

ELECTRICAL REVIEW

FOUNDED
1872

Vol. CXXXIX. No. 3593

OCTOBER 4, 1946

9d. WEEKLY

**WE'RE ALL DOING
OUR BEST!**



Dad is not typical of the age of L.S.E. men or their equipment, but he has a craftsman's touch and we need his help.

L.S.E. quality must come first; but while maintaining our standards we are fighting a not altogether unsuccessful battle for increased production of:



ELECTRIC MOTORS for all industrial and marine applications. CONTROL GEAR. Electro-mechanical INSTRUMENTS, etc.

LAURENCE, SCOTT & ELECTROMOTORS LTD.

NORWICH, MANCHESTER, LONDON AND BRANCHES

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BIG BEN

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CRYSELCO LIMITED, KEMPSTON WORKS, BEDFORD



WHO'S *been looking through my eyes?*



A maintenance man in an Electricity Department doesn't have much time for reflection in these days of shortage in materials and labour.

It's always seemed to me as if Heatrae planned the design of their Water Heaters from MY point of view and to save my legs from repeated journeys.

My experience is that HEATRAE are so nearly breakdown-proof that they need minimum attention from me.

Being only human, I appreciate that point.



leaders in electric water heaters

HEATRAE LTD, NORWICH

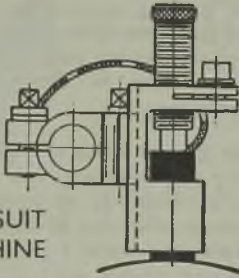
GRAMS : HEATRAE, NORWICH

PHONE : NORWICH 25131

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MADE TO SUIT ANY MACHINE

Dynamos and Motors Rewound and Re-constructed. "Partridge" Pressure Detectors, "Partridge" Earthing Devices, Switchgear, Photographic Arc Lamps, Electric Welders, Medical Arc Lamps.

The WESTMINSTER ENG. Co. Ltd.

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Telephone : Elgar 7372 (2 lines). Telegrams : "Regency, Phone, London."

TAG TERMINALS

FOR WIRELESS AND SIMILAR CONNECTIONS

A WIDE RANGE OF SIZES IN STOCK

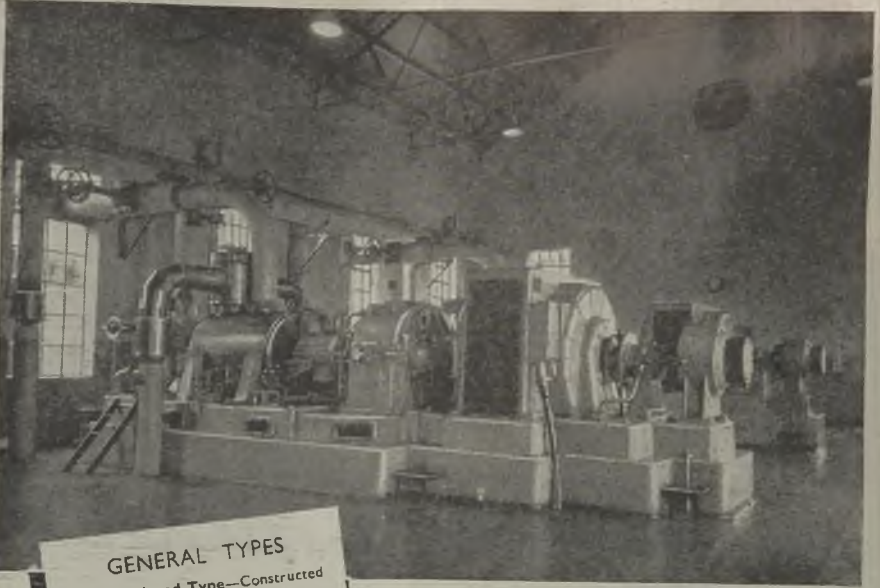
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Semi-Enclosed Type—Constructed to give adequate protection to all vital parts, and for ventilation from the machine room.

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Enclosed Ventilated Type with Self-contained Air Filters. Easily removable air filters embodied in the machine dispense with basement air ducts.

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EMINENTLY SUITABLE FOR MACHINE TOOLS
 RADETE, 10 AMPERES, 500 VOLTS. CATALOGUE N° Q1438

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and Cover



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5 to 300 Amp. 250 / 500 Volt
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Transmission,
Communication,
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Plug



Plain
Socket

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COPPER DEVELOPMENT ASSOCIATION. A non-trading organisation, maintained by the British Copper Industry to supply publications, information and advice, free, to all users of copper. Grand Buildings, Trafalgar Square, London, W.C.2 Enquiries to KENDALS HALL, RADLETT, HERTS. RADLETT 5616



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Over 50 years experience
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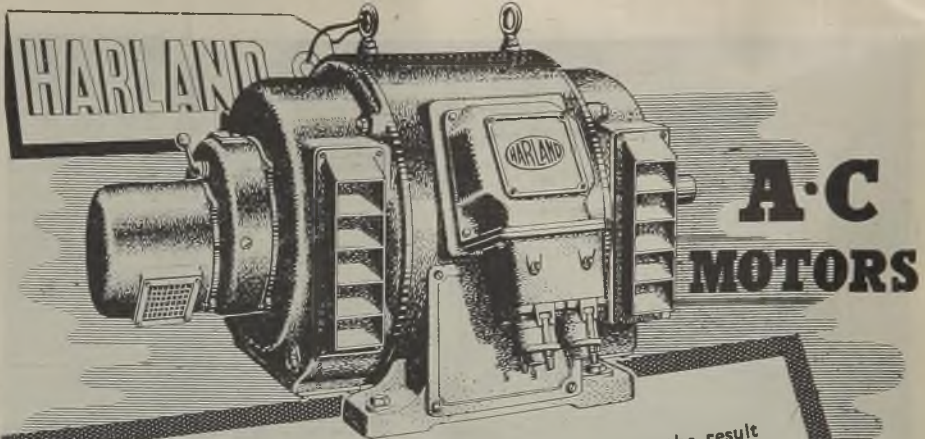
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The discerning buyer wants facts—then study these figures, the result of tests on M.F.R. slip ring motors—150 h.p. at 1470 r.p.m.

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Efficiency ...	93.2	92.5	91.2
Power Factor92	.90	.84

They prove that our claim for efficiency in Harland A.C. motors is well-founded—the figures mean lower running costs for you, while reliability and continuous high performance are assured. Harland Motors are built to last, they have big high-tensile steel shafts, large bearings, robust construction. Our manufacturing standards are high—precision machining, skilled assembly, balancing, testing, painstaking inspection, all play their part—that is why they are always "on-the-job" when there's real hard work to be done. May we send you some details to keep by you?

★ We illustrate an M.F.R. 60 slip-ring motor, 150 h.p., 960 r.p.m., with drip-proof protection.

6-337

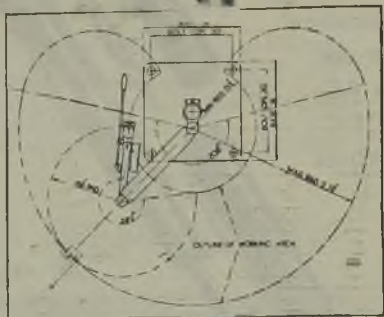
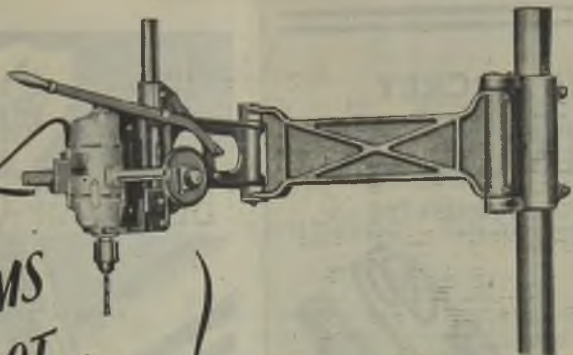
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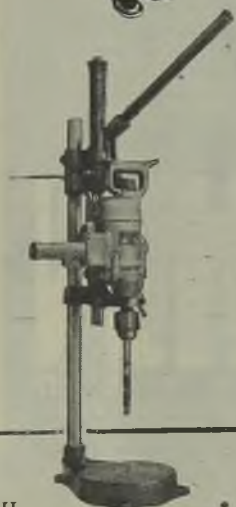
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All the better, if we may paraphrase, to do your drilling with! The Φ Jack-Knife Radial Arm shows yet another application of the unique day-in, day-out reliability of Φ Universal Electric Tools as applied to work normally requiring an expensive radial drill. And the arm does more than reach out to the useful range of 42 inches . . . it resists the torque of the tool . . . carries all radial and thrust loads on enclosed type taper roller bearings . . . is adjustable for height . . . and is extremely sensitive in operation. A Φ Bench Drill Stand as illustrated will widen the scope of usefulness of any Universal Drill but whether "hand-held," stand, or radial-arm mounted, Φ Universal Electric Tools meet efficiently and economically the needs of modern industry.



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THE POCKET TESTOSCOPE

Size of a Fountain Pen

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



for use
on
100-750 volts

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Burn "Tested Super Steel Conduit, the outcome of a century's experience in the manufacture of tubes, embodies the quality, consistency and finish vitally necessary to a good job.

Every Tube tested, passed and branded to British Standard Specification 31, and the "Bee" on every tube is your security—and ours.

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mining type
COUPLING BOXES
 for unit assembly of all
 cable coupling combinations

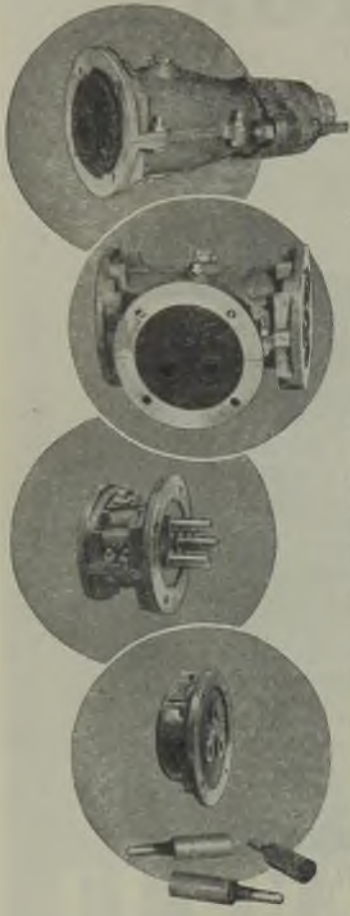
B.I. Callender's Mining Type Coupling Boxes provide a means of making the cable system as readily transportable as the operating machinery.

Extensions, withdrawals and repairs can be effected with minimum expenditure of time and material.

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Joining can, if desired, be carried out on the surface, under best possible conditions.

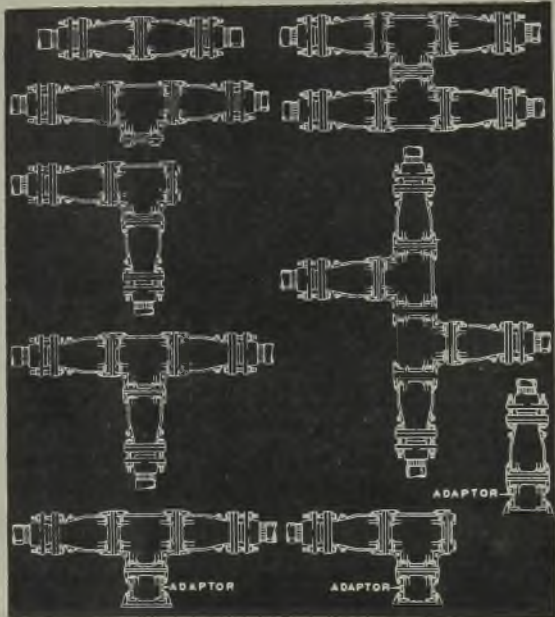
For working pressures up to and including 3,300v.



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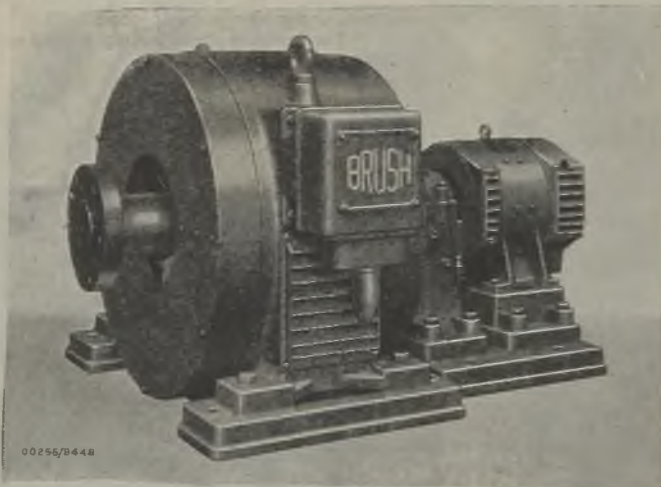
BRITISH INSULATED CALLENDER'S CABLES LIMITED
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Salient Pole **ALTERNATORS**

25 kVA to 2,500 kVA

Pedestal Bearing Series



THE extensive experience which the Company possesses in the construction of plant for electric generation is embodied in the design and construction of "BRUSH" Alternators. The outstanding feature of these machines is the high efficiency of operation characterised by low internal losses.

Many types of Alternators are available suited for drive by all classes of prime movers.

The important constructional features are set out in publication ER/B.226—write for your copy to-day mentioning the size of machine in which you are interested.

THE BRUSH ELECTRICAL ENGINEERING CO. LTD.
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B.64

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

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



**LIVES OF MEN
ARE PRECIOUS**

This electrostatic device provides a positive means of finally verifying whether conductors may be worked on with safety.

For Systems up to 11kV.

Model No. 1. Two ranges 0-5 kV. and 0-10 kV. (voltage to earth).

For Systems up to 33kV.

Model No. 2. Two ranges 0-10 kV. and 0-20 kV. (voltage to earth).

