Corporate Members of the Institution of Electrical Engineers and capable draughtsmen, with good experience in the preparation of schemes, specifications and estimates for all classes of electrical installation work.

Application forms, obtainable from the County Architect, Springfield, Maidstone, must be delivered to him, duly completed, not later than 14 days after the date of this publication.

W. L. PLATTS,
Clerk of the County Council.

County Hall, Maidstone. 3300

CITY OF BULAWAYO, SOUTHERN RHODESIA

Vacancies : Electricity Department

APPLICATIONS are hereby invited and will be received by the undersigned up to noon on Wednesday, the 9th June, 1948, for the following vacant positions in the Electricity Department of the Municipality :—

(a) CHIEF ENGINEERING ASSISTANT on the salary grade £672 × £24 — £792 per annum, plus, at present, a cost-of-living allowance presently fixed by the Council at the rate of 10% of the basic salary, and children's allowances (where applicable) at the rate of £24 per annum for the first child and £18 per annum for the second and third children. The minimum qualification which applicants should possess is that of Graduateship of one of the Chartered Engineering Institutions. Applicants should have had experience in the planning, designing and executing of electrical and mechanical works normally associated with large power undertakings. Applications should be accompanied by one unmounted passport type photograph of the applicant.

(b) ELECTRICAL TEST SUPERINTENDENT on the salary grade £600 × £24 — £696 per annum, plus cost-of-living and children's allowances on the basis set out in (a) above. The minimum qualification desired is that of Graduateship of the Institution of Electrical Engineers. Applicants should have had experience in the electrical testing section of a large supply undertaking, together with administrative and practical experience in a meter department. Mechanical test experience will also be an advantage. Applications should be accompanied by one unmounted passport type photograph of the applicant.

Applicants for the above positions should state age, whether married or single, and the earliest date on which duties could be commenced. Full details of qualifications and a summary of training and previous experience should also be furnished, together with copies of not more than three recent testimonials and a medical certificate of fitness.

Applications should be sent by air mail and a duplicate copy thereof—not including the photograph—should be addressed to the City Electrical Engineer (Bulawayo), c/o Rhodesia House, Strand, W.C.2.

Appointments will be subject to a satisfactory medical examination before leaving England and to the Council's service, leave and sick leave regulations as laid down from time to time. Successful applicants will, if satisfactorily completing a probationary period of one year, be required (if eligible) to join either the present Municipal Pension Fund or any other Municipal Pension Fund which may be in existence at the time, or the Municipal Provident Fund.

If the successful applicants are from Great Britain their own passage money (not exceeding £75 each) will be refunded by the Council, which will also pay salaries on the minimum of the advertised grade from the date of sailing from England.

Successful applicants will be required to enter into a contract with the Council for a minimum period of three years if on arrival in Bulawayo they are confirmed in their appointments. Failing such confirmation the Council will pay the applicants' return fares to England.

H. J. COOK, Town Clerk.

3236

GOVERNMENT OF NORTHERN IRELAND

Ministry of Finance

APPLICATIONS are invited for the post of Assistant Engineer, Grade B, in the Ministry of Finance. The employment will be temporary, but so far as can be foreseen will last for several years.

Remuneration. The salary will be within the range £500-£750 per annum, and will be fixed according to the qualifications and experience of the selected candidate. A salary lower than £500 may be paid in the case of a candidate under 26 years of age.

Qualifications. Candidates must be Corporate Members of the Institution of Electrical Engineers and must have had experience in preparing schemes, working drawings and contract documents for electrical installations for factories and similar works, and in supervising the execution of such contracts. A University Degree in Engineering and/or Associate Membership of the Institution of Mechanical Engineers will be an advantage.

Preference will be given to suitably qualified ex-Service candidates of the 1914-18 or 1939-45 war, providing the Ministry is satisfied that such candidates can, or within a reasonable time will be able to, fill the post efficiently. Applications, with copies of two recent testimonials, should be addressed to the Assistant Secretary (Establishments), Ministry of Finance, Stormont, Belfast, and should reach him not later than 15th June, 1948. 3301

CITY OF MANCHESTER

City Architect's Department

APPLICATIONS are invited for the following appointments :—

Permanent Staff.

(a) STRUCTURAL ENGINEERING ASSISTANT. Salary A.P.T. III, £450-£495 per annum.

(b) ELECTRICAL ENGINEERING ASSISTANT. Salary A.P.T. III, £450-£495 per annum.

Temporary Staff.

(c) TWO ASSISTANT QUANTITY SURVEYORS. Salary A.P.T. V, £520-£570 per annum.

Candidates for appointment (a) should possess adequate technical knowledge and practical experience in the design of structures in steelwork and reinforced concrete.

Candidates for appointment (b) should possess adequate technical knowledge and practical experience in the design of installations, including preparation of plans and specifications, and the supervision of contracts in connection with electric lighting, heating and power plants in municipal buildings, including schools and institutions.

Candidates for appointment (c) should have had considerable experience in the preparation of bills of quantities, estimates, valuations, and the settlement of accounts.

The successful candidates for the permanent positions will be required to pass a medical examination before the appointments are confirmed, and to contribute to the Corporation's Superannuation Fund and to execute the Corporation's Deed of Service.

Applications, on the official form, obtainable at the City Architect's Office, must be returned, together with not more than three recent testimonials, to Leonard C. Howitt, B.Arch., Dip.T.P., D.P.A., F.R.I.B.A., A.M.T.P.I., City Architect, Town Hall, Manchester, by Saturday, 12th June, 1948, endorsed for the appropriate appointment. Canvassing in any form, oral or written, direct or indirect, is prohibited and will be regarded as a disqualification.

PHILIP B. DINGLE,
Town Clerk.

Town Hall, Manchester.
May, 1948. 3237

COUNTY BOROUGH OF BARROW-IN-FURNESS

Borough Engineer and Surveyor's Department (Amended Advertisement)

APPLICATIONS are invited for the permanent appointment of Senior Engineering Assistant on Grade VI of the National Scales of Salaries for Local Authorities' Staffs, £595-£660 per annum.

Candidates must have had experience in the layout and maintenance of street lighting, both by gas and electricity. The possession of a recognised professional qualification is essential.

The Council has accepted the principle of providing housing accommodation if required by the successful applicant.

The appointment will be subject to (1) The National Scheme of Conditions of Service; (2) The provisions of the Local Government Superannuation Act, 1937; (3) Termination by one month's notice on either side; (4) The successful candidate passing a medical examination; and (5) becoming a member of the appropriate trade union.

Form of application may be obtained from the Borough Engineer and Surveyor, Town Hall, and must be completed and returned to him not later than Monday, 14th June, 1948.

No candidate summoned for interview who is not prepared to accept the position without qualification, whether it be offered to him or not, will be paid his expenses. Canvassing in any form will disqualify.

W. LAWRENCE ALLEN,
Town Clerk.

Town Hall,
Barrow-in-Furness. 3375

LONDON COUNTY COUNCIL

REQUIRED at South-East London Technical College, Lewisham Way, S.E.4, to commence as soon as possible, a full-time Lecturer in the Electrical Engineering Department. Applicants must be graduates or hold equivalent qualifications, and have had good professional or industrial experience either in the generation and distribution of electrical energy or in the design and manufacture of electrical machinery. The work includes Ordinary and Higher National Certificate courses for day and evening students. Burnham Technical Scales salary (£300 × £15 — £555, plus London allowance, and, within prescribed limits, increments allowed for approved industrial experience and previous full-time teaching service). The post will carry a special responsibility allowance of £100 a year. Application forms (stamped addressed foolscap envelope necessary) from the Secretary at the College, returnable within 15 days of the publication of this notice. (1136) 3235

UNIVERSITY OF SYDNEY

Chair of Electrical Engineering

THE Senate will shortly proceed to the appointment to the Chair of Electrical Engineering which will become vacant on the retirement of Professor Sir John Madsen. Applications are invited for the Chair. The subject, Electrical Engineering, includes both Electrical Power and Communication Engineering. Salary will be at the rate of £1,500 (Australian) per annum. There is a normal retirement provision on the lines of the Federated Superannuation System for Universities and, in addition, a pension of £400 (Australian) per annum upon retirement after attaining the age of 60 years. The Senate reserves the right to fill the Chair by invitation.

A statement of conditions of appointment and information for candidates may be obtained on application to the Secretary, Universities Bureau of the British Empire, 8, Park Street, London, W.1.

Applications close with the undersigned on 15th August, 1948.

G. DALE, Registrar.
3344

METROPOLITAN WATER BOARD

Appointment of Senior Assistant Engineer (Electrical)

APPLICATIONS are invited from fully qualified electrical engineers for appointment to the Board's permanent staff as a Senior Assistant Engineer, age limit 45 years, salary scale £720-£25-£820 per annum, plus cost-of-living bonus at present £80 per annum.

Candidates should have had responsible experience in the layout, specification, purchase, installation, testing and maintenance of all types of electrical pumping and generating plant, etc.

This appointment is excepted from the provisions of the Control of Engagement Order, 1947.

Particulars and a form of application may be obtained from the undersigned on receipt of a stamped addressed foolscap envelope quoting reference (E.R.).

G. W. STOKER,
Clerk of the Board.

Offices of the Board,
New River Head,
Rosebery Avenue, London, E.C.1. 3239

A young man with National Certificate and studying for Higher National (Electrical) is offered a junior staff position in the transformer test department of London manufacturers. Good opportunity to gain experience of transformer manufacture and electrical instruments, with prospect of advancement. Deferment of call-up will be supported. Write, giving full particulars, to—Box 3244.

AN electrical engineering company in the Midlands requires Draughtsmen experienced in the mechanical design and construction of D.C. machines; preference given to those with electric traction experience. Reply particulars of experience and training to—Box No. 439, 8, Serle Street, London, W.C.2. 104

APPLICATIONS are invited for the position of Switchboard Attendant at the War Department Generating Station, Aldershot, Hants. Applicants must have had good practical experience in the operation of E.H.T. 3-phase power station switchboards, including synchronising of turbo-alternators and parallel operation with incoming bulk supply. Wages at present £5 16s. per week of 44 hours (average), plus additional overtime pay for Sunday work. Full particulars, stating age, qualifications, experience and training, together with not more than three copies of testimonials, should be forwarded to Chief Electrical Engineer, Central Power Station (War Department), Thornhill Road, Aldershot, not later than 7th June, 1948. Envelopes to be endorsed "Switchboard Attendant." (This advertisement is published with the permission of the Ministry of Labour and National Service.)
3201

ASSISTANT Communications Engineers for Middle East area duty; with considerable practical experience in construction/operation/maintenance of telephone and telegraph equipment, including open-wire lines, cables, auto and C.B. exchanges and teleprinters, together with some administrative practice. Age limit 34; salary (incremental) from £500, plus allowances £195-£400 dependent on family circumstances; free quarters/messing. The service is pensionable. Married applicants should be prepared for initial three-year separation. Write, quoting No. 154, to—Box 2277, c/o Charles Barker & Sons Ltd., 31, Budge Row, London, E.C.4. 3306

ASSISTANT to Export Manager, by City firm of exporters. Knowledge of electrical trade an advantage. Good salary. No Saturdays.—Box 3219.