Can be used for "Phasing-out"

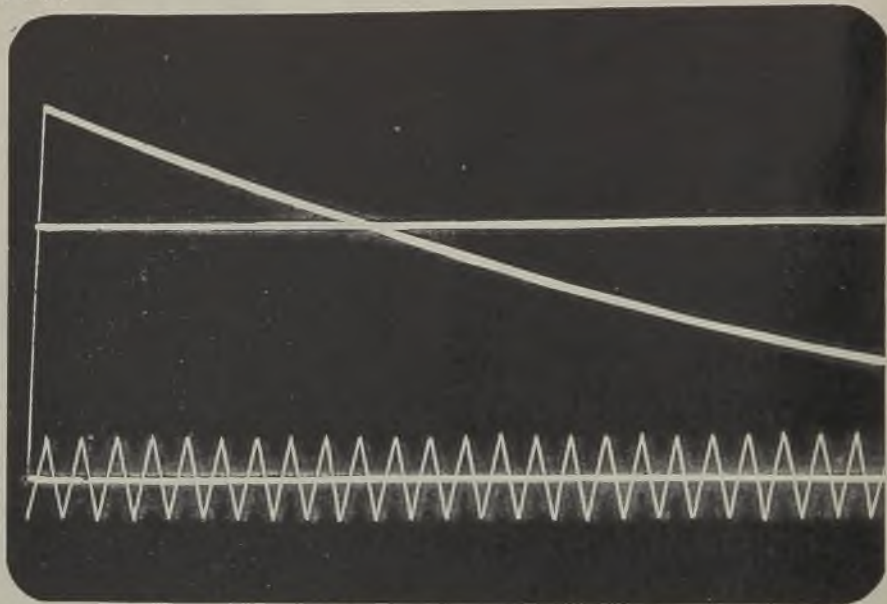
FERRANTI

High Voltage Indicator

(MARSHALL & FORREST)

FERRANTI LTD., Hollinwood, Lancs. London Office: Kern House, Kingsway, W.C.2.

AN EXAMPLE OF **T.T.** ENTERPRISE



(one million volt positive discharge rising to peak value in 0.9 microseconds and falling to half value in 50 microseconds)

motion picture of a **SURGE**

The "real life" graph that an oscillogram gives—a continuous, moving picture of what is happening under given conditions—provides invaluable data. In our modern and well equipped High Voltage Testing Laboratory at Stoke, nothing is left undone to provide you with the best. Whether in giant H.T. insulators or the smallest die-pressed parts, you can rely on T.T. being always "one jump ahead."

TAYLOR TUNNICLIFF

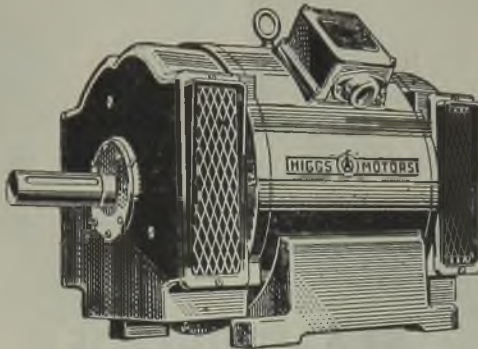
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H. T. & L. T. INSULATORS, DIE PRESSINGS, LOW LOSS CERAMICS

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Factories at Hanley, Stone and Longton, Staffs.

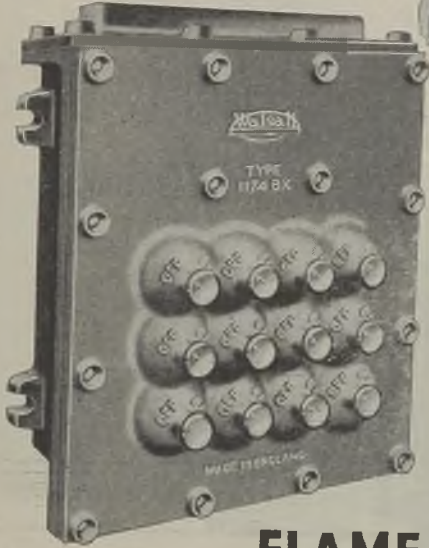
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HIGGS large alternating current machines up to 600 H.P. are the successful outcome of extensive research and experiment in design, and are produced individually by a highly specialized plant. Maximum efficiency and reliability in performance is thus ensured.

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FRUSTRATION OF SPIRIT VAPOUR



FLAMEPROOF EQUIPMENT

by "Walsall" means goodbye to the dangers of vapour ignition, in Petroleum, Cellulose, Paint and similar works. Furthermore, "Walsall" offer a comprehensive range



Remember: "Walsall" Flameproof Equipment is thoroughly tested and Certified by the Ministry of Fuel and Power



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PLANT MOTORISATION

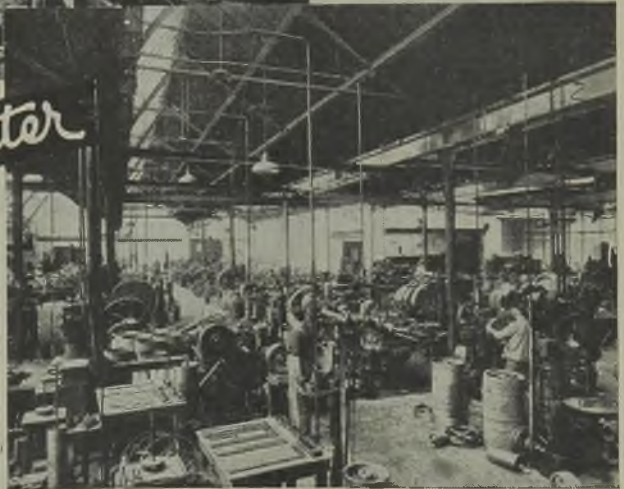
USING 'ENGLISH ELECTRIC' MOTORS
AND OVERHEAD BUS-BAR SYSTEM



View in a factory
containing 105
belt driven
machine tools.



105 machine tools
changed over to in-
dividual motor drive,
including all electrical
connections and motor-
isation of the machines.



**This changeover is fully described in our
publication entitled 'PLANT MOTORISATION'**

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WORKS: STAFFORD - PRESTON - RUGBY - BRADFORD - LIVERPOOL



BURCO

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THAT YOUR
ORDERS BEAR
A PRIORITY
SYMBOL
TO ENSURE
DELIVERY

BURCO V840.
Cabinet type
Electric
Wash Boiler

*Post war design
at its best*

BURCO LTD · ROSE GROVE · BURNLEY

ROTARY STRAINERS

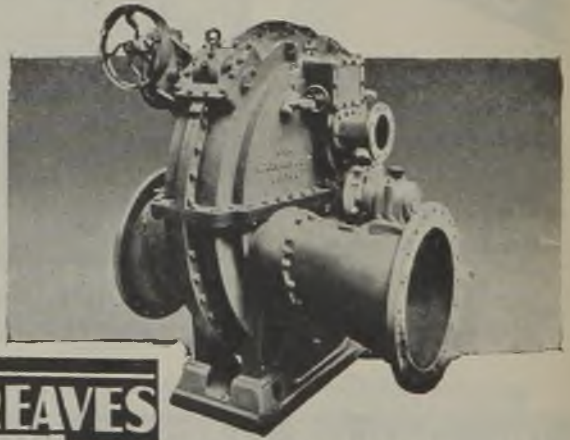
for CLEANSING CONDENSER CIRCULATING WATER

Entirely automatic and self
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Completely enclosed.

Airtight system maintained.

Made in various sizes with
capacities from 100,000 to
3,500,000 gallons per hour.



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AND COMPANY LIMITED

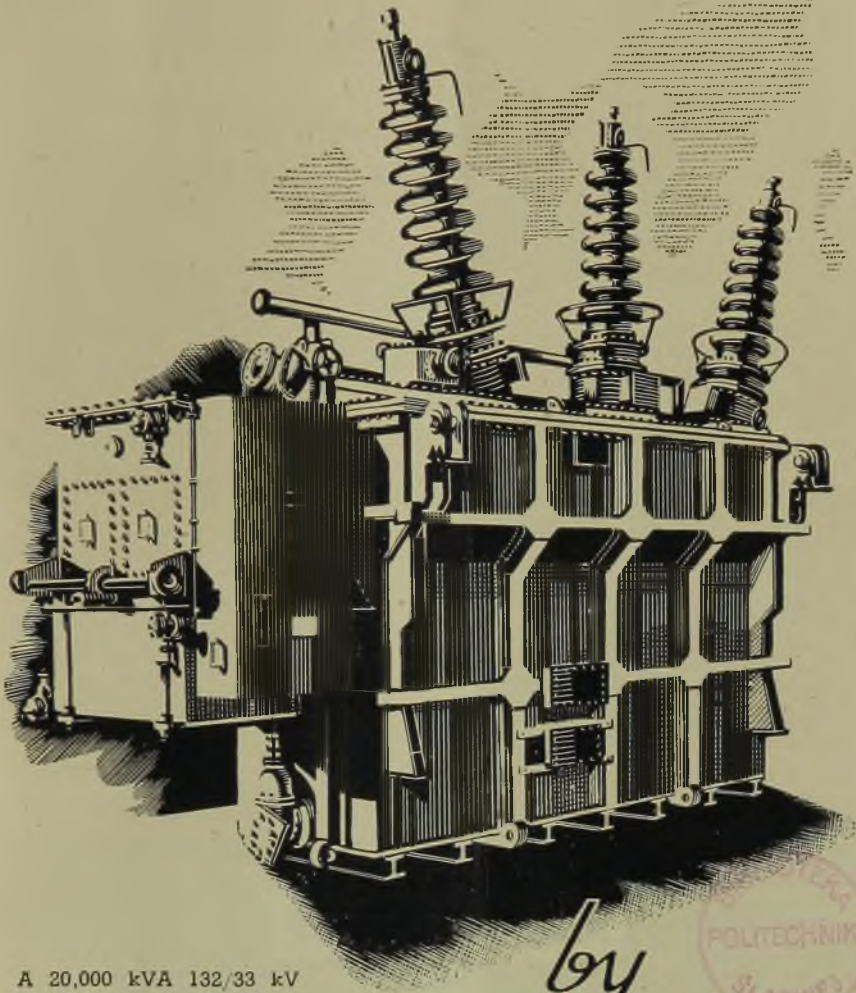
Phone:
1373 (3 lines)

BOLTON

Grams:
"HICK, BOLTON"

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TRANSFORMERS



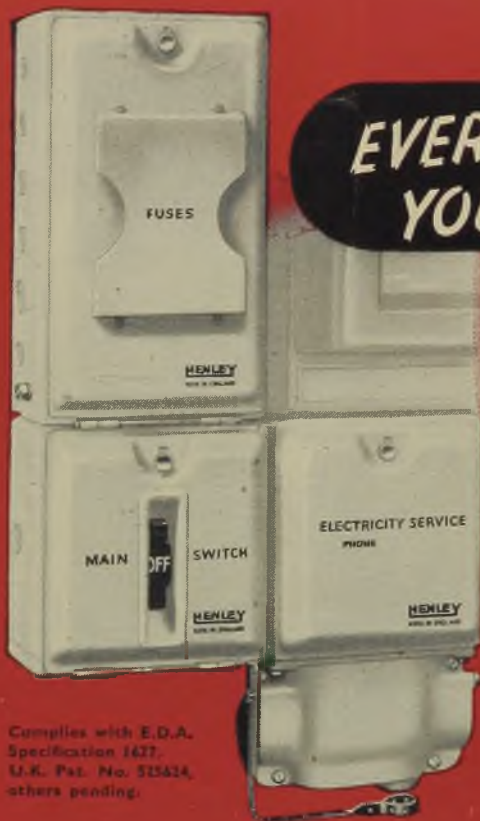
A 20,000 kVA 132/33 kV
3-phase transformer, fitted
with 132 kV on-load tap
changer, as supplied to the
C.E.B.

by



G.E.C.

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



**EVERYTHING
YOU NEED**

This simple, compact service unit incorporates everything you need for the supply intake and control installation for domestic consumers. The three main components, Supply Intake Chamber, Main Switch Chamber, and Consumers' Fuse Chamber, can be assembled in various formations to suit most requirements. Any of the usual types of wiring can be used for connections to consumer's circuits.

Complies with E.D.A.
Specification 1477.
U.K. Pat. No. 525624,
others pending.

Write for details.

HENLEY

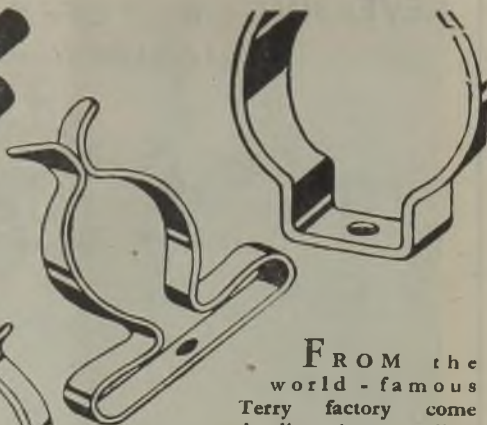
CONSUMER'S SERVICE UNIT

W.T. HENLEY'S TELEGRAPH WORKS CO. LTD.

51-53 HATTON GARDEN · LONDON · E.C.1

CHANCERY 6033
GRAMS: HENLEY & SMITH, LONDON

**CLIPS
CLIPS
CLIPS
CLIPS**



FROM the world-famous Terry factory come steel clips, bronze clips, stainless clips, big clips, little clips, wide clips, narrow clips — in fact clips in every conceivable shape and size.

Illustrated here are two of our stock patterns, 80 and 81, made in a range of sizes to grip from $\frac{1}{4}$ in. to $1\frac{1}{4}$ in.

Maybe a clip of special shape would be necessary for the job you have in mind. Well, we can help you because we make clips for hundreds of uses. We can make to print or specification, or our Research Department will design for you.