ASSISTANT (m. or f.) required for patent department (research information section) of large electrical manufacturers in Central London. Should have good education and one or more of the following: Familiarity with scientific-technical literature, experience of librarianship, knowledge of languages (particularly French and German). Suitable for young engineer/chemist with flair for documentation (searching, abstracting, indexing) and patent work. Training if required. Permanent progressive post. Write fully, stating salary required.—Box No. AB. 951, c/o Central News Ltd., 17, Moorgate, London, E.C.2. 3352

BELLING & Lee Ltd., Cambridge Arterial Rd., Enfield, wish to engage an Electrical Engineer for research and development work in connection with thermal cut-outs and thermostats. Applicants should possess qualification not less than Grad. I.E.E., or equivalent and must have had previous experience in the subject. Salary paid will be in accordance with age, experience and qualifications, which should be stated in full. Applications will be treated in confidence. 3350

BRITISH Engine Boiler & Electrical Insurance Co. Ltd., 24, Fennel St., Manchester, 4. Applications are invited for the permanent appointment of Head Office Assistant Electrical Engineer. Progressive salary commencing at £350-£380 according to age. Non-contributory pension. Candidates should be aged 22-24 and have served an apprenticeship with a leading manufacturer of electrical machinery, transformers and switchgear. Practical experience of the industrial application of electrical equipment will be an advantage. Graduate membership of the Institution of Electrical Engineers is essential. Applications should state age and give full particulars of training and experience. 2780

CABLE Jointers for contract in South America; must be first-class men with considerable experience of jointing P.I.L.C.D.S.T.A. underground cables up to 11,000 volts. Good pay with return fare paid. Food and accommodation free. Excellent climate. Hospital facilities on site, salary paid during sickness. Write detailing experience to—Personnel Dept., The Lummus Co., 525, Oxford St., London, W.1. 3281

CABLE Sales Representative, by Mersey Cable Works Ltd., for London, Yorkshire and South Wales areas, to develop sales of rubber-insulated cables. Applicants must have an intimate knowledge of rubber cable technique, and preferably a good connection with industrial, colliery, electricity and municipal undertakings. Applications, giving details of experience, age and salary required, should be sent to—Mersey Cable Works Ltd., Linacre Lane, Bootle, Liverpool, 20. 3217

DESIGNER-Draughtsman for work in conjunction with development department on the manufacture of light electro-mechanical apparatus. Some knowledge of light gauge sheet metal work useful.—The General Electric Co. Ltd., Personnel Dept., Union Works, East Lane, Wembley. 3151

DRAUGHTSMAN, by switchgear and control gear manufacturers in South Africa; progressive position for capable and experienced man. Apply in first instance, giving age, details of experience and when available, to—Box 3247.

ELECTRICAL Draughtsman with really sound training and all-round experience on modern power station installations, outdoor switchgear, cabling, protection, etc., required for London office.—Write, Box 590, c/o Judds, 47, Gresham St., E.C.2. 3374

ELECTRICAL Draughtsmen with some mechanical experience, aged 24 to 25 years, are invited to apply for a vacancy in the electrical and mechanical maintenance drawing office, salary approximately £425 per annum, according to experience, etc. Successful applicant will be invited to join the superannuation fund after serving a probationary period. Applications, stating age, qualifications, full details of training and experience, present position, and whether married or single, to—Personnel Manager, Boots Pure Drug Co. Ltd., Station St., Nottingham. 3243

ELECTRICAL Engineer, qualified and with general experience of power installations, transmission and industrial equipment, by British commercial concern for the East. Not over 35. Commencing remuneration not less than £1,000 p.a. for suitably qualified candidate; 4-year agreements, each followed by 6 months' home leave on full salary, initial outfit allowance, free passages and medical expenses. Profit sharing and retirement benefit schemes. Reply to—Box No. H.17, Foster Turner & Everetts Ltd., 11, Old Jewry, E.C.2. 3240

ENGINEER-Inspectors for India, by accumulator manufacturers. Applicants should be single and not more than 30 years of age, and have experience with self-contained lighting plants and accumulators.—Box 3153.

ELECTRICAL engineering manufacturers in the Midlands have a limited number of vacancies for Junior and Senior Engineers, with professional qualifications in electrical or mechanical engineering for tendering contracts and design work in relation to switchgear, rotating machines and transformers. Applications should be made, quoting ref. 85, and stating age, qualifications, experience and salary required, to—Box 24.

ELECTRICAL Engineers for Middle East area duty. Degree and/or A.M.I.E.E., with sound practical experience in erection/operation/maintenance of medium-sized H.T./L.T. diesel-generated station, distribution and switchgear; also D.O. and general administrative practice. Age limits 28-34. Salary (incremental) from £700, plus allowances £324 to £528 as conditioned by family circumstances, and free furnished quarters. The service is pensionable. Married applicants must be prepared for initial three-year separation. Write, quoting No. 155, to—Box 2275, c/o Charles Barker & Sons Ltd., 31, Budge Row, London, E.C.4. 3305

ELECTRICAL Foremen, by large oil company, for Middle East duty. H.N.C., and sound practical experience on the construction side in the operation/maintenance of medium-sized diesel-driven plants, distribution, H.T. and L.T. overhead and underground cables and wiring. Age limit 34. Single duty tour engagement in first instance at salary (and allowances) between the range of £620-£824 per annum, dependent on family status, plus free quarters/messing. No married accommodation throughout initial contract period. Write, quoting No. 156, to—Box 2276, c/o Charles Barker & Sons Ltd., 31, Budge Row, London, E.C.4. 3304

ELECTRICIAN for large brickworks in Midlands. Permanent position at slightly more than A.E.U. rates. Housing accommodation available. Apply with fullest particulars of age, experience, etc., to—Box 3196.

E.M.I. Institutes (associated with H.M.V., Marconiphone, etc.) require Lecturer in Radio Communications, whose duties will include some technical writing. Science or engineering degree (or equivalent) and good practical outlook essential. Commencing salary not less than Burnham scale according to age, qualifications and experience (minimum commencing rate £375, including cost-of-living bonus). Superannuation benefits in addition. Apply, giving fullest possible particulars, to—Principal, E.M.I. Institutes, 43, Grove Park Rd., London, W.4. 3216

ENGINEER, age 38/45, for service with large British commercial firm in India. Qualifications should embrace one or more of the following: B.Sc., A.M.I.C.E., A.M.I.M.E., A.M.I.E.E., with preference in that order. Constructional experience essential. Previous experience India and fluent knowledge one Indian language preferable. Only top grade men of proved ability need apply. Write, giving age and résumé of personal history, to—Box Z.323, Willings, 362, Gray's Inn Road, W.C.1. 3308

ENGINEER required by firm of electrical contractors. Must be fully experienced in estimating for and supervising contracts of all types. State age, experience and salary required.—Box 7903.

ENGINEER to take charge of development of high frequency brazing technique by large manufacturing company in Midlands. Good opening for young man 23-30 with sound electrical apprenticeship. Higher National electrical standard desired. Age, qualifications, experience, salary required, quoting Ref. No. 105 to—Box 3131.

ENGINEER with training in petroleum engineering, by London office of major oil company. Desirable experience in reading electric logs and in interpreting core analysis data. Salary according age and experience. Write, giving details to—Box T.W., c/o J. W. Vickers & Co. Ltd., 7/8, Great Winchester St., E.C.2. 3276

ENGINEER-Draughtsman, fully conversant with control gear for power station auxiliaries and contactor type control gear for all types of motors and applications. Apply, giving full particulars of experience, salary required, etc., to—Contactor Switchgear Ltd., Moorfield Rd., Wolverhampton. 3242

ESTIMATOR with all-round experience of electrical installation work. Applications should be addressed to—The Managing Director, The Colston Electrical Co. Ltd., 29, Orchard St., Bristol. 3286

EXECUTIVE vacancy in modern North of England factory. B.Sc. standard or equivalent, preferably electrical. Practical experience in wire-producing industry or its application. Age 30/40. First-class prospects.—Box 3179.

FLUORESCENT Lighting Commercial Technical Assistant for E.L.M.A. member, London. Inside sales development work, necessitating good education, commercial aptitude and sound electrical training to Ord. or Higher Nat. Cert. Lighting knowledge an advantage. About 27-30. Please state qualifications and salary required, to F.L.—Box 3185.

EXPERIENCED Transformer Draughtsmen required in Central London.—Box 3053.

FLUORESCENT Lighting Sales Correspondence Clerk for Central London by E.L.M.A. member. To handle large amount of correspondence and telephone work. Electrical and lighting experience an advantage. Write, stating full details of age, previous experience and salary required, to—Box 3184.

GENERAL Electric Co. Ltd., Research Laboratories, East Lane, North Wembley, Middx., have a vacancy in connection with the development of electrical agricultural equipment. Candidates must have a good Honours degree or equivalent qualifications. Apply by letter only to the Director, stating age, experience and academic record. 3133

GENERAL Electric Co. Ltd., Research Laboratories, N. Wembley, Middx., require men with Higher National Certificate or equivalent qualifications and with some factory or laboratory experience for work in connection with the development and manufacture of electronic devices. Knowledge of vacuum or high voltage techniques an advantage. Apply by letter to the Director, stating age, experience and academic qualifications. 3132

HOPKINSON Electric Co. Ltd. still have one or two home sales areas requiring appointment of first-class Sales Engineers. Only those with proved experience in sale of rotating electric machines should apply, giving age and full details to—Sales Manager, Hopkinson Electric Co. Ltd., Birchgrove, Cardiff. 3181

IMPERIAL Chemical Industries Limited, Explosives Division, require Electrical Engineers and Draughtsmen, to work at Stevenston, Ayrshire, on design, development and research problems connected with plant manufacturing explosives, cellulose derivatives, pentaerythritol and fibres. Vacancies are available for graduates, and for draughtsmen preferably with their Higher National Certificate or equivalent qualification. Salary appropriate to experience and qualifications. Applications to—Staff Manager, 25, Bothwell St., Glasgow, C.2. 3241

INSTRUMENT makers with moving coil experience, N.W. London.—Box 3373.

INSURANCE Co. requires Electrical Surveyor for service in Edinburgh district. Age 27-30. Unmarried. Manufacture and repair experience motors and generators. Higher National Certificate. Salary £400 rising to £600. —Box 7887.

INSURANCE Co. requires Electrical Surveyor for service in Eire. Age 27-30. Unmarried. Manufacture and repair experience motors and generators. Higher National Certificate. Salary £400 rising to £600.—Box 7886.

LAMP Engineer, used to maintenance of lamp-making machinery. Non-ring factory.—Box 3130.

LIGHTING Sales Engineers for London, Birmingham, Manchester and Dublin, by E.L.M.A. member. Good education, electrical training to Nat. Cert. standard and commercial experience. About 30. Please state qualifications and salary rquired to—Box 3186.

LONDON district. Draughtsman, about 25 years of age, with practical experience of the manufacture of electrical accessories. Reply, giving full particulars of age, experience and salary required, to—Box 3311.

MANCHESTER Company require the services of an expert man conversant with the manufacture of varnished cotton sleeving from the braid stage. The applicant must be fully conversant with general manufacturing procedure, and should have the appropriate intimate knowledge of plant.—Box 3143.

MANUFACTURERS of domestic electrical appliances in Oldham require first-class experienced Assembly Foreman. Priority given to man who has successfully filled similar position with reputable firms. Apply, giving full details and state salary required.—Box 3309.

MECHANICAL Draughtsmen (Seniors) for steam turbine, water turbine, diesel engine and gas turbine work in Midlands.—Box 3054.

OLD-established group of manufacturing electrical engineers require two energetic Representatives with good sales records for South and South-West areas of England. Must have own car and connection with supply authorities, consultants, etc., and possess sound technical knowledge of the distribution of low and medium tension. Excellent prospects with a rapidly expanding organisation. Apply, giving particulars of education, qualifications, experience and salary required, to—Box 3312.

PURCHASING Officer for works in Northern England. Must have good experience in general purchasing and some engineering knowledge. Write, stating age, experience and salary required, to—Box 3287.

REQUIRED by a large electrical firm in the Midlands, an Engineer experienced in insulation problems in heavy electrical engineering and who is interested in research. Preference given to engineers with an honours degree. Apply, quoting Ref. 106, to—Box 3246.

POWER Station Engineer for large works in the North of England. Candidates should have had experience in the operation and maintenance of modern H.P. boiler and turbo-generating plant, high voltage switchgear, and in the administrative control of a large power station. Applications, giving age, details of education, experience and salary required, should be addressed to—Box 3285.

REPAIR firm have vacancy for young Engineer for machine and transformer design and testing.—The Midland Electric Installation Co. Ltd., Cyprus Works, Upper Villiers St., Wolverhampton. 3351

REPRESENTATIVE for Newcastle-on-Tyne and North-Eastern area and local, having established connections with electrical contractors, architects, heating engineers, etc., required by manufacturers of new type patented electric radiator, etc. Large sales potential, thousands already installed. Small salary with expenses and commission. Carrying non-competitive articles not objected to.—Box 3282.

REPRESENTATIVE required by leading manufacturers for Northumberland and Westmorland to handle electric cookers and other domestic appliances. Fullest details in strict confidence.—Box 3086.

REPRESENTATIVES in all districts for selling Fluorescent Lighting Equipment, Spares, Conduit Fittings, etc., commission basis.—Box 7891.

SALES Manager, by electrical wholesalers, London area. Only first-class men considered, with good knowledge of the trade and of materials handled.—Box 85.

SALES Manager: Lighting fittings manufacturers seek highly competent man to organise and control sales staff. Must be able to create highly attractive sales campaigns and possess drive and initiative, build up and maintain turnover. Excellent terms offered to selected applicant.—Box 3310.

SENIOR Draughtsman with experience and technical knowledge of low tension metalclad switchgear for works in N.W. London. Able to superintend two or three other draughtsmen and to generally assist Chief engineer in this class of work. Full details of experience and salary required, etc., to—Box 2656.

SENIOR Draughtsmen, experienced on electronic equipment, by manufacturers in the Midlands.—Box 3052.

SERVICE Engineers, London area, to undertake service work in connection with electrical instruments, pyrometers, etc. State age, experience and salary required to —Cambridge Instrument Co. Ltd., Sydney Road, Muswell Hill, N.10. 3149

SHIFT Charge Engineers for service in Iraq in steam-generated electrical power house, 45,000 kVA. Applicants must possess qualifications to not less than H.N.C., considerable similar experience in large power houses, and, if married, be prepared to serve singly for first two years. Age limit 34. Salary (incremental) and allowances would range at entry from £945 (bachelor) and from £1,005-£1,150 (married) according to number of dependent children; plus free furnished quarters. Biennial (paid) home leave. Write, quoting No. 146, to — Box 2260, c/o Charles Barker & Sons Ltd., 31, Budge Row, London, E.C.4. 3307

STOREKEEPER to take charge of despatch department, with experience of export packing, required for East London factory. Write full particulars.—Box 3023.

SUPPLIES Supervisor. E.L.M.A. member, Central London, requires energetic man about 30-35 to plan and supervise supplies of fluorescent lighting equipment from various factories. Electrical and commercial training and experience essential, knowledge of lighting industry advantageous. Please state qualifications, age and salary required to S.S.—Box 3187.

TECHNICAL Salesman (Electrical Contracting), connection with architects and consulting engineers essential.—Box 3020.

THE General Accident Assurance Corporation's Engineering Department requires an Electrical Engineer-Surveyor to be resident in the London area. Age 25/30. Higher National Certificate necessary. Graduate member of the Institution desirable but not essential. Must have served complete apprenticeship and had experience in industrial plant. Commencing salary £400 per annum, rising to £600 in 11 years. The position is pensionable and non-contributory. Apply—Chief Engineer, Engineering Dept., 99, Aldwych, London, W.C.2. 3245

TRAVELLER, by well-known manufacturer, for London, to call on electrical and radio wholesalers. Please state age and remuneration expected.—Box 3176.

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

ADVERTISER seeks executive post, London. Experienced development, design, technical sales accessories, starters, resistances, lt. switchgear, motors. Export sales. Good correspondent.—Box 7901.

ADVERTISER (38), 22 years' exp., factory maintenance, installation H.T., L.T., A.C., D.C., supervising engineering contracting, desires similar position. Disengaged. Refs.—Box 7876.

ADVERTISER (39), fully expd., Manufacture meters, insts., small electrical assemblies, including winding. Seeks position foreman or superintendent. Not London. 20 years' exp. 10 supervisory. Refs. disengaged.—Box 7901.

ADVERTISER (43), 27 years' experience contracting, motor repairs, costing accounts, some capital, good connections architects business houses London. Own car. —Box 7905.

CHARTERED Electrical Engineer with strong mechanical background offers services in authoritative and responsible position. Wide industrial experience with proven designs, organising and administrative ability where scientific approach required. Well versed in commercial negotiations at high technical and directorate level. Would consider directorate appointment with guaranteed full technical support in development of industrial organisation of medium size. In strict confidence. —Box 7894.

CHIEF Electrical Engineer, sea-going, 15 years, age 41 years, requires shore appointment. Maintenance, supervising, A.C., D.C., diesel gens., etc. Ex-lieut. R.N.V.R.—Box 7854.

CHIEF Maintenance Electrician, 20 years' extensive industrial installation, maintenance experience, requires progressive position, London or B'ham.—Box 7869.

CONTRACTORS' Engineer and Manager, large technical/commercial experience. Estimating, supervising, designing, accounts.—Box 7866.

ELECTRICAL Engineer with considerable technical and commercial experience in industrial, generating station, steel works, mines electrification, etc., seeks contact with concern requiring 1st class executive engineer.—Box 7843.

ELECTRICAL Fitter, turner, assembly, testing, A.C. & D.C. power. Active elderly man, versatile, adaptable, suitable small shop, London, refs.—H.C., 130, Felsham Road, S.W.15. 7900

FOREMAN, Electrical and Mechanical (shortly disengaged), 30 years' experience, competent to take charge of large industrial power jobs, erection of machinery, diesel engines, large motors, switchgear, cabling, wiring, supervising and handling labour. Keen & conscientious worker.—Box 7908.

MECHANICAL and Electrical Engineer (35). Experienced supervision installation, maintenance, plant, generation boilers, heating systems. Industrial or factory. Ability to control staff, drawing office experience, excellent references. London or Surrey areas. —Box 7878.

TECHNICAL Sales Representative requires full or part-time position with reputable concern. Long experience utilisation side of the industry, including supervisory and managerial posts. Full practical knowledge, apprenticeship served. Many years supply co. Own car. London address.—Box 7823.

YOUNG Development Engineer (Hons. Graduate Cantab.), research and industrial experience with reputable firms, seeks post with electrical engineering firm on development work, or technical sales. Yorkshire preferred.—Box 7841.

AUCTION NOTICES

BY order of Dagenham Real Estates Ltd., Dagenham, Essex: Occupying an important position in a densely populated area, close to Dagenham Station (British Railways, Eastern Region). Freehold Factory Premises, known as Rainham Works, Rainham Road South, comprising substantially constructed single and multi-storey buildings, embracing a total floor space of 74,000 square feet, installed with all modern conveniences and services, having a frontage to Rainham Road South of about 480 feet, with a return frontage to Alexandra Road of 400 feet, covering a site area of about 4 acres, providing ample space for extension of the buildings. Vacant possession on completion of purchase. Leopold Farmer & Sons will sell the above by auction at the London Auction Mart, 155, Queen Victoria Street, E.C.4, Wednesday, 30th June, 1948, at 2.30 p.m. (unless previously disposed of privately). Particulars, plan and conditions of sale may be obtained of Messrs. Cosmo Cran & Co., Solicitors, 164, Bishopsgate, E.C.2, and Leopold Farmer & Sons, Industrial Property Auctioneers and Surveyors, 46, Gresham St., London, E.C.2. Telephone: Monarch 3422 (8 lines). 3278

G. R.

BY ORDER OF THE MINISTER OF WORKS

SANDS DEPOT, WEST WELLS, CORSHAM, WILTS.

Sale of Valuable
SURPLUS BUILDING MATERIALS
including 800 G.I. Tanks, Boilers and Cylinders; 12 Calorifiers; 27 Domestic Boilers and Heating Stoves; large assortment Firebricks, Smoke Pipes, etc.; 5,800′ × 4″ Asbestos Pressure Pipe; Sanitary Fittings; 25 Toilet Basins and Sinks; quantity of Porcelain Enamel Baths; quantity Roofing Tiles, Ventilators and Asbestos Ridging; 4,800 rolls Roofing Felt and Sisalkraft; 200 yds. Wooden Pale Fencing; Iron Wheelbarrows; Frames, Bodies and Wheels; Iron Ladders.

ELECTRICAL FITTINGS: Air Infiltration Plant; 230/270-v. Heater Unit; 230-v. Dam Dynamo; 15 240/250-v. Creda Wash Boilers; 24 110-v. Hotplates; 458 Memlok 500-v. 15-amp. Change-over Switches; quantity Strip Heaters, Thermostats, Bakelite Ceiling Roses, Porcelain Cleats, etc.

106 ROLLER TYPE STEEL SHUTTER DOORS; quantity 2-tier Bunk Ends and Wire Mattresses; Fire-Fighting Equipment; 400 Incinerator Buckets; 43 Manual Suction Pumps; 200 Abrasive Wheels; 370 Tin Funnels.

2,700 cwt. PAINTS, mostly Red Lead Primers; Shellac Varnish, etc.; 11 galls. Turpentine; 390 galls. Liquid Glue.

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THOMPSON, NOAD & PHIPP will sell the above by auction, without reserve, at the Sands Depot on Monday and Tuesday, 7th and 8th June, 1948, commencing each day at 10.30 a.m.

On view Thursday and Friday, 3rd and 4th June, from 10 a.m. till 4 p.m. each day.

Catalogues (price 6d.), to admit two persons on view days and one person on sale days, may be obtained from the Auctioneers' Offices, 39, Market Place, Chippenham (Tel. 2271-2) and at 1, Spa Road, Melksham (Tel. 336). 3233

G. R.

265 M.U., R.A.F., GROVE, WANTAGE

Third Important Unreserved Sale of
GOVERNMENT SURPLUS STORES & EQUIPMENT
lying at R.A.F. Station, Kidlington, Oxford (150 lots) and at Grove, comprising Tools, Benches, Shovels, Pick-axes, several thousand Fire Buckets, Fire Equipment, Steam Jennies, Drawing Requisites, Photographic and X-ray Sundries, 60 Analytical Balances, Cable, Ruberoid, Ladders, Hand Stackers, 130 Garden Water Barrels on wheels, Portable Boilers, Coal Bins, Iron Scraper Mats, Tarpaulins, a large quantity of Tentage and Cordage, Electrical and Radio Spares, Receivers, Compressors, Generating and Test Sets, Power Transformers, Spraying and Lubricating Units, Aircraft Cameras, Tyres and Tubes, Oxygen Equipment, Astrographs, 39 "Britannia" Outboard Motors, Marine Pumps, Dinghies, Lifebuoys, Water Containers, Parachute Equipment, about 10,000 Rubber Dinghies and Rescue Equipment, a large assortment of Paints, Greases and Chemicals, Perspex Sheets, Platform Weighing Machines, Balances, Counter and Coal Merchants' Scales, Bacon and Bread Slicing Machines, Sausage Machines, Hobart Mixers, "Peerless" Electric Potato Chippers, Urns, Enamelled Ware, Cycles, Cycle and M.T. Spares, 1,200 Iron Table Trestles, and numerous other effects.