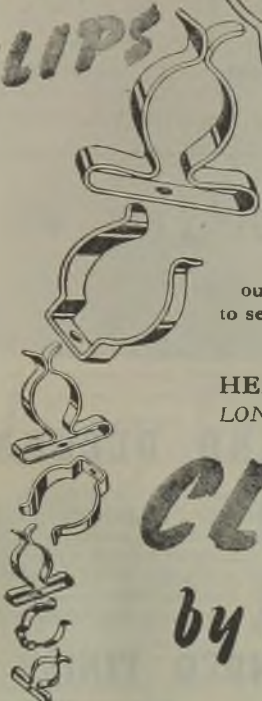
Our knowledge of clips has advanced side by side with our 91 years' spring-making experience, and we should like to send you our catalogue.

Sole Makers:

HERBERT TERRY & SONS LTD., REDDITCH
LONDON MANCHESTER BIRMINGHAM

CLIPS

by TERRY SPRINGS



Established 1855

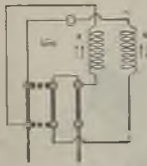
★ and just a few special shapes we have made to order.



T.C.4

REVERSING & "OFF" TUMBLER SWITCH

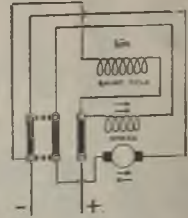
3 A. at 400 V. and 5 A. at 250 V.



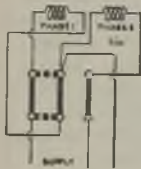
A.C. SINGLE-PHASE
(With Centrifugal
Starting Switch)



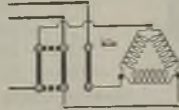
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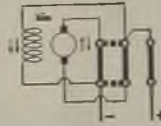
D.C. SERIES
COMPOUND WOUND



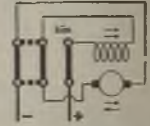
3-WIRE 2-PHASE



A.C. THREE-PHASE



D.C. SHUNT



D.C. SERIES

A. P. LUNDBERG & SONS, LTD., 491/403 LIVERPOOL RD., HOLLOWAY, LONDON, N.7

PAINT TO BE CUT BY THIRD
News Chronicle Reporter

BECAUSE starving Europe urgently needs more linseed oil for cattle food, supplies to paint manufacturers are to be cut by nearly 30 per cent. from August 21.

This step to be announced by the Food Ministry and the Board of Trade in mid-August, means a virtual ban on paint repair work to "non-essential" property.

Builders will get only the smallest trickle of paint.

For essential work

An official of the Paint and Varnish Manufacturers' Association told me that our supplies of linseed oil will be so severely curtailed that we shall only have paint enough for re-housing and work on prefabricated houses.

"Private householders who want to paint their front doors and window sills will have to congregate near their local council and the Board of Trade that the work is absolutely essential."

BE INDEPENDENT OF PAINT

The development of Metal powders during the war years has resulted in spraying by the Schori process, of all kinds of metallics and non-metallics, with the ease and speed of paint spraying. Base metals, such as steel, iron, etc., woodwork, stone, plaster, can be given decorative effects of copper, bronze, aluminium and many plastics, whilst at the same time being protected against corrosion and decay. The Schori powder process bonds all metallics and non-metallics to the

PROTECT AND DECORATE

parent surface, thus providing a covering that will not chip, crack or flake; a surface that will last indefinitely, thus reducing costly repetitive labour charges, and expensive renewal of protective coverings. Zinc, lead, aluminium, synthetic rubber or polythene, to name a few of the fifty odd Schori finishes, are in greatest demand for protection against the elements and acids. Decorative finishes in many colours are obtained by such plastics as Thiokol, polymerized shellac, ebonite,

WITH A BONDED FINISH BY

sulphur, etc., all of which, because they are applied in powder form without solvents, can be sprayed to any thickness. A Zinc sprayed surface forms a perfect key for painting, prevents rust creeping under the surface, and increases the life of paint tenfold. Approved by the Admiralty, War Office, Crown Agents, etc. Licensees throughout the Country.

Schori
METALLISING PROCESS LTD.



Linophryne arborifer

Linophryne arborifer—is one of the many species of fishes known as Angler fish, which, by movements of a lure on the head or appendages around the mouth, entice other fishes within their reach. These deep sea habitants are so constructed that once they have seized a fish they cannot release it. Their long, sharp teeth, depressible inwards, hold the victim until, tired by its struggles it is eventually swallowed. They are able to swallow fishes larger than themselves, and specimens, extended like balloons, have been found, alive but helpless, at the surface of the ocean to which they have been brought by the efforts of the victim before it was completely engulfed. Length approximately 3 inches.

but it's easier to say

ENFIELD

FOR ALL CABLES UP TO 132 kV.

PAPER · RUBBER · P · V · C.



FROM RAW MATERIAL TO PERFECTION

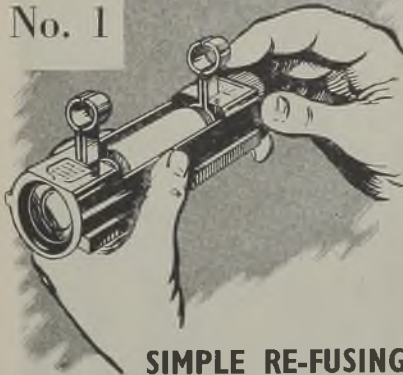
ENFIELD CABLES LIMITED, BRIMSDOWN, MIDDLESEX.

Works: Telephone: Howard 2661

London Offices: Telephone: Holborn 0591

Fusing Facilities

No. 1



SIMPLE RE-FUSING

EVEN if you happen to be a plumber, sans tools, sans mate, sans everything and miles from anywhere, you can re-fuse the new SLYDLOK FUSE from the coil of spare fuse-wire in the holder.

Fingers and thumbs are the only tools necessary, in fact you can't use any others. The same applies if you wish to fit an H.R.C. cartridge. No need to send and wait for another fuseholder. Providing you have a standard cartridge and two hands the rest is simplicity simplified to the nth degree.

Exclusive to the New

SLYDLOK



THE FUSE YOU WILL
EVENTUALLY USE

EDWARD *Wilcox* & CO. LTD.

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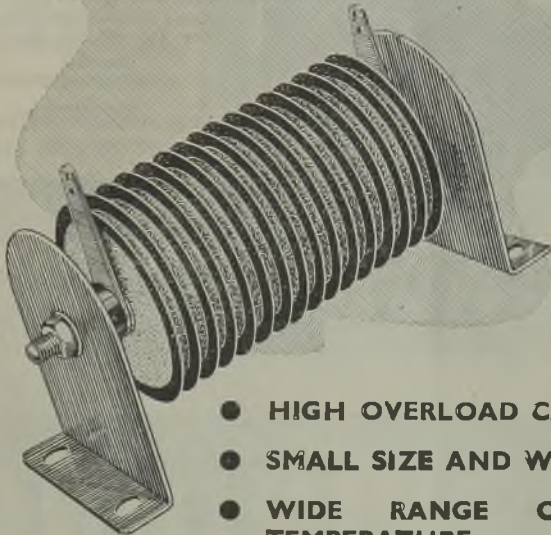
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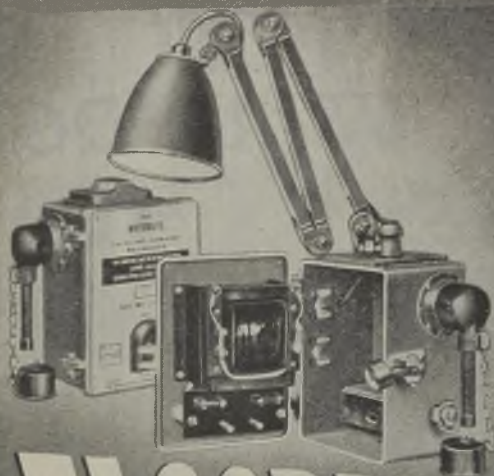
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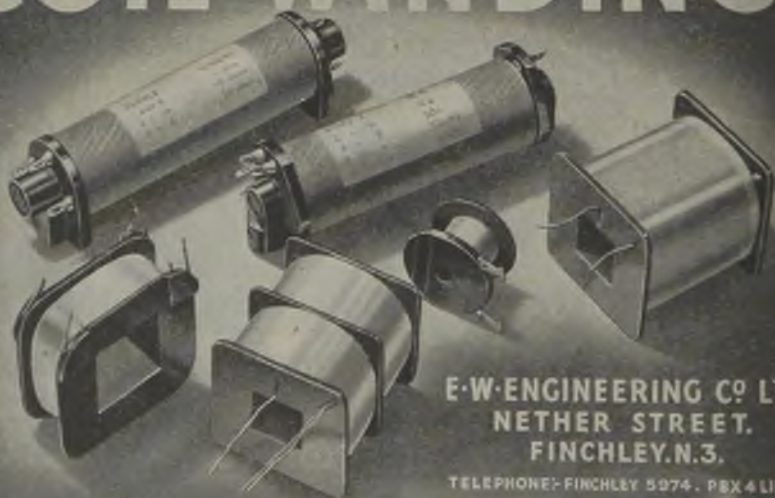
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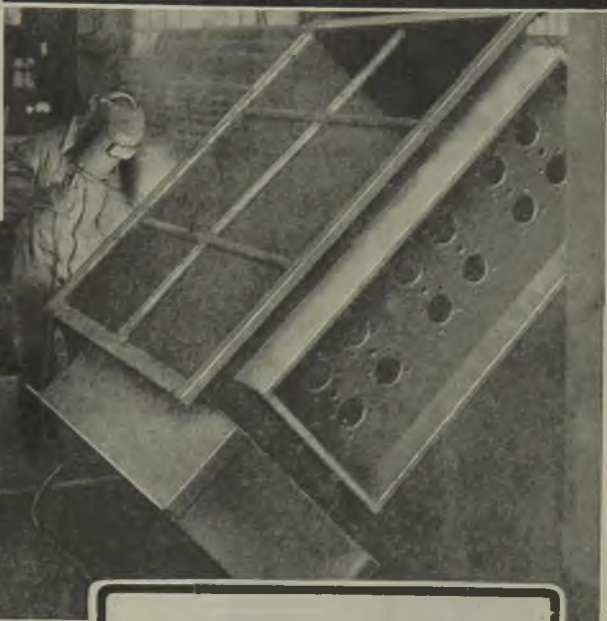
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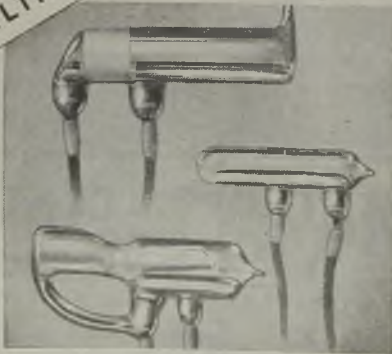
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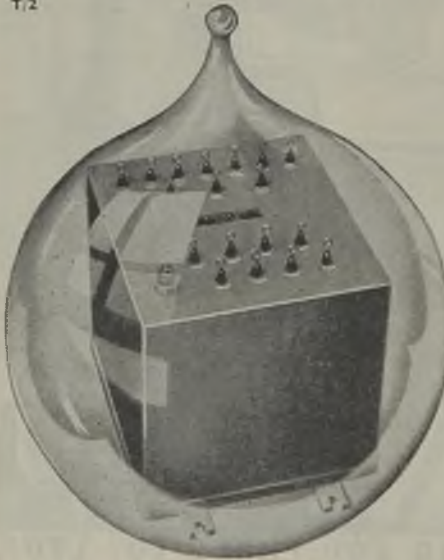
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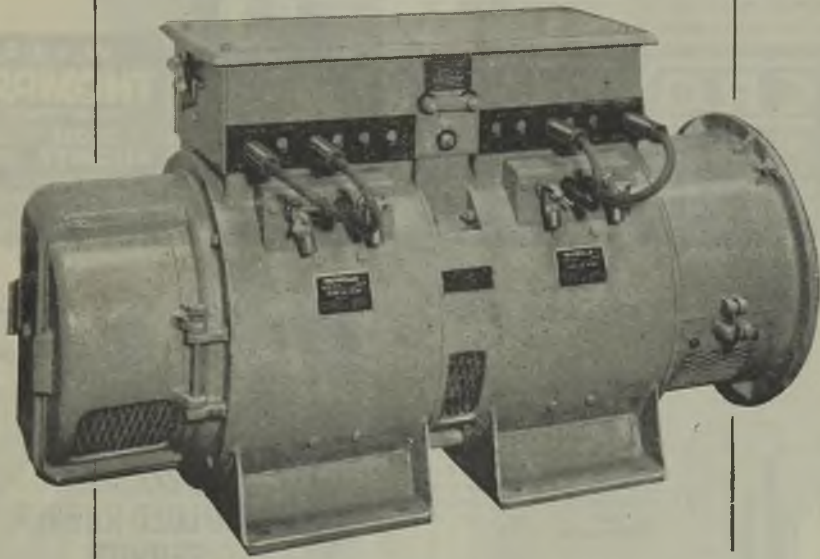