ADKINS, BELCHER & BOWEN and HOBBS & CHAMBERS (acting in conjunction) have been instructed by the Minister of Supply to sell the above by auction at Grove on Monday, 7th June, 1948, and four following days, commencing daily at 11.30 a.m.

View Days: Monday, 31st May, to Friday, 4th June, from 10 a.m. to 4.30 p.m. No viewing on sale days. Catalogues, to admit one person to view and sale, price 6d. each, from Adkin, Belcher & Bowen, Wantage, and 10, High St., Abingdon, or from Hobbs & Chambers, Faringdon, Berks, and Cirencester, Glos. 3345

Eighth Sale G. R. *Without Reserve*

BY ORDER OF THE MINISTER OF SUPPLY

ASHCHURCH, GLOS
(within 2 miles of Tewkesbury and 7 of Cheltenham)

Sale by Auction of a
LARGE QUANTITY OF GENERAL STORES
including Radio and Electrical Equipment, Wireless Receivers, Cable, etc.; Surveying Equipment, Theodolites, Planimeters, Dumpy Levels, Drawing Boards, Stationery, etc.; Photographic Materials, Chemicals, Glazing Presses, Printing Paper, etc.; Paint, Varnish and Enamel; Vehicles, comprising 13 Jeeps, 2 Cars, 3 Trucks, Trailers and Tyres; Hand Tools, etc.

Auctioneers: BRUTON, KNOWLES & CO., in conjunction with GEORGE HONE.

Sale Days: Tuesday, Wednesday, Thursday & Friday, 15th, 16th, 17th, 18th June, and 22nd, 23rd, 24th, 25th June, 1948, at 11 o'clock punctually each day.

View Days: Thursday and Friday, 10th and 11th June, and Mondays, 14th and 21st June, from 10 a.m. to 4 p.m., and on sale days from 9 a.m. to 10.45 a.m.

Catalogue, covering complete sale, price 6d. (postal orders only), may be had of the Auctioneers, Bruton, Knowles & Co., Albion Chambers, Gloucester (Tel. Gloucester 2267), or of George Hone, Tewkesbury (Tel. Tewkesbury 2110). Note: Applications for catalogues to be sent in envelopes marked "ASH" top left-hand corner. Admission will be by catalogue only. 3234

G. R.

BY ORDER OF THE MINISTER OF SUPPLY

BALDERTON R.A.F. DEPOT
(3 miles from Newark on the Great North Road)

Fourth Sale, without reserve, by ESCRITT & BARRELL, on Monday, Tuesday and Wednesday, 14th, 15th and 16th June, 1948, at 11 a.m. each day.
GENERAL ENGINEERING, PHOTOGRAPHIC, RADIO AND RADAR EQUIPMENT
and another fine collection of HAND TOOLS, including Glazing Machines, Electric and Treadle Sewing Machines, Cycle Wheels, Tool Bags, Tyres and Cycle Spares, Duck Boards, Tarpaulins, Skid Chains, Angle Irons, Charging Sets, J.A.P. Engines, Oxy-acetylene Welding Sets, Soldering Irons, Pinking Shears, Cutting Pliers, Files, Hammers, Grease Guns, Bolt Croppers and Shovels, etc., etc.

View Days: Thurs., Fri. and Sat., 10th, 11th and 12th June, 10 a.m. to 3.30 p.m., and on sale days 9 a.m. to 10.30 a.m.

Admission by catalogue only, price 6d. (postal orders only), obtainable from the Auctioneers: Escritt & Barrell, Elmer House, Grantham. Please mark envelopes "Balderton." 3279

AT 27a, Floral Street, Covent Garden, London, W.C.2, on Thursday, 3rd June, 1948, at 11.30 a.m. sharp: Large stock of Power and Lighting Cables, comprising 60,000 yds. Twin T.R.S. from 3/.029 to 7/.044; 12,000 yds. Single do.; 1,000 yds. 7-mm. H.T. Cable; 7,000 yds. 61/.018 Triple T.R.S.; 4,000 yds. 7/.036 Triple P.V.C.; 12,000 yds. 53-amp. V.I.R. Power Cable; 1,300 yds. 117/.018 Twin V.I.R.; quantities of Dynamo and various 1 to 4-core Cables and Flexibles, etc.; Wireless Test-meters; Welding Rods; and Electrodes; Control Panels, etc.; 3 tons Insulating Sheeting, Rod and Tube, etc. Catalogues of the Auctioneers, West Central Merchandise Mart, 4, Conduit Court, Long Acre, London, W.C.2. Phone: Temple Bar 0233/4. Grams: "Loudsigs, Rand, London." 3232

FOR SALE

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

A. Cooksley & Co. Ltd.: A.C. and D.C. Motors, Portable Fans, Switchgear, etc.—21-25, Tabernacle St., London, E.C.2. Phone: MON. 3357/8/9. 46

A number of brand new, cold start Diesel Engines, 44 h.p., 1,000 revs., 2-cylinder, vertical, electric start, radiator cooled, ex stock.—Box 3261.

A.C. and D.C. House Service Meters, all sizes, quarterly and prepayment, reconditioned, guaranteed one year. Repairs and recalibrations.—The Victa Electrical Co., 47, Battersea High Street, S.W.11. Tel. Battersea 0780. 138

A.C. and D.C. Motors, all sizes, large stocks, fully guaranteed.—Lyton Electric Co., 7, Picton Place, W.1. Welbeck 8096. 3288

A.C. and D.C. Motors, all sizes, large stocks, fully guaranteed.—Milo Engineering Works, Milo Road, East Dulwich, S.E.22. Forest Hill 2278-9. 102

A.C. and D.C. Motors, Generators from stock.—Service Electric Co. Ltd., Water Road, Alperton, Middx. Perivale 7251/2/3. 91

A.C. Generating Sets, petrol, 3-phase, 50 periods, 400 volts and 230 volts; 50 periods, single-phase, 5 to 15 kVA; 40 sets available.—Midland Counties Elec. Eng. Co. Ltd., Grice Street, West Bromwich. 43

A.C. Motors, A.E.M.T. guarantee. Choice of 400 always available at reasonable prices. Call or write—John Phillips & Co. (Electrics), Clydesdale Works, 32, Park Road North, S. Acton, W.3. Acorn 6011/2. 149

A.C. Motors and Starters, unused. Special offer of 10-h.p. Crompton Parkinson "Tork" Squirrel Cage Motors, 1,400 r.p.m., ball-bearing, screen protected, 400/3/50; also Allen West type S.C.D.2 automatic contactor type Star-Delta Starters, with isolating device and push-buttons; 50 of each available.—Stewart Thomson & Sons (L'pool) Ltd., Fort Rd., Seaforth, Liverpool (Tel. Bootle 2697) and Dacre House, Victoria St., S.W.1. (Tel. Abbey 4017 and 4835). 101

A.C. Motors, 2-20 h.p., ball-bearing, S.C. type, new and guaranteed, most sizes available for immediate delivery in quantity; also prompt deliveries Starters all types.—Alec H. Fuller, A.M.I.E.E., 211, Harwoods Rd., Watford. Phone 7585. 7884

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BATTERIES, new, for house lighting, in blocks of 12 volt, 75 amp. hr., £3 10s. each. Special price for quantities.—W. H. Bond (Machinery) Ltd., Carsons Works, Warminster, Wilts. Phone 296. 3096

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BATTERY Chargers for home and export, 4 models, 2-6-12 v., 1, 2 or 4 amp. D.C., any mains voltage. Generous trade terms. Write for catalogue.—The Banner Electric Co. Ltd., Hoddesdon, Herts. Tel.: Hoddesdon 2659. 97

BELLS, 3-volt Bakelite Tangent, new, at wholesale prices.—Box 7848.

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B.T.A. A comprehensive service is now available for all classes of tools and equipment for the accumulator trade.—B.T.A., 246, Cavendish Road, London, S.W.12. Tel.: Balham 6691/2. 10

B.T.H. 400-amp., 300-amp., 100-amp. T.P. Switchgear for disposal, fitted H.R.C. fuses, complete with 500 and 1,000-amp. busbar chambers, floor mounting pedestals and cable boxes suitable for P.I.L.C. cables. Would separate.—Hobson & Partners, 7a, Old Rd., Linslade, Leighton Buzzard, Beds. 3296

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CABLES, Condensers, Wire, Volume Controls, etc. Write for a list, guaranteed delivery.—H. Fisher & Co. Ltd., Titan House, The Quadrant, N.W.4. 171

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ELECTRIC Motors, A.C., 3-phase, single-phase, and D.C. Motors; Electric Motor-driven Pumps and Blowers; 1 Allen West, 5-h.p., slipring, 400-440-v., 3-ph. Starter, and single-phase direct-on Starters, Switchgear and Fuseboards; 2 210-v., 300-amp. D.P. P.E.C. Circuit Breakers; 1 B.T.H. 3-phase Oil Circuit Breaker; 1 British Federal Electric Flash Butt Welder, 100 kVA, 50 cycles, 400 v.; 1 Metrop. Vickers Flash Butt Welder, 60 kVA, 400-440 v., 1-phase; 2 Birmingham Electric Furnaces, 25 kW, 400 v., 3-phase, 50 cycles, 1 zone, temp. range 0-700° C.; 1 Birlec Cassel Carboneutral Furnace, 40 kW, 420 v., 3-phase, 50 cycles, 1 zone, temp. 0-1,400° C., complete with transformer and control panel; 1 Birlec 40-kW, 400 v., 3-ph., 50 cycles, 1 zone, temp. 0-1,000° C., complete with transformer and control panel; 4 Keith Blackman Blower Exhausters, type 30, 400 v., 20 amps., 15 h.p., 2,900 r.p.m.; 4 do., type S.4, 400 v., 11 amps., 8 h.p., 2,900 r.p.m.; 1 Vickers Rotary Converter, 200 kVA, 220-150 v., 50 cycles, 750 r.p.m., 6-phase, complete with starting panel; 1 Lucas Twin Chambered Hardening Furnace, 6' × 3' × 9', with air unit; 1 Wild Barfield H.M.3 Furnace, electric, 3' × 5' × 6'; 2 Oil Feed H.T. Furnaces, with motor-driven blowing fan, 10' × 10' × 10'; 1 Birlec Type V.F.C.2018 Furnace, 4' dia., 6' high; 1 Brayshaw Oil-fired Furnace, 8' × 6' × 10'; 1 Oil-fired Salt Bath, 4' × 4' × 3'; 4 Oil S.1 Furnaces, 1' × 8" × 10"; 2 Electric Hauling Winches (1 Helicon cut steel wheels), 400 volts, 3-phase, 50 cycles, 20-ton type (2½ tons direct off barrel).—C. J. Rice, 137, Mayplace Road West, Bexleyheath, Kent. Bexleyheath 3282. 55

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STEAM and Diesel Sets, A.C. and D.C., to 1,250 kW. 400/3/50; Alternators, 4 to 350 kVA; A.C. Motors, 400/3/50, 20 h.p. to 500 h.p., some 3,300 and 6,600 v. larger sizes; Dynamos, D.C. Motors (selection to 900 h.p.); two 20-kW. 120-v. Steam Turbo Sets; 20-h.p. Motor, 200/1/50, S.R., 725 r.p.m. and gear; various Panels, lighting and charging; Transformers, 10 to 500 kVA.—E. Binns, 156a, Falsgrave Rd., Scarborough. 7910

SURPLUS A.C. and D.C. Electric Motors for immediate disposal. List from—Commercial Structures Limited, Staffa Road, Leyton, E.10. 219

STORAGE Tanks: Sectional Totally Enclosed, 1 23' diameter × 10' high, bolted steel construction ¼" plate, 26,000 galls. capacity; 2 13' 5" × 5' 5" × 5' 6", approx. 2,400 galls. Enclosed Cylindrical, 1 24' long × 5' diameter, complete with manhole and fittings, welded construction, previously underground petrol storage, 3,000 galls. capacity. Enclosed Rectangular, 1 welded steel, 14' 6" × 4' × 5' 9", ex-ship's diesel tank, manholes and covers, 2,000 galls.; 1 welded steel, 7' × 3' 6" × 3' 6", 500 galls., in two compartments, with two manholes and connections; 1 rivetted steel, 7' 11" × 4' 6" × 3' deep, 650 galls. Open Top Tanks, 8 rectangular, 6' × 3' × 1" deep, welded construction, some with steam heating pipes in bottom, 450 galls; number of open top galvanised cylindrical engine cooling tanks, approx. 200 galls.; several enclosed cylindrical hot water storage tanks, 200-250 galls. William R. Selwood, Chandler's Ford, Nr. Southampton. Phone, Chandler's Ford 2275. 3255

SUMMER or winter it's Winter for all types of Fluorescent Fittings. We carry a complete range of 3', 4' and 5' fittings and spares in stock. Your enquiries are invited. —Winter Trading Co. Ltd., 6, Harrow Road, Paddington, London, W.2. Tel. Paddington 3271. 107

SUPERIOR Type Builders' Ladders now in production; also Steps, Trestles and Extension Ladders. Phone—Shaftesbury Ladders Ltd., 453, Katherine Road, E.7. Grangewood 3363/4. 15

SWITCHGEARS, Contactor D.S. type, for 1-h.p. motors, 400 line, 400 coil, 2 amps., brand new, £11 12s. each. —Lewis Woolf Ltd., Milton Grove, opposite Harrow Rd., Bristol Rd., Bournbrook. 3327

TERMINAL Blocks, 5-way, moulded, totally enclosed, first quality, suitable fluorescent fittings, transformers, alarms, etc., 6d. each. Samples by return.—Willio Products, 160, McAslin St., Glasgow. 3315

TRANSFORMERS, new and guaranteed, up to 60 kVA, any phase or voltage. Good deliveries ranging from 6 weeks. Manufactured to customers' requirements.—Box 145.

TWO D.C. Motors, by D. H. Allen, 6 b.h.p., 220 volts D.C., 27 amps., compound winding, 700 r.p.m., period ½ hour, shunt control, totally enclosed, equivalent continuous h.p. 2½.—Box 3293.

TWO Electric Starter Switches by Electric Construction Ltd., Wolverhampton, 1 h.p., 415 v., 3-ph., 50 cycles, with overload trip.—Commercial Structures Ltd., Staffa Road, Leyton, E.10. 124

TWO 5 RW Davey, Paxman 100-h.p. Diesels, coupled to Bruce Peebles 62.5-kVA, 440-volt A.C. generators. One new, the other run only 450 hours.—S. Hubbard Ltd., Regent Mill, Luton. 3289

UNUSED Portable Petrol-driven Welding Sets, by Meadows, with switchboards and resistances. Suitable for electrodes sizes 6 to 14.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. Tel. B.S. 1000/1. 151

UNUSUAL opportunity: Fourteen 20-h.p. Flameproof Motors and Starters. Motors by Met-Vick., squirrel cage, 400 v., 3-ph., 50 cyc., 735 revs., cont. rated, frame 7840K.F., ball-bearing, 3⅜" diam. shaft. Complete with Ellison flameproof star-delta starters on stand. Government surplus units. Immediate delivery. New price nearly £100 each. Would accept £250 each prompt sale. —Hodson & Co. (Machinery) Ltd., Tottington, Nr. Bury, Lancs. Tel. Tottington 123/4. 3168

WE have large stocks of ¼" × ⅜" Insulating Tapes, in various colours, available for immediate disposal. Why not write to-day for comprehensive list?—Box 3342.

WEE-Megger Testers in carrying cases, £8 8s., unused; Record Test Sets in carrying cases, £8, unused. Comprehensive range of unused switchboard instruments at competitive prices.—Hocking & Orchard Ltd., 90, Victoria St., Bristol. Tel. 24458. 3317

WEE Megger Testers, 500 v., in case, £13 16s. 3d.; Record 500-v. Test Set, £12 7s. 6d., C.O.D. (new). —Robins, 222 West End Lane, N.W.6. HAM. 0879. 82

WIRES! Why be short of Enamelled and Single Rayon-covered Copper Wires? We have large stocks available for immediate disposal.—Box 3167.

3-h.p. Hopkinson Squirrel Cage Dual Voltage Motors, 4 220/240, 380/420/3/50, 1,450 r.p.m.; ¾-h.p. E.D.C. Squirrel Cage, 220/3/50, 1,440 r.p.m.; 8-h.p. Max Electric, 220/1/50, 1,500 r.p.m., with starter, S.H.; 7½ and 10-h.p., 400/440/3/50 Howells Squirrel Cage, 1,000 and 1,500 r.p.m.; 15-h.p., 400/440/3/50 Howells Slipring at 1,500 r.p.m. Press-button and star/delta starters available for all types. Lists of motors and starters per return. —Metropolitan Distribution Ltd., Truro 2277. 3126

1 Keith Blackman Extractor Unit, 2,850 r.p.m., ¼ h.p., 230 volts, 1-phase, 11¼-inch fan; 1 Holmes Connesville Blower Unit, 4 × 4, 2-inch inlet, 975 r.p.m. Offers. —Box 3256.

2 75-kVA Petrol-driven Generating Sets, 130 v. A.C., 3-phase, 50 cycles, in new condition, £25 ea.—Commercial Structures Ltd., Staffa Rd., Leyton, E.10. 211

WOODSTONE Table and Bedside Lamps. Entirely new artistic designs in wonderful range of colours. Something that will appeal to the discriminating buyer. Write for details and photographs.—W. B. James & Co., 6, Rose Hill, Brighton. Tel. B'ton 9444. 7909

1 Mining Type Flameproof E.E.C. Switchboard, type O.L.A.1, comprising three 150-amp. switch units and busbar chamber mounted on floor pedestals, for use on 3,300-volt, 3-phase, 50-cycle supply.—Oldfield Engineering Co. Ltd., 96, East Ordsall Lane, Salford, 5. 3250

1 4-stroke Hydraulic Press Pump (by Asquith & Co.), driven by Laurence Scott 25-h.p. D.C. motor, and automatic starting panel; 1 4-stroke Hydraulic Press Pump (by Shaw & Son, Salford), driven by Laurence Scott 30-h.p. D.C. motor, and starting panel; 1 10-h.p. Laurence Scott D.C. Motor, compound wound, 500 v., 600 r.p.m., continuous rated, with starter; 1 27-h.p. Mavor & Coulson D.C. Motor, 500 v., 1,000 r.p.m., with starting panel; 1 15-h.p. Laurence Scott D.C. Motor, 500 v., 600 r.p.m., with starting panel; 2 ¾-h.p. Laurence Scott D.C. Motors, with variable speed regulator starters; 1 15-h.p. Siemens D.C. Motor, 500 v., 900 r.p.m., with starter; 1 25-h.p. Bruce Peebles D.C. Motor, 500 v., 900 r.p.m., with starter. Offers sold as lot. Archibald K. Brown, 743, London Rd., Glasgow, S.E. 3367

2 500-kW Bruce Peebles Motor Convertor Sets, A.C.-D.C., complete with starters, switchgear, etc., suitable for export. Price £400 per set.—F. J. Church & Sons Ltd., BIS, 1431. 3316

3 Metal Plate Rectification Battery Charging Sets, each complete with switch panels and suitable for 230-v., single-phase input, and with output of 30 v., 56 amps.—Commercial Structures Ltd., Staffa Works, Staffa Road, Leyton, E.10. 123

3 N.E.C.O. 400-volt, 3-phase, 50-cycle, totally enclosed Squirrel Cage Geared Motor Units, ¾ h.p., 88 r.p.m.; 1 Parkinson 400-volt, 3-phase, 50-cycle Squirrel Cage Motor, 5 h.p., 1,450 r.p.m., complete with starting gear; 1 Brook Squirrel Cage Motor, 220 volts, 1-phase, 50 cycles, 4 h.p., 1,450 r.p.m., complete with starting gear.—Oldfield Engineering Co. Ltd., 96, East Ordsall Lane, Salford, 5. 3251

3/.029 Three-core Flat Lead-covered Cable, 5 × 500 yds. Drums available. Cheap.—Burleigh, Alpine Rink Works, Empire Way, Wembley, Middx. Phone, Wembley 1900. 7805

3/50/400-v. A.C. Motors: 64 h.p., 725 r.p.m. S.R., J.H. Holmes; 60 h.p., 575 r.p.m., S.C., Westinghouse; 50 h.p., 300 r.p.m., S.R., Crompton; 50 h.p. 730 r.p.m., S.R., Baxter & Caunter; 33 h.p. 3,000 r.p.m., S.C., Vert. Spindle; 15 h.p., 700 r.p.m., S.C., Crompton-Parkinson; 10 h.p., 1,450 r.p.m., S.C., T. E. Scott; 5 h.p., 720 r.p.m., S.C., Crompton-Parkinson; 2.5 h.p., 715 r.p.m., S.C., B.T.H. ½-hr.; 2 h.p., 960 r.p.m., S.C., L.D.C. Vert. Sp.; 1.5 h.p., 1,450 r.p.m., S.C., M. Vickers Vert. Sp.; .5 h.p., 1,400 r.p.m., S.C., Mansfield. Geared Motors: 1.5 h.p., 1,425/100 r.p.m., S.C., G.E.C.; 3 h.p., 3,000/500 r.p.m., S.C., Higgs; 1.5 h.p., 940/18 r.p.m., S.C., Higgs; 1 h.p., 740/26 r.p.m., S.C., T.E.; .5 h.p., 1,425/340 r.p.m., S.C., Higgs, 2/50/200 volts; 50 h.p., 960 r.p.m., S.R., B.T.H.; 30 h.p., 965 r.p.m.; S.R., E.C.C.; 30 h.p., 720 r.p.m., S.C., E.C.C.; 7.5 h.p., 925/1,000 r.p.m., S.R., B.T.H. A.C. Commutator, var. speed, 3/50/240 v., 50/8 h.p., 2,500/400 r.p.m., S.R., B.T.H. Generating Sets: 26-h.p., 220-v. D.C. Motor, 15.75-kW, 35-v. Generator; 26-h.p., 105-v. D.C. Motor, 15.75-kW, 35-v. Generator; 50-h.p. S.R. Motor, 1,450 r.p.m., Canning, 60 v., 500 amp. Also many other similar machines.—S. C. Bilsby, Crosswells Road, Langley Green, Near Birmingham. Broadwell 1359. 3363

4-h.p. Repulsion Induction Single-phase Motor (B.T.H. Co.), new, 230 or 460 volts, 1,460 r.p.m., with P.B. starter, £48.—Gothard, A.M.I.E.E., Eaton Socon, St. Neots, Hunts. 3248

4-kW Lister Diesel 110-volt D.C. Generating Set, reconditioned and guaranteed in first-class condition, £200. Several new Ruston Diesels at list prices. Generators supplied, 110 or 220 volts.—Saville-Calvert (Machinery) Ltd., Warwick Rd., Stratford-on-Avon. Telephone, Snitterfield 291. 3371