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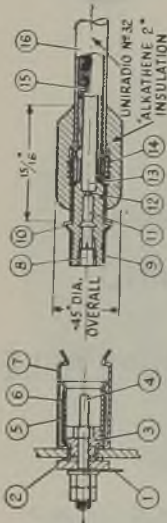
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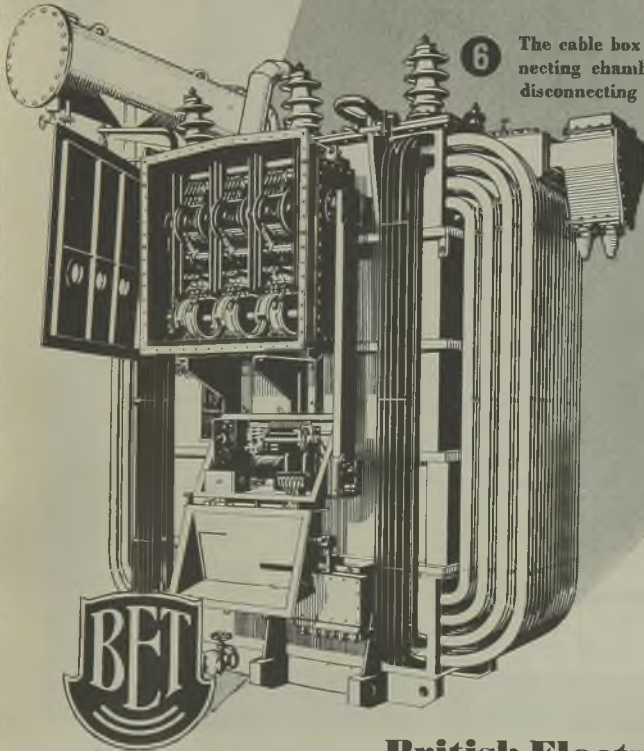
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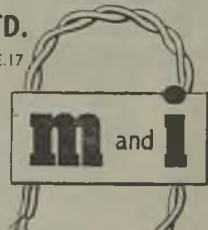
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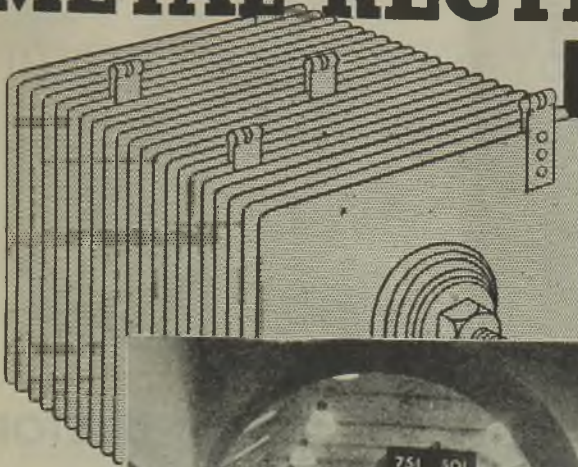
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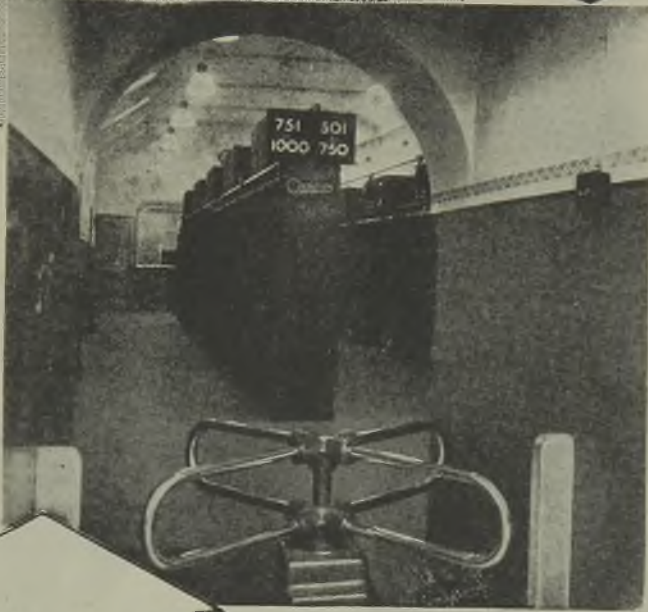


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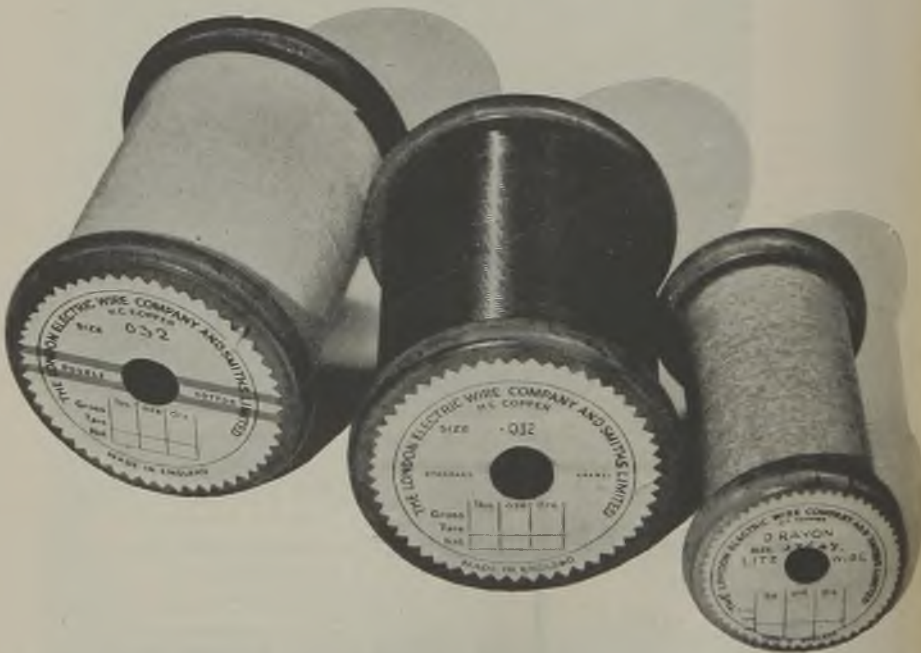


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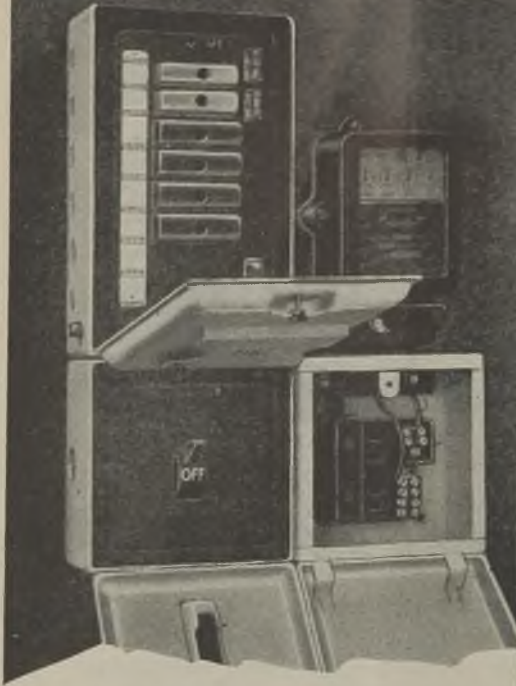


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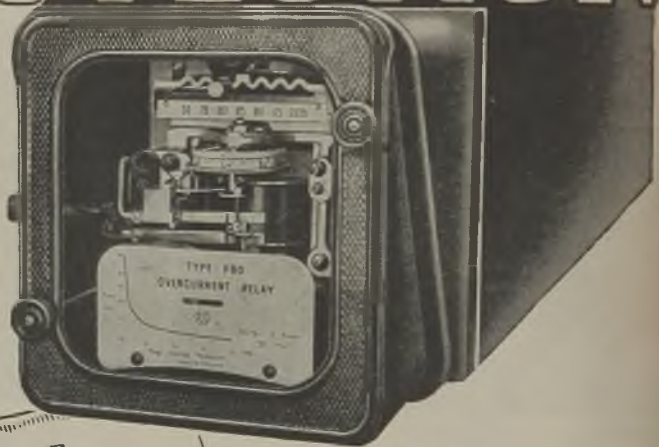
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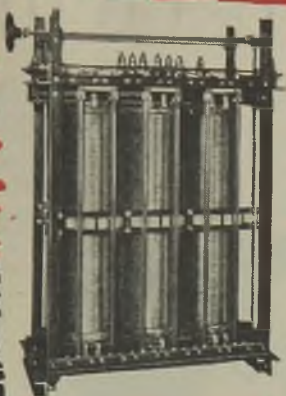
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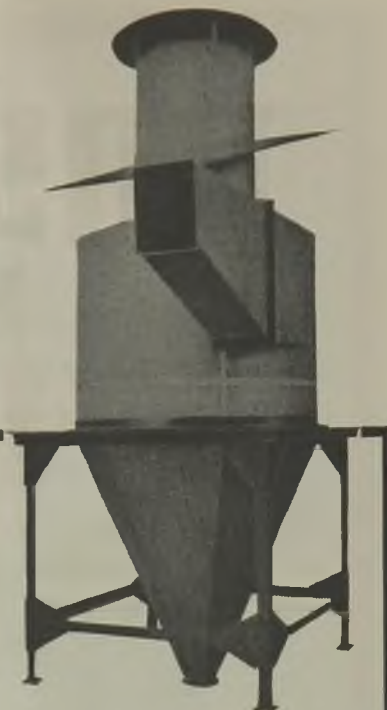
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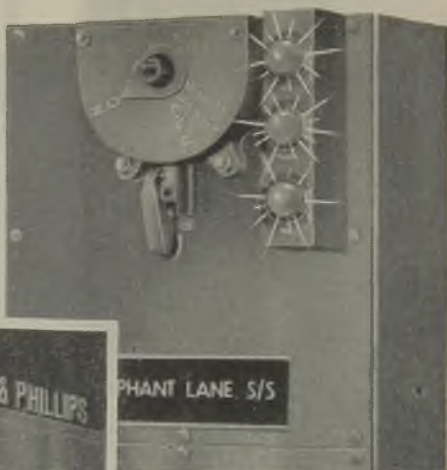
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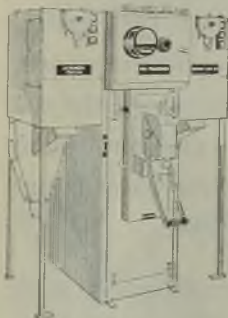


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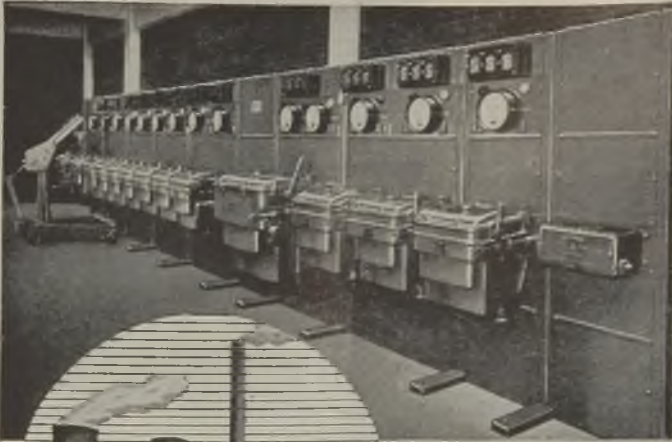
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ELECTRICAL REVIEW

October 4, 1946

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXIX. No. 3593.

OCTOBER 4, 1946

9d. WEEKLY

Trade with Russia

Sir George Nelson's Views

SINCE the war ended exports from this country to Russia have dwindled to a very small figure. In the last published Board of Trade returns (those for August) no electrical exports to Russia were recorded. For the first eight months of this year the total value of exports of electrical goods, apparatus and machinery was £533,957, as compared with £6,740,542 in the corresponding period of 1945. Exports were still higher than in 1938, however. The position is not satisfactory either from our view as an exporting country or from the wider consideration of harmonious relations between our two countries.

Anxious to do Business

Russia's willingness to buy from us has not been definitely established hitherto. Now the conclusion of an Anglo-Russian trade treaty recently gives a gleam of hope and this is fostered by the emphasis placed by Sir George Nelson upon the anxiety of the Russians to do business with this country. Sir George went to Moscow recently, at the invitation of the Soviet Government, purely in his capacity as a leading British industrialist with no Governmental or other ties. He was allowed to move about the country freely and to see for himself how much that Russia had built up had been destroyed by the enemy and what steps were being taken to restore the country's economic and industrial life.

There is no doubt that the opportunity exists for us to help in a very large measure in this work of reconstruction and further

expansion of industry. There is equally no doubt as to the desire of industrialists here to take on this business. But how much and how soon is not an easy thing to decide. It is perhaps unfortunate that what the Russians require most are just those items that we ourselves stand in need of—power plant and heavy industrial equipment. At present we are not in a position to dispose of too much in the way of capital equipment lest we cripple our own productive system.

Nevertheless an effort has to be made to achieve some compromise between these competing needs so that we may establish friendly relations with the Soviet Union as a contribution to world stability and peace. We have the consolation of knowing that the other important industrial nations are at present no better able than ourselves to undertake the supply of all that Russia needs.

Arranging the Conditions

Questioned at a press conference, upon his return from Moscow, Sir George Nelson said that his visit was exploratory; he did not go to Russia to secure orders. Before actual business could be done a number of questions would have to be further discussed, particularly prices, delivery and conditions of contract. He saw no reason why we should be unable to meet the Russians in these matters and during his visit he was able to prepare the ground to some extent by impressing upon the Russians the need for consideration of our present difficulties. This should have some value in helping them to adjust their

requirements according to our ability to meet them and prevent them from imposing conditions which are difficult or impossible to fulfil. With regard to payment, Sir George pointed out that Russia was wealthy in resources and no difficulty need be anticipated in this direction.

Kilowatt Deficiency with limited generating capacity are not lessened by the shifting of the times of the peak. The national load curves reproduced on a later page reveal more than a seasonal change or the effect of a cheerless early autumn. The comparison also reflects what are presumably changes in social and industrial economy. While the aggregate kW demand in September was about 1,800 MW less than it was in January, the effective plant capacity was down by over 2,000 MW—an amount that corresponded approximately to the additional plant being overhauled last month, when more plant was incapacitated owing to unsuitable fuel as well. The demand would have been higher but for the reduction in frequency, since it is affected either directly or as the square or as the cube of the speed.