5-h.p., 1,440-r.p.m., T.E., Newman Motor, £25; 1-h.p., 1,440-r.p.m. G.E.C., £10; 2 ¼-h.p., £4 each; 2 6-h.p. S.D. Starters, £8 each; 1 5-h.p. P.B. Starter, £5; 1 M.E.M. Auto S.D. Starter, £8 10s.; 1 10-h.p. Stator-Rotor Starter, £16; 1 1-h.p. Flameproof Starter, £10; 1 3-h.p. Flameproof Starter, £12; 12 15-amp. T.P. Contactors, £6 each; 6 15-amp. 4-pole Sw. Fuses, £1 10s. each; 6 T.E. Fan Motors for 21" fans, £5 each. All equipment overhauled, 400 v. 3-phase.—T. Wilson, 19, Frances Rd., Earlsheaton, Dewsbury, Yorks. 7913

5 Spot Welding Machines, 390 kVA, Metro. Vick., with controllers for 440/400 v., single-phase. As new. Can be seen at Burleigh, Alpine Rink Works, Empire Way, Wembley, Middx. Phone, Wembley 1900. 7803

71-h.p., 950-r.p.m., 400/3/50, ball-bearing, Squirrel Cage Motors, drip-proof, new; also a few new Brook screen-protected ditto; new Hoover ¼-h.p., 230/1/50 Capacitor Motors; several reconditioned, 2 and 3 h.p., 400/3/50.—Mayor Smith Ltd., 73, Market St., Birkenhead. Phone, Birkenhead 1350; Grams, "Lecmos, Birkenhead. 3207

8-kVA Lister Newton Paraffin Generating Plant, 400/50/3, 600 r.p.m., spec. 8OTO, in good running order. Can be seen by appointment in Kent. £250.—Box 3313.

9-kVA new Switchboards, 230 v., 1-phase, with instruments, switches and regulators; also Isenthal Automatic Voltage Regulators.—Midland Counties Electrical Eng. Co. Ltd., Grice Street, West Bromwich. 169

10 cwt. ½" sq. free cutting Extruded Brass Bar in approx. 4' lengths; also approx. 5 cwt. ½" × 1/16" Copper Strip H.D.; approx. 1 cwt. 732 × .018 Phosphor Bronze Spring Strip.—Electrocraft Equipments, Foundry Lane, Birmingham, 20. 7892

12 Commutator A.C. Motors, 400/440/3/50, 5 h.p./1.6, speed 1,440/480 variable, with inset control panels and 6-point push-button boxes.—Box 3094.

15-amp. Ironclad D.P. Switch Fuses. Robustly constructed, cable or conduit entry, welded steel boxes with standard safety hinged lid, 5½" × 3", 21s. 6d. each. Deliveries immediately from stock.—D. V. Abbott, 1, Manor Drive, Surbiton, Surrey. 7899

15-amp. Plugs and Sockets (shutter) and all Bakelite Accessories; Fluorescent Chokes, 230 v., 26s. ea.; 200/250 v., 29s. each; Starter Lamps, 6s. 9d. ea.; Power Factor Condensers, 7s. 6d. ea. Send for lists.—Winco Industries, 17, Stretford Road, Manchester, 15. 191

15-amp., 3-pin Switched Sockets. Robustly constructed of cast aluminium, box measuring approx. 4¾" × 3¾" × 2¼", with florentine bronze finish face plate, box finished cream with 4 knock-outs for ¾" conduits. Special terms to exporters.—Scemco Ltd., 6 & 7, Soho Street, London, W.1. GER. 1461-2-3. 166

16" Oscill. Fan, prototype, all req. material available.—Box 3259.

23 High Tension Cubicles and Switchgear for substation for reducing 6,600 volts to 415 volts, 3-phase.—Box 7855.

24-kVA Scott-connected Transformer, input 200 volts, 2-phase, 50 cycles, output 400 volts, 3-phase, 50 cycles, manufactured by Simmonds Bros., Stourbridge, £125 delivered; 2.75-kVA Transformer, input 130 volts, 3-phase, 50 cycles, output 200 volts or 350 volts, any phase to neutral, £20.—C. E. Marshall (Wolverhampton) Ltd., 27a, Queen St., Wolverhampton. 3322

30-amp. Fused Mains Switches, 2 and 4-way Splitters and Consumer Units; 2 to 12-way, 15-amp. Distribution Boxes, D.P. and S.P.&N. Deliveries from stock. Send for lists.—Winco Industries, 17, Stretford Road, Manchester, 15. 192

100-volt Generating Plant, consisting of the following: 1 25-h.p. R.H. diesel engine, type 6HR, 1,100/150-volt generator, 109 amps., by E.C.C., with switchboard, 57 Pritchett & Gold cells, 810 amp.-hour, 1 750-gallon diesel oil storage tank, all in first-class condition. Plant can be seen where installed in Herefordshire by appointment.—Drake & Gorham Ltd., Hereford. 3258

100, 50, 30 and 20-kVA, 400/230-v. Diesel Engine-driven Generating Sets. Immediate delivery.—The Horseshoe Supply Co. (Spalding) Ltd., Horseshoe Road, Spalding. Phone 2535. 49

250-kW Rotary Converters (2), with transformers and switchgear, input 6,600 volts, 3-phase, 50 cycles, output 420/210 volts; also A.C. and D.C. Motors, Switchgear, Generating Sets, Welders, etc.—Midland Counties Electrical Engineering Co. Ltd., Grice Street, Spon Lane, West Bromwich. 36

440/3/50, 15-h.p., 950-r.p.m., b.b., pipe-ventilated G.E.C. Slipring Motor and Starter; 3-kVA, 3-ph., 50-cyc., 230-v. Douglas Petrol Alternator Set, unused; 50-v. Lighting Plant with 150-a.h. battery, replated.—Allen & Gibson Ltd., Towcester, Northants. Tel. 197. 7896

500-kW Rotary Converter, input 11,000 volts, 3-phase, 50 cycles, input 500 volts D.C., complete with switchgear.—Box 3072.

2,000 unused Heavy Duty Panel Mounting Sliding Resistances by G.E.C. and De Renzi Holmes offered at less than ½ to-day's price, in three sizes only: Size 1, max. current 5 amps., max. ohms 70, max. dissipation 1.75 kW, price ex works £2; Size 2, 10 amps., 12 ohms, 1.2 kW, price £1 15s.; Size 3, 20 amps., 5.4 ohms, 2.16 kW, price £1 12s.—P. W. & Co. Ltd., Davenset Electrical Works, Leicester. 83

30,000 yards T.R.S. Cable, .06, 3-core, 19/064, on drums of 500 yards; also 20,000 yards Twin Flat Cable, .1, 19/083, on drums of 500 and 1,000 yards.—S. J. Barnett & Co. Ltd., Barkingside Metal Works, Mossford Green, Ilford, Essex. Phone: Valentine 2201. 3295

5,000 lengths 39" × 1" Soda Glass Tubing; two Spot Welders, 2 kVA and 4 kVA; 56 lbs. Bi-Metal, 10-th. HIF.—Box 3308.

5,000 Diamond "H," 25-amp. Switches; also 5,000 Santon Rotary Domestic Switches. Low price to clear the lot.—Burleigh, Alpine Rink Works, Empire Way, Wembley, Middx. Phone, Wembley 1900. 7806

£115. One brand new Stuart Turner 2½-kW Lighting Plant, 230 v. A.C., suitable for land use, fitted with built-in radiation. Supplementary to requirements.—317, Regent's Park Rd., N.3 Finchley 5143. 215

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ACCUMULATOR Plates (old) and lead Peroxide; as actual smelters we pay top price. Also old storage batteries, transformers and whole installations purchased. —Elton, Levy & Co. Ltd., 1/4, St. Ermin's (West Side), Caxton Street, S.W.1. Whitehall 9621/2/3. 39

BUSBARS, English Elec. Co., 3-phase and neutral, 9/16" copper rod, 12 ft. lengths, completely cased in. Any quantity, any condition; also Switchgear. Spot cash.—Box 146.

GLASGOW exporting house solicits offers of Electric Motors, 1-100 h.p., suitable 400/440/3/50 or 220/380/3/50 of slipring, totally enclosed and squirrel cage types, at competitive prices; also all types Starters, Conduit Tubing, Vertical and Horizontal Diesels, Diesel Generating Sets, A.C. and D.C.; 3-100 kW. Only new material required.—Box 3061.

INDUCTION Regulator for use with L.S.E. N.S. type variable speed commutator motor, approximate h.p. 5. —Box 3063.

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ONE 70-h.p., 1,400-r.p.m., 400-volt, three-phase Slipring Motor, complete with Ellison starter. Full particulars and price to—A. H. King & Son, Westbridge Rd., London, S.W.11. 3209

ONE 120-h.p., 400/3/50-cycles, slipring Motor, with or without starting gear, for direct coupling at 970 r.p.m. Ring-oiled bearing machine considered.—Box 3230.

ONE 300-400-h.p., 415-volt, 3-phase, 50-cycle reversible variable speed A.C. Motor (preferably moving brush gear type), speed range about 500-1,000 r.p.m.. Starting torque not less than 150% full load. Reply to—Fisher's Foils Ltd., Exhibition Grounds, Wembley, Middx. 3099

ONE 300-400-h.p., 415-volt, 3-phase, 50-cycle, 720-r.p.m. Slipring Induction Motor, complete with reversible P.B. automatic stator/rotor starter and automatic resistance steps, rated for about 10 starts per hour. Reply to—Fisher's Foils Ltd., Exhibition Grounds, Wembley, Middx. 3100

ONE 450/650-h.p., 440-volt D.C. Slow Speed Motor, single or two bearings. Price and full particulars to—James Grant & Co., 480, Pollokshaws Rd., Glasgow, S.1. 3266

SURPLUS Panels in ebonite, bakelite, laminated bakelite, colour black, minimum sizes, 3½" square, 1" thick.—Box 7912.

TWO Duplicate 3-h.p., 440-volt D.C. Motors, ball-bearing preferred, speed not above 600 r.p.m.—Box 3231.

TWO 100-kVA (approx.) Alternators, 400/3/50, 4-wire, 700/750 r.p.m., for belt drives; one 70/80-kW D.C. cpd. Interpole Generator, 230 volts, max. r.p.m. 750, belt drive.—A. E. Dent, North St., Nelson, Lancs. 7890

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WANTED, D.C. and A.C. ball-bearing Motors. Full details to—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 29

WANTED for prompt cash, Ferrous and Non-Ferrous Scrap; also plant for dismantling. Buyers of second-hand machinery and plant for re-use.—W. & H. Cooper Ltd., 176, Brady Street, Bethnal Green, E.1. 142

WANTED immediately: One 6.6/22-kV Transformer, approximately 5,000 kVA. Reply stating price and full particulars to—Box E.R.634, L.P.E., 110, St. Martin's Lane, W.C.2. 3265

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

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WHOLESALER with reps., Cheshire, Derbys., Lancs and Yorks, requires to purchase Electric Fittings (glass, metal or wood), also Shades. Manufacturers only. Present sales £600 to £700 per week.—Box 206.

WHOLESALERS require supplies of Fans, Refrigerators, Washing Machines and Cookers.—Box 3354.

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130-h.p., 480-volt D.C. Motor at 1,000 r.p.m., with starter; also 125-h.p., 415/3/50/750 Slip, with starter.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 3358

200-h.p., 750-r.p.m. Slipring Induction Motor, C/R, with starter, 440 volts, 3-phase, 50 cycles; 500-kVA Transformer, 6,600/440/240, with off-load tapping switch, 3-phase, 50 cycles.—Box 3318.