Molybdenum Steel SOME trouble has been caused in power stations using steam at high temperatures during the past couple of years as a result of the cracking of piping made from 5 per cent molybdenum steel. The factors responsible have not yet been clearly identified, and the E.R.A. Committee which has the matter in hand is unable, as reported in this issue, to make definite recommendations at this stage regarding the composition of the steel. Decisions in regard to power stations now being designed will, therefore, depend very much on experience of the engineers responsible, having regard to individual service conditions. Since new stations will probably start as base-load stations they would not immediately be subject to the variations in temperature that accompany periodic running up and shutting down—conditions that are particularly adverse.

Dangerous Sparking In a remote-control circuit that has been certified as "intrinsicly safe" for mines, the mainly inductive spark from a rapid break does not ignite fire damp. On the other hand a spark

from a comparatively slow break, especially of a current exceeding 1A, may still be dangerous. The Chief Inspector of Mines, Mr. J. R. Felton, points out that any risks can be minimized by avoiding the interruption of a circuit in air (e.g., bridging earth and pilot contacts of a socket for testing the operation of a remote-controlled switch), by careful maintenance of earth-conductor continuity and (if they must be used) of plug and socket couplers and by adequate ventilation. Before a circuit can be regarded as safe in all circumstances, some modifications will probably be necessary in existing design and testing procedure.

Production Bulletin It is gratifying to editors of engineering journals to learn that the "Production and Engineering Bulletin" issued jointly by the Ministries of Production and Labour has ceased publication. While it may be true, as the Ministry of Labour claims, that it served a useful function in the peculiar circumstances existing in wartime, in peacetime the "Bulletin" could only cut across the paths of an efficient technical press. Indeed the Ministry recognizes this when it says:—"It is felt that the wide resources of the technical and trade press are fully capable, as in the past, of serving the best interests of industry." Government publications can seldom win the regard and co-operation of readers which the technical press enjoys and will continue to enjoy with the promised help of the Ministry and other Departments concerned.

Applications for Appointments THERE is justice in a complaint received from an overseas reader that a person in his position are handicapped in applying for appointments advertised in the *Electrical Review* (and other papers no doubt). This reader says that by the time his copy arrives the date for the receipt of applications has passed or the time left is too short. It is probable that in many cases advertisers are in a hurry to fill vacancies but there may be instances in which it is possible to give more time to applicants. Where this is so advertisers might give a thought to men in overseas countries, who may possess just the qualifications and experience which are sought for, and extend the period for the sending in of applications.

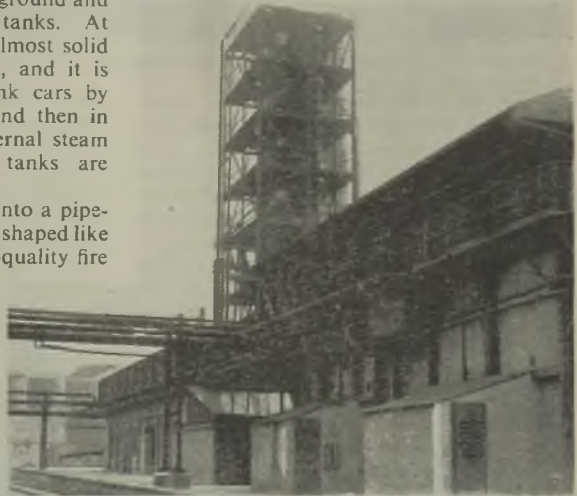
Oil Refining

Electrical Applications in Scottish Shale-Oil Industry

IN this article we propose to deal with the third and last major stage in the production of oil from shale, as it is carried out by Scottish Oils, Ltd., following the articles, "Oil-Shale Winning" and "Distilling Oil," which were published in the *Electrical Review* of July 19th and August 23rd. The crude oil produced at the six crude-oil works served with shale from the fourteen mines and pits operated in the area is brought by rail tank cars to the central refinery at Pumpherstons, where it is first discharged from the car tanks into a trough below ground and thence pumped into large stock tanks. At the initial stage the crude oil is almost solid because of its high wax content, and it is therefore heated, first in the tank cars by injecting steam into the tanks, and then in the stock tanks by means of internal steam coils with which these latter tanks are equipped.

The crude oil is then pumped into a pipe-still which is a rectangular furnace shaped like a house and constructed of high-quality fire brick. The still roof and end walls are lined with alloy steel tubing in a continuous to and fro fashion, and through this tortuous circuit the crude oil is pumped under pressure. The pipe-still furnace is fired with a low-grade by-product which is obtained from the oil processing,

a fractionating column at a point about one-third of the way up the column from the base. Here the heated oil is "flashed" into its component parts as the result of the drop in the pressure of the vapours, etc., immediately after they enter the tower. The lightest components of the oil, representing a very crude spirit, are thus able to ascend the tower through bubble cups on the bubble trays, and to leave the tower through an overhead pipe leading to water-cooled condensers in which the spirit is reconverted to liquid form for



In the fractionating column the heated oil is "flashed" into its component parts; pipe-still in foreground and condensers and control room at rear. The heavy residue oil from the fractionating column is pumped into the coking stills (left)



and the temperature of the furnace is maintained reasonably constant at 1,300 deg F.

Oil leaves the pipe-still, largely in the form of a vapour at around 750 deg F, and enters

transfer to other plants for subsequent treatment.

Components of higher gravity which cannot quite reach the tower top are trapped on one or other of the intermediate bubble trays, with the lighter oils on the upper trays. There are eighteen trays above the inlet point and the tower, and it is only necessary to tap off selected trays to



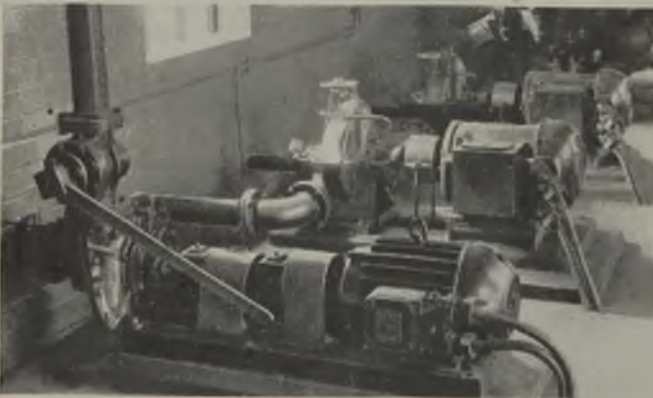
Crude oil is brought by rail tank cars to the refinery at Pumpherton

get the oil of the particular specific gravity required. Near the top of the tower crude Diesel oil is extracted, and further down near the middle of the column a heavier oil containing crude liquid wax is withdrawn. The heaviest oil of all is taken from the cup-shaped base of the column and pumped away to residue-oil coking stills. A group of three centrifugal pumps serves to transfer the different grades of oil from the fractionating column to the various parts of the works for

delta control, both the motors and the Metrovick starters being flameproof equipment.

Heavy residue oil is pumped from the column base batchwise into coking stills, each of which holds about 1,800 gallons. There are seventy-two of these in the installation; each consists of a mild-steel cylindrical top tightly jointed to a hemispherical flanged base of special cast iron. Each still sits over an oil-fired pot-shaped furnace, and a vapour

pipe connects the top of the coking still to a water-cooled condenser. The liquid residue is distilled off to complete dryness in about 24 hours, leaving a solid residue in the base of the still. This is very nearly pure carbon and is used for smelting high-grade ores. The condensed liquid distillate from the coking stills is pumped back to rejoin the fresh crude oil going into process. The coking stills are emptied every second day, and they resume their coking cycle after



This group of three centrifugal pumps transfers the different grades of oil from the fractionating column

further treatment. Each pump will handle about 100 gallons per minute against a 180-ft head, and is directly driven by a 10-H.P. Bruce Peebles squirrel-cage motor under star-

the emptying operation.

Reverting to the fractionating column, the heavy oil "cut" containing the liquid wax is pumped to a wax extraction unit from

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which the de-waxed oil is passed forward as another constituent of crude Diesel oil. This extraction of the wax is effected very simply. The oil and wax mixture is primarily chilled to a low temperature in tubular liquid-to-liquid temperature exchanges, using cold liquid ammonia as the refrigerant, for the production of which there is an installation of ammonia refrigerating plant with the orthodox set-up of compressors, condensers and receivers. The compressors are directly driven by 115-H.P., 375-r.p.m. Met-Vick synchronous motors which provide a means of power-factor correction for

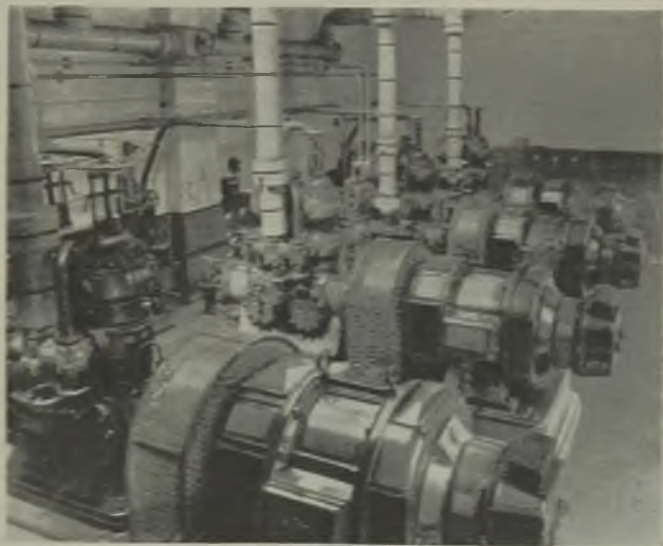
Oil and wax mixture is chilled in temperature exchangers supplied with refrigerant from 115-H.P. motor-driven ammonia compressors

the electrical installation generally.

Chilling the oil causes the wax content to assume crystalline form, and in the semi-solid state the mixture is pumped into huge 530-plate horizontal extraction presses working at 500 lb per sq in. After a period the presses become fully charged with crude wax, having exuded all the oil which is

collected and pumped off to storage. The crude wax is first treated with acid and alkali to remove certain impurities and is then further de-oiled by "sweating"—a process which involves slowly raising the temperature of the oil by a few degrees per hour—thus allowing the contained oil to creep out of the wax. This is carried out in large stoves which are essentially vertical tubular heat exchangers, each containing about three thousand $\frac{3}{4}$ -in. tubes. The heating medium is water which is itself steam heated under thermostatic control.

The de-oiled wax—pure white in colour—is finally melted out by steam heating. The hot water circulates through the tubes during the process, and the wax remains outside the tubes in the vessel. This purified and de-oiled wax is subjected to a final filtration by passing it in liquid form down through specially prepared Fullers earth in vertical cylindrical filters. This absorbs all the discolouring matter and entraps any particles of foreign matter. The liquid wax is run into steel trays and cooled ready for dispatch. This final transfer of the wax is effected by three pumps, each driven directly by a 6-H.P., 1,450-r.p.m. Bruce Peebles squirrel-cage motor with star-delta control. The oil which has been sweated out from the wax as described



is sent as charging stock to cracking plants. The crude spirit obtained from the top of the distillation column is blended with a spirit brought in from the crude-oil works.

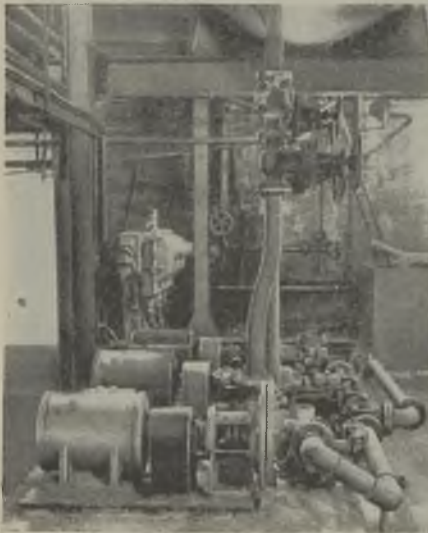
This mixture of crude spirits is redistilled in another pipe-still furnace and bubble-tower installation which produces motor spirit, solvent spirits and plasticising spirits for the rubber and allied industries. The residue from the distillation of the various spirit "cuts" is added to the crude Diesel oil obtained from the crude-oil fractionation and to that sent back from the wax-extraction

Wax is further de-oiled by "sweating" in stoves; horizontal run-off tanks in foreground

unit. This is the principal process material in demand throughout the works, since finished Diesel oil is the "bread and butter" product of the refinery. The oil is first treated with acid and alkali to improve its colour and reduce its impurities. It is then redistilled in a modern pipe-still and bubble tower unit so as to produce the highest grade of Diesel-engine oil.

The residue, along with the oil sweated out

from the wax, is charged to a cracking plant in which it is lightly cracked to produce more motor spirit, more Diesel oil, coke and an unavoidable percentage of refinery gas. This gas is used for smoothing out the by-product



Final transfer of the wax is by three 6-H.P. motor-driven pumps

fuel in the firing of the various pipe-still furnaces used throughout the processes. The operation of cracking differs from that of distillation as carried out in the earlier processes, in that cracking disrupts the molecules and results in the production of different molecule groupings, some of which are much lighter and some much heavier than the molecules in the original oil.