300-h.p., 400-volt D.C. Motor, approx. speed 600 r.p.m., with extended shaft and bearings for drive.—Box 3267.

400/3/50 Slipring Motors and Starters, totally enclosed, pipe ventilated or screen protected: 1 40 h.p., 720 r.p.m.; 1 40 h.p., 1,425 r.p.m.; 1 100 h.p., 960 r.p.m.; 6 200 h.p., 720 r.p.m.; 35 130 h.p., 720 r.p.m.; one indoor type Transformer, 750 kVA, 11 kV, 400/3/50; 1,000 yds. .25 sq. inch, 3-core, 660-v. P.I.L.C. S.W.A. and served; 600 yds. .1 sq. inch, 3-core, 660-v. P.I.L.C.S.W.A. and served.—Witcomb & Blackwell Ltd., 234-236, Belgrave Gate, Leicester. 3356

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ARMATURES, Vac., Gramo. and Dryer Armatures rewound and returned in seven days. Special terms for quantities.—Streatham Transformer Co. Ltd., 68, Streatham High Road, S.W.16. Streatham 7626. 118

ASSEMBLY, incl. coil winding, light machine work and welding. Best quality finishing (cellulose spray, stove enamel, handwork). Experimental models, prototypes, full production runs. Product development from sketches or drawings. Prompt quotations.—Awlin Products Co., 1081, Finchley Rd., N.W.11. SPE. 6227. 3066

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CASTINGS. Fisher Foundries Ltd., Greet, Birmingham, have capacity for Brass, Gunmetal and Soft Grey Iron Precision Castings in large quantities, suitable for plate and machine moulding. Weight 1-50 lb. Delivery by road. 181

CASTINGS. R. Blandy & Co. Ltd., The Foundry, High St., Chalvey, Slough, have immediate capacity available for Sand Castings in Aluminium, Gunmetal, Copper, Brass and Phosphor Bronze. Phone your requirements to Slough 21073 for expert advice and attention. 3170

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ENGINEERS, Precision, South England, seek manufacture of electrical, mechanical or domestic assemblies or components, Press tools, gauges, small stampings, capstan turning, also Internal and External Grinding. Write—Metal Components Ltd., Dolphin Rd., Shoreham-by-Sea, Sussex. 74

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FLUORESCENT Lighting. Speciality Fittings designed to your own requirements and specifications. Estimates and sketches submitted free of charge of genuine enquiries. Apply—Scemco Ltd., 6 & 7, Soho St., London, W.1. Gerrard 1461 (3 lines). 121

MOTOR Rewinds, quick service, keen prices. Small work a speciality. Vacuum Armatures, 17s. 6d. Trade enquiries to—G. & V. Davis Bros., 53, Fox Green Crescent, Birmingham, 27. 7820

PRECISION Engineering, capstan and centre lathe work, welding, spot welding, tube bending, finishing, assembly, experimental work, product improvement, complete production runs. All enquiries to—Herbert W. Baker (Engineering) Ltd., 2a, Kilburn La., W.10. LAD. 4006. 75

PRESS Tools for the electrical industry. Prompt delivery and reasonable prices. Also capstan and machining work undertaken. Send enquiries to—E. H. Roberts, 25a, Watford Fields, Watford. Tel. Watford 6019. 71

REWINDS: Vacuum Cleaners, Portable Tools, A.C. Motors, etc.—The Omega Electrical Rewinding Co., 316-318, High Rd., London, N.W.10. Phone: Willesden 0769. 78

RUNBAKEN Electrical Repairs, Rewinding to trade. Fractional h.p. motors a speciality, A.C. and D.C. Prompt service. Guaranteed work.—45, Oxford Road, Manchester. Tel. Ard. 2507 (3 lines). 100

SIMMONS Electrical & Winding Co. offer a guaranteed rewinding and repair service of electrical motors, quick deliveries and high-class workmanship. All types of conversions are our speciality. Also stocks of A.C. and D.C. motors for sale. Address—Hawkesworth Rd., Bromley, Kent. Telephone, Ravensbourne 5906. 226

SKILLED capacity and plant available for Turning, Milling, Grinding, Drilling and Bench Fitting, the production of small special machines and experimental apparatus.—Beardmore Motors Ltd., The Hyde, Hendon, N.W.9. 7856

SMALL pressings supplied, silver soldering, assembly and plating complete under one roof. Efficient toolroom available. Enquiries invited.—Philip J. Conway, Dept. 16, Carlton Works, Clayton, Bradford, Yorks. 67

STANDARD Automatic Co., Standard Works, Chesterford Rd., Manor Park, E.12 (Ilford 2150). New works now open. Greatly increased capacity for Auto and Capstan Work. Large and small runs. Quick delivery. Fine limits. 3044

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22/6, Cleaner Type Armatures rewound; 67/6, Split-phase Motors rewound. One to three-phase conversions. Three to one-phase conversions. Carriage paid one way over £5.—J. B. Electric Limited, Broadheath, Altrincham, Cheshire. 183

AGENCIES

ACTIVE London company desires represent progressive electrical manufacturers, old or newly established.—Box 81.

ADDITIONAL Agencies required for South of England, including London: (a) Cables and Flexibles; (b) Small Switchgear; (c) Transformers, and any lines suitable for distributing through wholesalers.—Box 40.

ADVERTISER, at present with well-known company, known to wholesalers and exporters in London, desires agencies: (a) Brass and Bakelite Accessories; (b) Switchplugs; (c) Conduit Tubes and Fittings; (d) Switchgear, etc.—Box 7895.

AGENT calling on factories and electrical wholesalers required for Birmingham area by electric furnace manufacturer. Write giving full particulars to—E. 106, c/o Streets, 110, Old Broad Street, E.C.2. 3353

AUSTRALIA, New Zealand, South Africa, India: Agents with active connections in electrical supply industry required to introduce system for inspection and treatment of overhead line wood poles, efficiency of which already proved in Great Britain and on the Continent.—Cobra (Wood Treatment) Ltd., 84, High St., Braintree, Essex. 3277

MANUFACTURERS of Industrial Lighting Fittings (including Fluorescent) require agents throughout Great Britain and Northern Ireland. Write in first instance giving details of references, present activities, area covered, experience and commission required.—Wades (Metal Spinners) Ltd., Fenton Rd., Halifax. 3188

CANADA. Qualified Telecommunications Engineer proceeding Ontario, desires agencies export manufacturers telecommunications equipment.—Box 7902.

EXPORT. Expanding Johannesburg firm seek direct factory representation for South Africa and Rhodesia. Write—Harris & Bristow (Pty.) Ltd., Mosley Buildings, President Street, Johannesburg. 7911

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).—Box 23.

REPRESENTATIVE, to sell Domestic Appliances. Must have sound connections amongst wholesalers, supply companies, stores and large retailers in the following districts: London and South-East, South Coast, Midlands, Wales, Northumberland and Scotland. Commission basis.—Box 3321.

SCOTLAND: Established firm of repute is open to consider representations in heavy engineering lines. Good technical staff available with splendid connections amongst public bodies, shipbuilders, engineering firms, etc.—Box 3070.

SOUTH Africa. Agents with resident representative in Johannesburg will be pleased to hear from manufacturers who are interested in exporting to that country.—Box 2723.

TECHNICAL Sales Engineer, excellent contacts, Sheffield area, seeks agencies, Heavy and Light Electrical Equipment.—Box 7828.

WELL-known old-established firm of manufacturers' agents, covering London, South of England, requires additional agencies: (1) Brass Accessories, Switchplugs, etc.; (2) Conduit and Fittings, etc. Advertisers have contacts with every wholesaler in territories mentioned. Immediate turnover can be guaranteed on either commission or buying basis.—Box 64.

BUSINESS OPPORTUNITIES

ADVERTISER with valuable connections certain trades can introduce Contracting and Fittings business to firm willing to sub-let workshop space, 500/1,000 sq. ft., for repair work, London.—Box 7862.

ADVERTISER with £1,000 capital and small but sound rewinding business at present in temporary premises, London area, would like to hear of any reasonable proposition. Long all-round contracting experience. Full investigation both sides.—Box 7822.

CAPITAL needed to market fully developed electrical product.—Box 7898.

COMPANY of Designers, Lighting Engineers and Draughtsmen seek collaboration with manufacturers, architects and consultants, with the view to undertaking regular design and drawing commissions in the lighting and electrical fields.—Box 3171.

MANUFACTURERS and wholesalers for new pat. Plugs and Connectors and for Rotary Switches required.—Box 3269.

SCEMCO Ltd., Fluorescent Lighting and Electrical Component Specialists, wish to contact manufacturers of 5-amp., 10-amp. and 15-amp. Switch Plugs and other Switchgear accessories. Full co-operation given for Sole Distribution Rights. Illustration and write-up will be inserted in "The Scemco Export" Bulletin. Apply to—Managing Director, Scemco Ltd., Scemco House, 6 & 7, Soho Street, London, W.1. Gerrard 1461 (3 lines). 167

BUSINESS PREMISES

HERTS: New Freehold Factory, 5,000 sq. ft., with land 1¾ acres, to be sold with immediate possession.—Box 3104.

SMALL Workshop Premises required, London, for repair and maintenance business.—Box 7863.

URGENTLY wanted: Factories in London and suburbs for well-known firms. Areas from 5,000 ft. upwards. Particulars in confidence to—Leopold Farmer & Sons, Factory Agents, 46, Gresham St., London, E.C.2. Phone: Monarch 3422. 3268

BUSINESSES FOR SALE AND WANTED

A Modern House, Workshop and Yard for sale in Warwickshire, freehold property, no restrictions. Old-established business with very wide connections in all branches. Agencies and very good connections for all supplies. This business has been doing general electrical work, which includes insulations, agricultural, car, factory and all kinds of winding. Price £3,000 clear for property, nothing for goodwill and connections. Very large stocks which can be purchased in any quantity to suit purchaser. Workshop equipment can be bought to suit purchaser. Purchaser of business and property need not buy equipment or stock. If required, owner would leave an amount of cash in the business as a sleeping partner. Reason for selling business owner retiring.—Box 3274.

ELECTRICAL Contracting and Retailer's Business, N.E. industrial town, main thoroughfare. Substantial contracts now in hand. Sale includes valuable freehold property with flat, vehicles, fixtures, fittings, equipment, etc.; s.a.v. (approx. £2,500); goodwill £1,500. Audited accounts available.—Box 7857.

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OBTAIN the best price for your business by getting amongst substantial buyers. We have them and effect quick sales with strict confidence and high ethical standards.—Commercial Development Co., 199, London Road, Sevenoaks, Kent. 114

OWNERS of old-established businesses wishing to retire should consult in confidence Business Brokers Ltd., 46, St. James's Place, London, S.W.1 (Regent 4720). Many buyers available, particularly for large propositions. Advice as to value given free of charge. 197

WANTED to purchase, Electrical Contracting or Motor Repair Business, or controlling interest.—Box 7906.

WELL-established small Wireless Electrical Engineering Retail Business in country town. For sale as a going concern, including limited company liability and the unexpired portion of the lease; s.a.v., £12,000.—Lee & Co., 21, High St., Ware, Herts. Phone 61. 3118

PARTNERSHIPS

ENGINEER with production and commercial experience of medium weight electrical and mechanical machines requires active directorship in sound engineering business; £3,000/£5,000.—Box 7881.