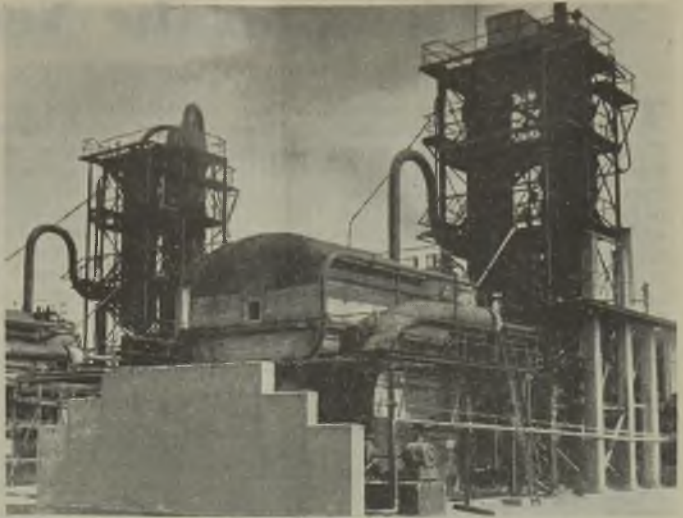
Cracking is always performed at a high temperature and generally at a high pressure, since this assists in breaking up the molecules. Distillation, on the other hand, merely separates various groups of like molecules from one another. The distillation process is carried out in the low-pressure fractionating columns at 10 lb per sq in. gauge, or less, while for cracking pressures varying from 150 to 2,000 lb per sq in. are employed. The cracking equipment therefore consists of heavy solid forged or fusion welded drums with very thick-wall seamless alloy tubing. On each cracking pipe still is a 20-H.P., 485-r.p.m. motor driven pump which keeps the oil in circulation in the pipe-still. It is directly coupled and has auto-transformer control. The motor operates in the open air.

It will be seen that the major electrical application to the refinery processes is the driving of pumps and the transfer of the various liquids to and from the different sections of the plant. Another good example

of the pumping equipment is a line of fourteen pumps which handle the motor spirit in the final spirit treatment processes. The squirrel-cage driving motors range in size from 2 H.P. to 12 H.P. and, run-

Cracking is effected at up to 2,000 lb per sq in.; note motors at bottom left for circulating oil in pipe-stills

ning at 1,500 r.p.m., they are all directly coupled to the turbine pumps. They are direct or star-delta

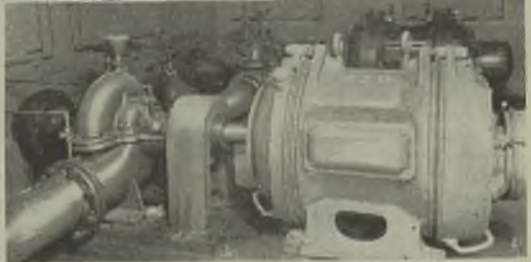


Line of fourteen units handling the motor spirit in final treatment stages. Large quantities of water are required, particularly for condensing; right, two 66-H.P. motor-driven sets in one of the pumping installations

controlled, and both the motors and the starters are flameproof. Large quantities of water are required in the works, particularly for condensing purposes, and pumping is also used extensively for this service. One of the water-supply pumping installations embraces two turbine pumps which will handle 120,000 gallons of water per hour each. These pumps are directly driven by 66-H.P., 1,500-r.p.m., 3.3-kV slip-ring motors with direct-on stator switching and rotor-resistance starters.

We are indebted to Mr. R. Crichton, managing director, Scottish Oils, Ltd., for

permission to visit the works and to publish this article, and to Mr. A. Anderson, B.Sc., manager of the Pumpherstons Refinery, Mr. G. A. McLennan, chief electrical engineer, and Mr. W.



Stirling, assistant electrical engineer, for their help in compiling this article.

Illuminating Engineering Society

The opening meeting of the session of the Illuminating Engineering Society is to be held at the School of Hygiene and Tropical Medicine, Keppel Street (Gower Street), W.C.1, on October 8th. Mr. J. S. Dow will deliver his presidential address.

Views on the News

Reflections on Current Topics

THOSE present at the twenty-first birthday luncheon of the London & Home Counties J.F.A. last week agreed with the Prime Minister's comment that Messrs. F. W. Purse and Leslie Gordon seemed too young to have reached retiring age. But "official" retirement in such cases frequently marks the beginning of a new career and I have no doubt that this will apply in this case. After all, and it is not disparaging to say so, Messrs. Purse and Gordon are still quite junior to many members of the Authority who continue to give valuable service.

* * *

There is a good deal of not cheap but nasty domestic electrical equipment in the shops nowadays, some of it calculated to break the heart of the genuine electrical retailer with high standards of commercial morality and responsibility. One of these appliances, a toaster, provided material for a sound article on the subject by John Langdon-Davies in the *Daily Mail* one day last week. After pointing out about twenty defects in the toaster he blames the public which encourages the production of such things by continuing to buy them. I despair of ever seeing a public with the proper discrimination in these matters. One point in the article tickled me. Mr. Langdon-Davies made a grievance of the fact that no plug was provided. He can have but little acquaintance with the electrical industry if he thinks that any plug supplied would be likely to fit the buyer's sockets.

* * *

A correspondent asks what foundation there is for Mr. H. H. Merrett's statement, in a recent article in the *Sunday Times* on "What is the Future of Coal?" that coal-fired plants are often used as stand-by to hydro-electric systems. A short answer is: To provide against drought (a failure of fuel supply rather than of generating units) as illustrated by experience in Eire. "Deliveries" of water are normally more erratic than those of coal and storage much more expensive. In some countries most water is available from rainfall in winter, in others from the melting of snows in summer. In any event hydro-electric stations when linked with more flexible coal-fired stations can be operated more closely to their optimum conditions of maximum continuous output.

* * *

This great flexibility of coal-fired stations in its economic aspects, which Mr. Merrett presumably has in mind, arises from the larger proportion of the overall cost of

generation that varies almost directly with output, to wit, the cost of fuel. With hydro-electric stations, on the other hand, total generating expenses (mainly capital charges) remain approximately the same whatever the output, as also do the generally higher costs of transmission. Further, capital expenditure per kW installed in steam stations is usually considerably less. It includes a very much smaller allocation to civil engineering which is independent of the number of sets installed. Hence coal-fired stations can be extended by stages to meet a growing demand for electricity, whereas the full ultimate capacity of water-power plant is commonly provided for initially. In the Highlands schemes the problem of relating maximum continuous output to consumers' demands is to be solved by turning surplus energy over to the grid.

* * *

Most people will sympathize with the view expressed by the Council for the Preservation of Rural England in its 1946 report that wherever possible power lines in rural areas should be placed underground. But opinions as to its practicability will naturally differ according to the degree of liability for the cost. The Council favours this practice even in cases where it will be "uneconomical" to follow it. But a certain naïvete is displayed by the Council when it says:—"It is rare to find any disfiguring overhead distribution in urban areas where the return on the supply for industrial and domestic use justifies the provision throughout of underground distribution, while still producing a handsome profit," even though it goes on to say:—"It is profitable enough to warrant more generous treatment in the rural areas."

* * *

In view of the many recent complaints of inferior installation work, the "earn while you learn" type of electrician is not to be encouraged. Writing in the September *Electrical Trades Journal*, Mr. E. W. Bussey, general secretary of the Electrical Trades Union, draws attention to an advertisement by an "electrical training college" which offers to impart the "specialized knowledge necessary for the installation, maintenance and repair of household electrical systems and apparatus" in a period of twelve weeks. Mr. Bussey suggests that as the normal apprenticeship is for five years and even adult women workers have to serve a probationary period of six months, the "college's" course is a trifle concentrated. I certainly endorse his comment.—REFLECTOR.

I.E.E. Sub-Centres

Chairmen for the Ensuing Year

THE chairman of the Sheffield Sub-Centre of the Institution of Electrical Engineers is **Mr. W. T. Wardale**, consulting engineer. Mr. Wardale was educated at William Hulme's Grammar School, Manchester, and the Manchester College of Technology, and received his training at the Barton Hall Engine Works of L. Gardner & Sons, Ltd., and the Birkenhead shipyard of Laird Bros. In 1901 he joined the Rochdale Corporation Electricity Department as junior engineer and later became shift engineer. In 1902 he was appointed chief engineer at the Peterborough electricity works, and in the following year went to the Sheffield Corporation tramways power station, being transferred to the Electricity Department in 1914, where he became traction engineer in 1922, a position which he held until 1943 when he took up consulting work.

Mr. W. Warren, the chairman of the East Midland Sub-Centre, is deputy borough electrical engineer at Derby. Mr. Warren commenced his career as mains draughtsman

The chairman of the Devon and Cornwall Sub-Centre, **Mr. H. C. Widlake**, is mechanical and electrical engineer to the Plymouth & Stonehouse Gas Co. Mr. Widlake was educated at Jago's Public School, Plymouth, and was apprenticed to the British Electric Traction Co. In 1906 he joined the Plymouth Corporation Electricity Department as switch-board attendant and relief charge engineer at Prince Rock power station, and in 1912 he took up his present position with the Plymouth & Stonehouse Gas Co. He is an associate member of the Institutions of Mechanical and Gas Engineers. Mr. Widlake read a paper at the International Gas Conference in Paris in 1937 on "Electrolytic Corrosion of Gas Mains." He is also the author of "Electricity on Gas Works."

Mr. T. E. Daniel, M. Eng., M.I.E.E., A.M.I. Mech. E., borough electrical engineer of Darlington, is the new chairman of the Tees-side Sub-Centre. After receiving his education privately and at Wallasey Grammar School, he served an apprenticeship with



Mr. W. T. Wardale
(Sheffield)



Mr. W. Warren
(East Midland)



Mr. H. C. Widlake
(Devon and Cornwall)



Mr. T. E. Daniel
(Tees-side)

with the Glasgow Corporation Electricity Department in 1919, and in the following year went to the Northmet Power Co., as junior engineer at Willesden. In 1922 he became charge engineer at Islington, and in 1924 maintenance engineer at Hammersmith. After a brief period as engineer representative with International Combustion, Ltd., he joined the Derby Corporation Electricity Department as generation engineer, became station superintendent in 1936 and deputy borough electrical engineer in 1940. He is a member of the Institution of Mechanical Engineers and of the Institute of Fuel.

Fawcett, Preston & Co., Ltd., Liverpool, followed by a period at Liverpool University, where he graduated B. Eng. in 1922, and M. Eng. in 1925. Subsequent experience was gained with the North Metropolitan Electric Power Supply Company and the Battersea Borough Council on both the operational and constructional sides. He was appointed deputy borough electrical engineer at Ashton-under-Lyne in 1932, being promoted to the position of borough electrical engineer and manager in 1933.

In 1937 Mr. Daniel took up his present appointment at Darlington, where the

generating capacity of the undertaking has since been extended from 17,000 kW by the construction of a new 60,000-kW power station. He is chairman of the Northern Counties E.D.A. Area Committee (being their representative on the E.D.A. Council), North-East Centre representative on the I.M.E.A. Council, a member of the North-Eastern Area Consultative Technical Committee of the Central Electricity Board, and a member of the No. 1 District Joint Board and J.I.C. for the Electricity Supply Industry.

The Dundee Sub-Centre chairman is **Mr. W. H. Howard**, assistant distribution engineer with the Dundee Corporation Electricity



Mr. W. H. Howard
(Dundee)

Department. He received his technical education at Bootle Evening Technical School where he won the Davies Engineering Scholarship for a three-year course at Liverpool University. He was an apprentice instrument maker with Chadburn's (Ship) Telegraph Co., and from 1934 to 1936 was a junior engineer with the North Wales Power Co. In 1936 he went to Dundee as district engineer in the Electricity Department, and was promoted to assistant distribution engineer in 1939.

Mr. G. S. C. Lucas, O.B.E., has been elected chairman of the Rugby Sub-Centre. He was born in Rugby in 1901 and after a period at the City and Guilds Engineering College he joined the British Thomson-Houston Co., Ltd., as an apprentice. He became a member of the staff of the Research Laboratory at Rugby upon its inception and in 1932 was appointed head of the electrical and development section. In March last year he became head



Mr. G. S. C. Lucas
(Rugby)

of the Electronics Engineering Department and in July he was appointed assistant chief electrical engineer of the company.

Mr. Lucas has been responsible for many new developments, particularly for the evolution of the company's talking-film and sound-

reproducing equipments, for the acoustical surveys of buildings, noise analysis, amplifiers and modulators. In his section investigations into electrical transients, oscillography and internal combustion engine ignition are carried out. Mr. Lucas was awarded the O.B.E. in the 1944 King's Birthday Honours.

The chairman of the West Wales (Swansea) Sub-Centre is **Mr. J. F. Wright**, who is chief technical assistant with the Swansea Corporation Electricity Department. Mr. Wright was educated at the municipal secondary school and the School of Engineering at Ipswich, and at West Ham Municipal College. He was an articulated pupil of the chief engineer and manager of the Ipswich Corporation



Mr. J. F. Wright
(West Wales)

Electric Supply and Tramways Departments from 1930 to 1934, and subsequently became junior technical assistant with the Ipswich undertaking. In 1938 he was appointed assistant section engineer, East London, with the Central Electricity Board, and in the following year joined the Swansea Corporation as

technical assistant (distribution), being appointed to his present position in 1941. He is an associate member of the Institution of Mechanical Engineers. At Swansea he is responsible for the electro-technical work of the undertaking. On the generation side he was responsible for the electrical design and contracts for the two wartime extensions of Tir John station, and on the distribution side he has carried out modernization of the system and large extensions.

Insulation Testing

AN improved method of impulse voltage testing insulation between turns of machine coils, which has given good results in the company's Swiss factory, is described by Dr. M. Wellauer in *Bulletin Oerlikon*, No. 251, Vol. XXIV. The author's account and diagrams show his impulse generator to be similar to the Rylander arrangement, but instead of the unstable discharge thereby produced, a capacitor charged with d.c. is discharged through a spark gap into the test coil. Thus voltage pulses of equal magnitude and wave can be impressed in any sequence on the insulation to be tested. The measuring circuit is tuned from the start and so adjusted that a pilot lamp glows at each impulse, failure to glow indicating rupture of a coil turn.

Industry and the House

A Twelve Months' Parliamentary Retrospect

By F. J. Erroll, M.A., A.M.I.E.E., M.P.

Parliament re-assembles next Tuesday after the summer recess and we have commissioned Mr. Erroll to provide periodical reviews of those aspects of its work, both inside the Chamber and elsewhere, which have a bearing upon any of the branches of the electrical and allied industries. Mr. Erroll's articles, written from the point of view of a Member who is an electrical engineer, will also take into account much "unofficial" information in elucidating the facts for our readers. As an introduction Mr. Erroll has prepared the following survey.