MISCELLANEOUS

FOREMEN, Supervisory and Technical Grades, employed in the electrical industry, should join their appropriate trade union, which is The Association of Supervisory Staffs, Executives and Technicians. Write for a free copy of the "Asset Charter," to Asset, 110, Park St., London, W.1. Phone, Mayfair 8541. 94

THE Electroplant Co., Wembley, for any type of Special Duty Elec. Plant. Specialities: Converters, Gen. Sets, Elec. Test Equipment. Ask for production range. 3264

EDUCATIONAL NOTICES

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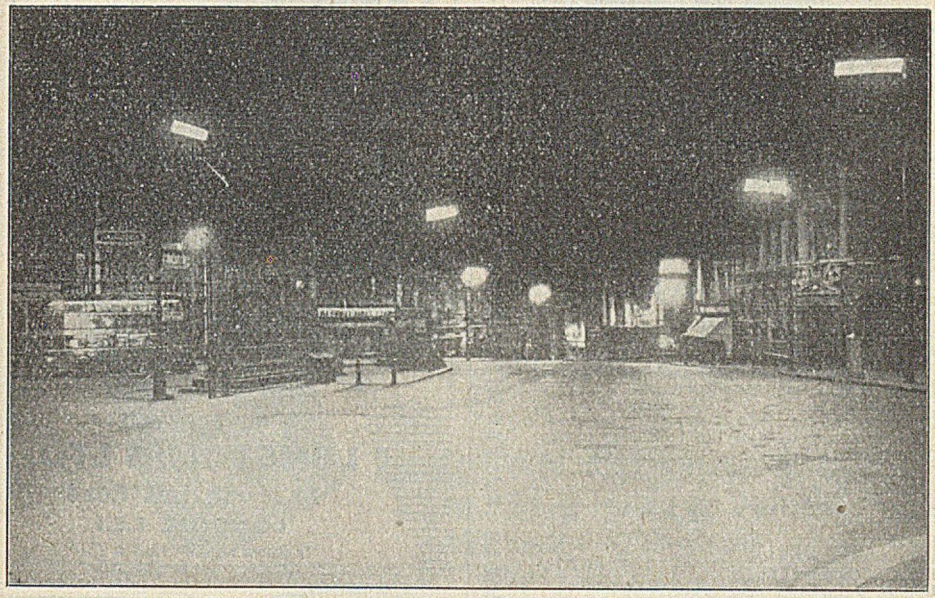
ENGINEERING Careers and Qualifications. Both Government and industry have announced and emphasised that young men with technical knowledge and qualifications must receive every chance of rising to the highest posts within their capacity in post-war engineering and allied industry. Write to-day for "The Engineer's Guide to Success"—200 courses—free—which gives particulars of the first-class training supplied by The T.I.G.B. for the A.M.I.E.E., A.M.Inst.C.E., A.M.I.Mech.E., A.F.R.Ae.S., A.M.I.P.E., B.Sc.(Eng.), C. & G., etc., examinations in which T.I.G.B. home-study students have gained over fifty first places. The Guide covers careers in all branches, Electrical, Mechanical, Radio, Aeronautical, etc.—The Technological Institute of Great Britain, 35, Temple Bar House, London, E.C.4. 77

WOLVERHAMPTON



Queen Square, Wolverhampton, and other principal roads in Wolverhampton are now lighted by Revo "Sol-Etern" Street Lighting units.

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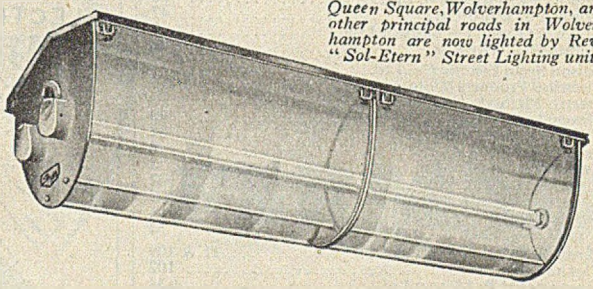

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the twin-80W-lamp street lighting unit which when mounted at 25 ft. and spaced 120-150 ft. provides visibility comparable with that normally obtained from 500-watt Tungsten or 400-watt Mercury Lamps under similar conditions.

"Lightens the load as it Brightens the road"

FULL PARTICULARS FROM:

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INDEX TO ADVERTISERS

(*Continued from page 78*)

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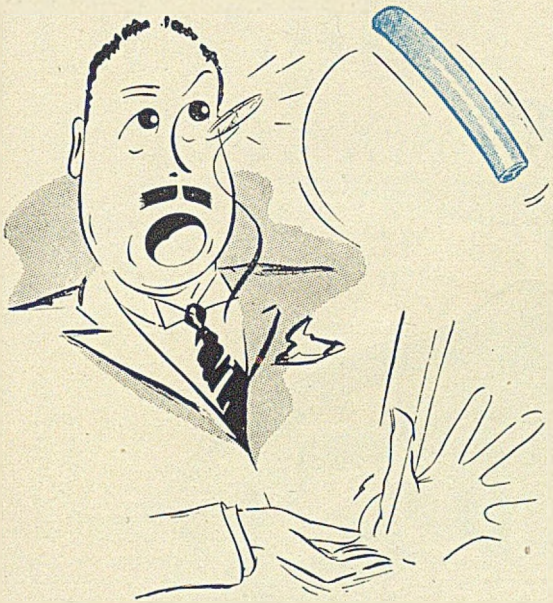

. . . the great reduction in weight can only fully be realised by the handling of actual cable . . .

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The weight reduction against similar lead sheathed cables varies between 20% and 70% according to size and type.

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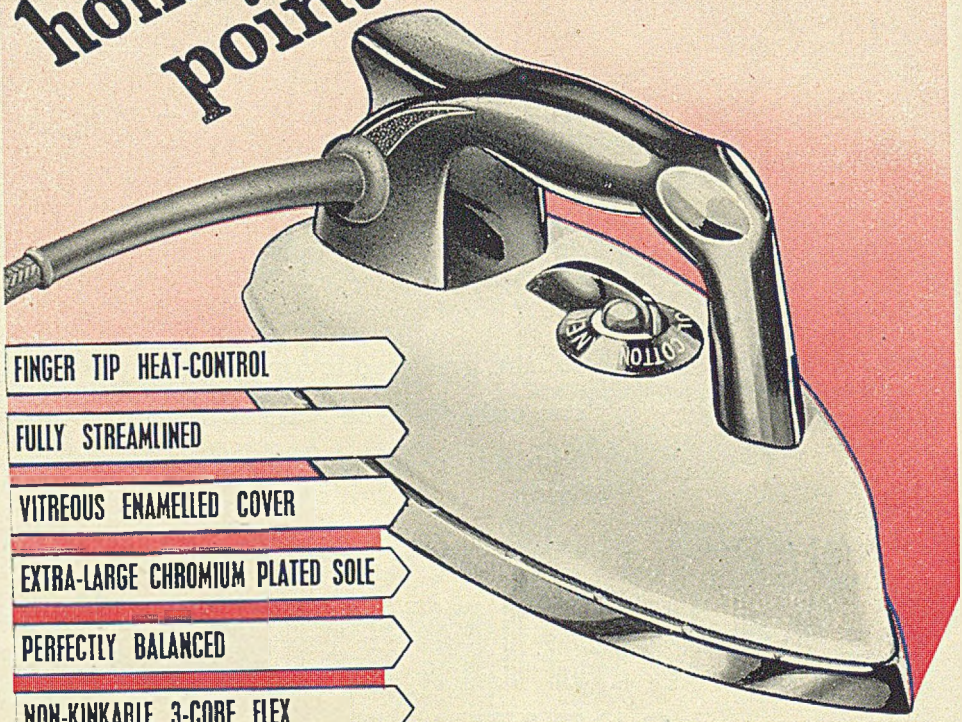
The mark that means that "little more" in quality

Presses home its own points . . .



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Plant		No. 1		No. 2		No. 3	
Water		Crude	Treated	Crude	Treated	Crude	Treated
Cations							
Calcium	Ca	3.2	–	9.4	–	10.7	–
Magnesium	Mg	0.8	–	0.36	–	1.09	–
Sodium	Na	0.46	0.23	1.0	0.31	1.66	0.44
Total		4.46	0.23	10.76	0.31	13.45	0.44
Anions							
Carbonate	CO_3	4.2	0.24	12.4	0.29	10.5	0.57
Chloride	Cl	1.8	0.06	2.5	0.12	2.84	0.30
Sulphate	SO_4	1.35	–	3.48	0.03	11.95	–
Nitrate	NO_3	–	–	–	–	1.15	–
Total		7.35	0.30	18.38	0.44	26.44	0.87
Total ions in solution		11.81	0.53	29.14	0.75	39.89	1.31
COST per 1000 gallons		5.22d		9.83d		16.5d	

The table shows the composition of some types of water before and after treatment by Permutit's "Deminrolit" Process. Water similar to a distillate is produced by this process at a fraction of the cost. Where distilled water was too expensive you can afford "Deminrolit" water. The process has been in practical use in Great Britain for over 7 years. Write for technical publication "Distilled Water without Distillation" to

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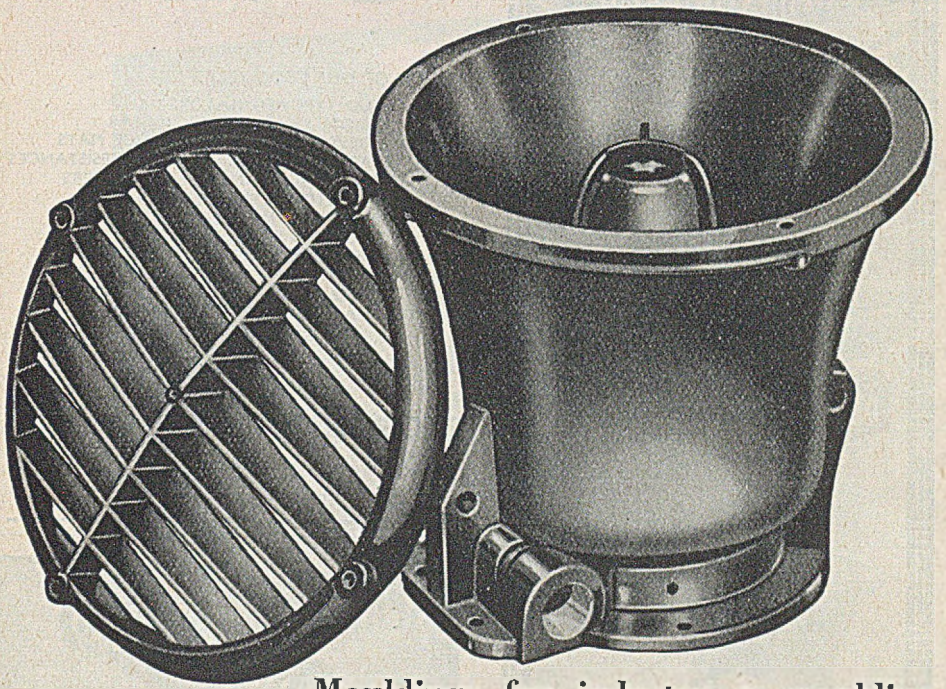

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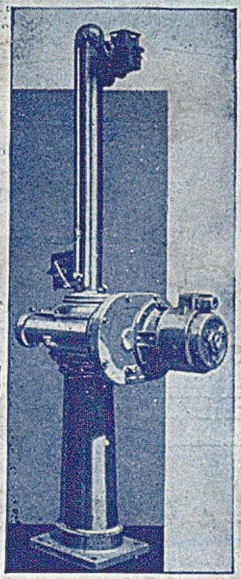

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