LOOKING back on Parliament's first year of work since the Labour Party was returned to power, I am impressed both by the number of occasions on which matters of close concern to the electrical industry have been debated, and by the unusual degree of technical knowledge which Members have shown in their speeches. It may be that in the first respect I am prejudiced to some extent through being myself an electrical engineer, and I was indeed pleased that my maiden speech should have been during one of the most important debates on electricity during the sitting of the present Parliament, namely the discussion on Mr. Snadden's motion for the annulment of the Tummel-Garry hydro-electric scheme.

Amenity and Prosperity

So specialized a subject brought forth four maiden speeches, one other in addition to my own being the views of an electrical engineer, Mr. T. F. Cook, the Member for Dundee. M.P.s on both sides of the House displayed great breadth of vision during this debate.

The essence of the case against the scheme was that the loss of amenity in one of the loveliest parts of Scotland was too high a price to pay for electric power. It was the general feeling of the House, however, that even beauty spots must be sacrificed if the continued industrial impoverishment and social backwardness of the Scottish Highlands is to be overcome. Underlying the many valuable speeches on the project was the realization that the future prosperity of Britain is very much tied up with the generation and distribution of electric power on the widest possible scale. Rightly, the House

voted against the prayer and so showed itself in favour of the scheme.

If the importance of electric power was prominent in the minds of Members at the beginning of the Session, it was brought again into the forefront of their thoughts at the time of the Summer Recess by Mr. Shinwell's initial attempts to secure the co-operation of the supply side of the industry in the preparation of his nationalization scheme. Here, obviously, politics entered far more prominently into the picture than during the debate on the Tummel-Garry plan. The House and the country have known since November of the Government's intention to nationalize electricity supply, bringing it with the coal and gas industries within the framework of a single national fuel policy.

Improvement Uncertain

The need for conserving Britain's available resources of power is accepted by both sides of the House. Whether, however, the placing of electricity supply under public ownership will itself bring about a higher standard of efficiency is very uncertain. As in the case of the iron and steel industry, it would seem that the case for nationalization is only being worked out after the decision to nationalize has already been taken, and it can hardly be for the good of the industry that in preparing the plan only one half of the industry, namely the municipally-owned undertakings, are prepared to co-operate.

If we can take, as a sample of the energy and foresight with which the Government will manage the nationalized industry, the way in which it is at present handling its Post Office responsibilities, the outlook is not particularly encouraging. I am reminded of two occasions, one in April and the other in May, when the Government's function as a purveyor of telecommunications was under fire. The first was the second reading of the Post Office and Telegraph (Money) Bill, the second an adjournment debate on Post Office research launched by Mr. F. A. Cobb, Labour Member for one of the West Riding Divisions. The House was scarcely satisfied by the Assistant Postmaster-General's account of attempts he was making to overtake the



Mr. F. J. Erroll (West Mills)

arrears of telephone installations brought about by the war. Not only will the convenience of the general public be served by a more energetic policy of installation, but in many respects commercial developments are being held up by the still unjustifiably low standards of the telephone service.

Even more disappointing was Mr. Burke's response to the challenge thrown down by Mr. Cobb when he urged that public corporations such as the Post Office should be examples of efficiency. The answers were all too inadequate to the four questions he raised: "Does the Post Office do sufficient research? Does the telecommunications industry do sufficient research? Is this great Government undertaking an example to industry? How do we compare with other countries, and what is the future research policy of the Post Office and the telecommunications industry?" The Assistant Postmaster-General gave only the most watery account of the research carried out by the Post Office itself, and did far less than justice to the sustained and very remarkable programmes of research carried out by the telecommunications industry.

Indeed, it is pertinent to recall that the development of a virile British manufacturing industry was for long held up in the early years of the century by the backwardness of the Government after assuming responsibility for the telephone service. Since that time the industry has consistently been ahead of the Post Office, and it is significant perhaps that in the present plethora of "working parties" for industry the electrical manufacturers have so far been exempt. The industry is indeed more energetic than Mr. Cobb would admit, despite his personal experience, and given a clear lead by the Government there is no reason to doubt that it will continue to maintain its high reputation for research and development.

Television Development

It is to be hoped that in television, where manufacturers are already away to a flying start, the step taken last November in setting up a special advisory body will be followed by a thorough implementation of its proposals. These, it may be worth recalling, were intended to cover the planning of the future television service, including standards to be adopted; the initiation and co-ordination of research into principles and practice; the encouragement of pooling of television patents and their use in the national interest;

and the investigation of all developments, bearing particularly in mind the importance of the export trade.

Broadcasting itself has been before the House on at least three occasions, first in January when the increased charge for broadcast receiving licences was announced, secondly in July when the amalgamation of regions was discussed at question time and, thirdly, during the important debate on broadcasting policy later the same month. All of these have an indirect bearing on the electrical industry, but the important debate was limited to the politics of broadcasting and did not deal with technical problems, apart from wavelengths.

Education and Training

Finally there are a few matters connected with the personnel of the industry which are worthy of comment. First, it is worth emphasizing once again, if only briefly, the serious effect upon firms occasioned by the indiscriminate call-up of young men in key positions. Throughout the year M.P.s of all parties shot questions at the Minister of Labour, and they certainly secured important modifications. Many of the young men were trained during the war years, when the industry had high priority, to fill positions of considerable technical importance, an importance which has in many instances been in no way decreased by reconversion.

The other aspect of this matter to which I would like to refer is one in which the Government has itself taken a definitely clear lead. This concerns the scheme for a new and effective link-up between technical education and industry. To an interested House the Parliamentary Secretary to the Ministry of Education announced in March the steps that were being taken to implement the recommendations of the Percy Report. The first was a system of regional councils leading up to the establishment of a National Council for Technology, aimed at securing a sufficient supply of industrial personnel from the universities. Secondly, industry was to be given a strong voice on the governing bodies of major technical colleges, and thirdly there was to be an extension of research work in technical colleges, especially on behalf of local industries. This is a matter in which a Government Department has given an example of energy and vision which might well be followed by other Departments which affect the electrical industries. These industries must give their fullest backing.

CORRESPONDENCE

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

Domestic Water Heaters

RECENT articles and correspondence in the *Electrical Review* have referred to the waste of electricity in maintaining thermostatically controlled domestic water heaters at the required temperatures and also to the amount of time taken as well as the further waste of electricity in heating the bulk of the water with the present methods of circulation.

As a result of tests on models constructed in accordance with the accompanying diagram, the efficiency of the design shown (which is patented) appears to be higher than that of present water heaters and it should cost less to manufacture. In this waste is obviated, since the water flowing through the inlet pipe (1) automatically passes through the union (2) and rises through the copper tube (3) which is covered by a quartz-glass sleeve carrying a heating element of any desired loading.

Immediately the water enters (3) it is heated and by the time it reaches the outlet pipe (4) complete circulation has been created and the bulk of the water heated very rapidly. The outlet pipe passes through the air chamber, which has become almost white hot owing to the concentrated heat from the element, and which is not cooled in any way, not having come into contact with a lower temperature of water at any time.

The water heater could be made so that the water from the main could be connected directly to pipe (3), through which it would pass to the outlet-pipe via a union provided between the two, giving it an extra boost. In this form the thermostat shown at (5),

of course, not necessary. Tests show that the flow is approximately $\frac{3}{4}$ gal. per min., thereby giving hot water constantly without utilizing the storage tank.

Westcliff-on-Sea.

G. JONES.

Trunk Road Lighting

I SHALL be glad if you will kindly correct the misreporting in your September 20th issue of my remarks in the discussion of Mr. Fryer's paper on "Street Lighting from the Motorist's Point of View" read at the recent conference of the Association of Public Lighting Engineers.

My actual statement was to the effect that I considered Mr. Fryer to be too conservative in his reference to road lighting outside built-up areas, and that the Association should advise the Minister of Transport, now taking over responsibility for the lighting of trunk roads, that modern methods brought the lighting of long stretches of such roadways quite within the realm of economic practicability.

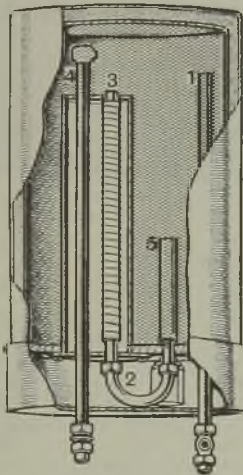
I further stated that I believed that demands in the interests of safety and national efficiency would in any case bring about early extension of this form of arterial road lighting which had already begun to appear before the war, and that development of a new Code of the Practice was called for to ensure uniformity and efficiency since this class of work was not really covered by the present M.O.T. report.

London, W.1. HUGH F. ALLPRESS

(Simplex Electric Co., Ltd.)

Trams and Buses

HAD it not been for the war, a decision of the Southampton City Council, approved by the ratepayers and ratified by Act of Parliament, to replace the trams by trolley-buses, would have by now been completed. Without reference to the public, and as a result of a report, the details of which were never disclosed (and which this Association was informed was for "privileged persons only"), the Council decided to abrogate the approved scheme and to carry out a programme of replacement by oil-engined buses. Immediately a storm of protest arose. Six letters out of seven in the local papers ask that electric traction, in the form of either modern trams or trolley-buses,



Construction of domestic water heater

shall be retained. The Council has refused to produce comparative operating costs and to give an assurance that fares will not be increased or stages reduced.

This Association (a local organization which is entirely unconnected with any commercial undertaking) recently conducted a house-to-house canvass. The results are as follows: In favour of modern trams, 2,605; trolley-buses, 2,164; motor omnibuses, 425. The Association has sought to have the whole matter reviewed by the Council, suggesting that a demonstration of a modern tram, trolley-bus and motor bus be arranged, following which a free vote could be taken.

While our preference is for modern trams, we hold that, in either form, electric traction is preferable. As ratepayers, we do not relish the loss of about £12,000 per annum to our own electricity generating station any more than we do the £50,000 scheme proposed for building a bus depot at a time when housing shortage is acute.

Southampton. H. N. STOCKWELL,
Hon. Secretary,
Southampton Tramcar Passengers'
Association.

Design and Practice

Factors Influencing Cost and Performance

IN his inaugural address this week at Manchester as chairman of the North Western Centre of the Institute of Electrical Engineers Mr. E. T. NORRIS (Ferranti, Ltd.) explained how academic design, which is largely theoretical, must be modified by practical considerations. The latter occasionally obscured the principles involved so that a decrease in the cost of materials, for example, might increase the cost of the article manufactured although the labour cost remained unchanged. Such complications might be avoided by differentiating between cost and price.

Mr. Norris considered contact between designer and user indirectly through the sales department, in general, to be inadequate. Purchasers should refrain from insisting upon mathematically optimum relations, for wide departures from calculated optimum values generally had little practical effect and were frequently justified by other considerations.

It was surprising how frequently the actual (statistical) value of the factor of safety was not definitely known. It was made up of four components, namely, the designer's incomplete technical knowledge and experience; variability of materials and labour employed (discussed by the author in the *I.E.E. Journal*, Vol. 93, Part II, April, 1946); variability of operating conditions, which was a matter of discriminating

judgment; and the margin allowable to safeguard the maker's standard and reputation.

Extraneous influences on design were grouped under the headings of production limits of materials and labour; commercial pressure and limitations; and operation qualifications. With these complications and obstructions it was not surprising that the cost and performance of the apparatus concerned frequently seemed to have little logical or rational relation to the simple principles of design and manufacture.

As a broad generalization it should be expected that, assuming modern methods of production were employed, any modification which interfered with the standardized construction was liable to cost more even though the material and labour concerned were decreased. This result, though not generally appreciated, followed naturally and logically from its inverse form (one of the chief arguments for standardization) that due to the quantity production costs were thereby reduced.

Municipal Reports

York.—The Electricity Department possesses a small hydro-electric station at Linton Lock which generated 2.1 million kWh in 1945-46. Although this was only a fraction of the total sales—111.6 million kWh—it resulted in a saving to the undertaking of £3,390, the cost of generation being only 0.218d. per kWh; all capital charges were paid off in 1936. The report of the city electrical engineer (Mr. W. A. Crocker succeeded to the position last March on the retirement of Mr. E. J. Nichols) relies largely on a series of charts to illustrate the growth of the undertaking and the changes in costs. Last year's sales were 3.8 million kWh less than in 1944-45, although domestic supplies expanded and now represent slightly more than half of the total. Income rose by £12,428 to £438,166, of which £389,982 was for the sale of electricity. Expenditure on the revenue account amounted to £401,230 and the net result was a loss of £22,768.

Guildford.—The fall in the sales in 1944-45, owing to a reduction in the demand for power from wartime factories, etc., continued last year, when sales of industrial power fell by over a million kWh. This, however, has been more than counterbalanced by an increased demand from almost all other consumers, including an increase of nearly half a million kWh for street lighting. The net result, at 56 million kWh sold, is a record for the undertaking, enabling it to limit the rise in costs to three-hundredths of a penny per kWh sold. On the other hand the maximum demand has increased by 2,000 kW, which will mean a rise of £10,000 in grid charges.

The accounts show a deficit of £10,412 after paying over £12,000 in rebates to consumers. In the past five years the total returned to consumers in the form of rebates has exceeded £84,000.

London J.E.A.

Twenty-one Years of Service

ON Friday last the London and Home Counties Joint Electricity Authority held a special meeting and luncheon for the dual purpose of marking the Authority's "coming-of-age" and to pay tributes to Mr. Leslie Gordon (clerk and solicitor) and Mr. F. W. Purse (chief engineer) upon their retirement from the Authority's service. The Prime Minister, the Rt. Hon. C. R. Attlee, a founder member and former vice-chairman of the

It was due to the joint efforts of Mr. Purse and Mr. Gordon that they were able to embark upon distribution. It was hoped that their work was but a stepping stone to a greater future for the J.E.A. On behalf of the members he presented to each of them a special resolution, with a record of their services, engrossed on vellum and handsomely bound.

Alderman Shaw welcomed Mr. Attlee and expressed the members' gratification that the Prime Minister had been able to spare the time from his onerous duties to attend that day. For a great many years Mr. Attlee had had a full appreciation of the great importance of electricity supply.

In responding, MR. ATTLEE said he was glad to meet so many old colleagues and to be able to do honour to Messrs. Gordon and Purse. Before the J.E.A. was formed he was concerned with its "pre-natal" care and he was trying to put into practice some of the lessons which he then learned. The Authority had been fortunate in securing such experienced and wise chief officials. He

remarked that they both still seemed young and would no doubt carry their vigour into whatever future activities they engaged in.

In expressing his thanks, MR. GORDON said that the J.E.A. with a very sound crew had returned to port. He hoped that the shipmaster, Mr. Shinwell, would not have the ship broken up but refitted to set out on an even grander voyage. A great deal of the talk about nationalization was useless; there was no room for anything which tied up the use of electricity. There was no need for nationalization to stifle individual enterprise and he was sure that the Government would not take the actual conduct of the industry out of the

Authority, was present at the luncheon. ALDERMAN W. H. SHAW, vice-chairman, presided in the absence of the chairman (Alderman Dudley Stuart, M.I.E.E.). He read a letter from Alderman Stuart regretting his inability to attend and mentioned the absence for various reasons of others who had hoped to be present, including Mr. Herbert Morrison, Mr. J. Chuter Ede and Mr. C. W. Key, all former members of the Authority and now in the Government.

Referring to Mr. Leslie Gordon, Alderman Shaw said that he had taken the initiative in securing greater powers for municipal electricity supply authorities; his efforts were largely responsible for the legislation which enabled such bodies as the London J.E.A. to be set up. He had also been active in obtaining the transfer of local authorities' purchase rights to the J.E.A.

Mr. Purse had worked for the electricity supply industry for nearly fifty years and his experience and work for the Authority had been invaluable.



Mr. Leslie Gordon (left) and Mr. F. W. Purse (right) with the Prime Minister



Members and guests at luncheon

present capable hands. He thanked all his colleagues for their help and wished success to the new manager, Mr. Norman Elliott, the clerk and finance officer, Mr. A. L. Burnell, and the solicitor, Mr. W. H. Failles.

MR. PURSE also replied. He said that he had always stood for the same things as the Authority; indeed he had got into trouble with the I.M.E.A. for expressing his views on these matters. The work had been difficult but interesting; he had found much opposition outside to the Authority's schemes. The public wanted a number of anomalies straightened out and this had caused successive Governments to realize that something had to be done. He looked upon the Authority's work as, in effect, a small nationalization scheme. The war had put an end to their upward swing and probably before they could resume they would be swept into a larger organization.

LORD FALMOUTH (a former vice-chairman), in proposing the toast of the J.E.A. described himself as an "old boy" of the Authority. He had returned to see many new faces and some sad gaps. Turning up the "school register" he found that many "old boys" had done very well—many of them were now Cabinet Ministers. When he joined the Authority a scheme was afoot for the erection of a large power station from which the local authorities would be supplied but the plans failed to mature.

In his opinion, in the great changes which were in prospect, the J.E.A. would still play an important part though its name might be changed. It could well constitute one of the contemplated regional authorities.

He had been president of the Electrical Research Association and had been asked to serve on the Gas Research Council. In these bodies engineers and scientists worked together for the common good. In his view, so far as the public was concerned it did not matter whether they received their energy by wire or by pipe. Referring to the possibilities of the atomic bomb, Lord Falmouth suggested that it would result in smaller, more widely distributed power stations. He did not think that atomic power would be available for many years, but he had great hopes of the gas (or hot-air) turbine.

Record Development

ALDERMAN SHAW, responding to the toast, said that the Authority was proud of its record. Since the taking over of the distribution areas the number of consumers had increased from 40,000 to 132,000 and the sales of energy from 32 to over 200 million kWh per annum. No other undertaking could show greater development and they hoped to make even more rapid progress in the future.

MR. MARCHANT, past-chairman, recounted some of the early struggles of the Authority. A scheme produced in 1928 for the taking over of the distribution rights of 88 authorities did not meet with the hoped-for success, but

within the more limited scope of its activities the Authority had done extremely well.

MR. GODRICH, chairman of the General Purposes Committee, also replied. He said that the Minister of Fuel and Power would be well advised to look to the J.E.A. as one means of ensuring a good service. The electricity industry had been built up by the efforts of competent men and women irrespective of the form of ownership. They hoped that the Authority and similar bodies would be allowed to continue their good work.

The Retiring Officials.

MR. LESLIE GORDON has been clerk and solicitor to the Authority since its inception. Mr. Gordon began his career in the public service nearly fifty years ago when he entered the office of the town clerk of Wallasey. Thence he went to Northampton and later to Hammer-smith, becoming town clerk of that borough in 1912 when he was only thirty-two. Twelve years later he was appointed town clerk of St. Marylebone and joined the Authority in the following year. Mr. Gordon was a prime mover in the establishment of what is now known as the Metropolitan Boroughs' Standing Joint Committee and he became the hon. secretary of the Conference of Local Authorities Owning Electricity Undertakings in Greater London which qualified him for the position of clerk of the J.E.A. when it was formed. He has an encyclopædic knowledge of electricity supply matters and this was recognized by his appointment as hon. secretary of the Conference of Joint Electricity Authorities and Joint Boards and as chairman of the Joint Committee of Electricity Supply Organizations.

MR. FREDERICK W. PURSE, the retiring chief engineer to the Authority, is one of the best-known figures in the electricity supply industry and other branches. He has been with the J.E.A. since 1929 before which he had had thirty-two years' experience in the supply industry. He is a native of Bristol and received his education at the Merchant Venturers' Technical College and University College, Bristol. He obtained a number of certificates in electrical engineering and allied subjects, including a City and Guilds honours diploma in electric light and power distribution. His connection with the supply industry began in 1897 when he entered the Bristol Electricity Department. Two years later he went to Bath as assistant and in 1901 was appointed deputy at Warrington. His first "chief's" job was at Watford where he stayed from 1908 to 1913; while there he recommended the provision of trolley-bus services, installed a 30,000-kW, 3,000-r.p.m. set, and secured the adoption of the I.E.E. Regulations for the Electrical Equipment of Buildings as bye-laws. He went to Carlisle in 1913 and remained there until 1919 when he became chief engineer at West Ham, leaving to join the J.E.A. in 1929.

Mr. Purse has a long record of service on

committees and councils of the electrical and allied industries. He was president of the I.M.E.A. in 1928 and he has been a vice-president of the Institution of Electrical Engineers and chairman of the Transmission Section. He has been a member of the Board and Executive Committee of the National Register of Electrical Installation Contractors since its inception and he has recently accepted an invitation to continue to serve the Register as honorary director. He was chairman of the

Fair Trading Committee "D" and has also been active in the affairs of the Electrical Research Association, the British Standards Institution, the Electrical Development Association and many other electrical organizations. He was recently elected president of the Building Industries National Council.

In the course of his career Mr. Purse has acted as consultant to many supply authorities, and he intends to devote some of his attention to this type of work during his retirement.

PERSONAL and SOCIAL

News of Men and Women of the Industry

IN this issue we publish the first of a series of Parliamentary surveys by **Mr. F. J. Erroll**, M.A., A.M.I.E.E., M.P., whose varied experience has equipped him well for the interpretation of the proceedings for our readers. Mr. Erroll was born in London of Scottish parents in 1914. He was educated at Oundle and went to Trinity

College, Cambridge, where he obtained an honours degree in the Mechanical Sciences Tripos. He rowed for Trinity First Boat. In 1936 he spent eight months studying transport, engineering and mining developments in South Africa, Rhodesia, East Africa, the Belgian Congo, Nigeria, etc., and upon his return to this country prepared a draft chapter



Mr. F. J. Erroll

for Lord Hailey's African Research Survey.

In 1931-32 and 1936-37 Mr. Erroll served an apprenticeship with the Metropolitan-Vickers Electrical Co., and was chairman of the Apprentices' Association. After this, he remained in the company's Research Department. He was on the staff of Evershed & Vignoles, Ltd., in 1938-39 and made several journeys to the Continent, including visits to German engineering establishments.

Mr. Erroll joined the 4th County of London Regiment (T.A.) in May, 1939, and was technical adjutant on the outbreak of war. In 1941 he was transferred to the Tank Division of the Ministry of Supply where he served in various capacities. As a lieutenant-colonel he went to Italy and later to India and Burma. He acted as technical advisor on armoured vehicles to S.E.A.C. and took part in the Command's first large-scale amphibious operation. He was promoted colonel in 1944.

In the General Election Mr. Erroll was elected Conservative member for Altrincham and Sale. Later in the year he carried out various missions for the British Intelligence Objectives Sub-

Committee in Germany and Austria. Upon his release from the Army in January he joined the boards of W. J. Furze & Co. (London), Ltd., and the Mills Scaffold Co., Ltd.

Sir Arthur Stanley Angwin (chief engineer of the General Post Office) headed twenty British communications experts who went to Moscow by air last week to take part in the five-power conference on wavelengths and to arrange a world telecommunication conference in Washington next April. A *Reuter* message from Moscow states that the other countries represented at the talks, expected to last about three weeks, are the Soviet Union, France, China and the United States.

Dr. P. Dunsheath, C.B.E., M.A.(Cantab.), D.Sc.(Eng.), relinquished his position as chief engineer of W. T. Henley's Telegraph Works Co., Ltd., on September 30th. His services will be retained as consulting engineer and he also retains a seat on the boards of the parent company and its subsidiaries, Henley's (South Africa) Telegraph Works Co., Ltd., Henley's Tyre & Rubber Co., Ltd., and the Holborn Construction Co., Ltd. Dr. Dunsheath joined Henley's in 1919 and was initially engaged in reorganizing the company's Research Department, being appointed research and technical manager in 1929, and chief engineer in 1934. He was elected a director in 1937.



Dr. P. Dunsheath

On September 18th, the staff of the North Wales Power Co., were entertained by the directors of the company to their first post-war annual outing. The outing took the form of a day at Llandudno. After lunch the party went for a short cruise to sea on the pleasure steamer, *St. Trillo*. Upon the return to Llandudno an evening meal was served after which Lt. Col. J. Rankin, director and general manager, said

that out of 660 employees, 570 were present. He expressed pleasure at the presence of the chairman, Air Commodore C. E. Benson, and several other directors and friends of the company. Air Commodore Benson referred to the strenuous part played by the staff during the war. After tea, there was dancing at the Winter Gardens Ballroom and the party then saw the show "Summer Serenade" at the Pier Pavilion.

Lt. Col. W. R. S. Hodgson, after seven years' war service, has taken up his duties again as manager of the Lead Industries Development Council, which he has held since the formation of the Council in 1935.

Mr. E. W. Krebs, A.M.I.E.E., resigned early this year from the position of chief technical and development engineer with Bull Motors, Ipswich, and has established himself as consulting engineer specializing in design and development work for electrical machines. He has changed his office address to 42, Selcroft Road, Purley, Surrey (telephone: Uplands 6789).

Mr. A. N. Allen, chief clerk in the Gloucester City Electricity Department, was presented with a gold wristlet watch and a silver tankard on his retirement after over forty years' service. The presentation was made by Mr. Emil Braathen, city electrical engineer.

St. Pancras Borough Council Electricity Committee has recommended the appointment of **Mr. J. F. Sweetland**, shift engineer, as assistant power station superintendent at a salary of £601 per annum.

Mr. Hedley Large, borough electrical engineer of Stoke Newington, is to retire next April after forty years' service.

Mr. H. W. Leonard retired on Monday last after thirty-six years' service with the General Electric Co., Ltd. Mr. Leonard was a senior member of the G.E.C. publicity organization, and for many years he held the position of space buyer. During his career Mr. Leonard served on the publicity committees of nearly all the associations connected with the electrical industry.

Mr. J. Denis Pooley has been appointed a director of Pooley & Austin, Ltd., the appointment taking effect from July 1st. Mr. Denis Pooley is a nephew of Mr. F. Pooley, chairman of the company.

Miss Caroline Haslett, C.B.E., director of the Electrical Association for Women, is a member of the Committee appointed by the Minister of Town and Country Planning to advise him on the building of a new town in the Crawley-Three Bridges area, Sussex.

Mr. E. S. Waddington, of Philips Industrial (Philips Lamps, Ltd.), has received notification of three new appointments in the past few weeks, in the various Associations with which he is connected. He has become chairman of the

Organization Committee of the Society of Engineers of which he has been a member of the Council for some time, vice-chairman of the Finance Committee of the Institute of Welding, and has been elected to the Council of the Sheet and Strip Metal Users' Association.

Mr. F. R. A. Morris, of Carlisle, has been appointed lecturer in electrical engineering and allied subjects at Carlisle Technical College.

Mr. J. L. Hewett, A.M.I.E.E., resigned from the Research Department of the English Electric Co., Ltd., Stafford, on August 30th to take up an appointment as lecturer in electrical engineering at Staffordshire Technical College. Mr. Hewett joined the English Electric Co. in 1935 in the transformer drawing office, later being transferred to the Research Department. He took up his new duties at the end of September.

Bolton Corporation Electricity Committee has appointed **Mr. E. W. Hewlett**, A.M.I.E.E., A.M.I.Mech.E., deputy borough electrical engineer at Tunbridge Wells, as deputy electrical engineer and manager of the Bolton undertaking in succession to Mr. T. Jack. Mr. Hewlett was with the Central Electricity Board as assistant transmission engineer at Bristol from 1933 to 1936, and as assistant engineer to the commercial manager in London until 1938. He was then appointed senior distribution assistant and later mains engineer to the Preston Corporation Electricity Department, staying there until June of this year, when he accepted his present appointment in Kent.

Mr. S. W. Spendlove, A.M.I.E.E., retired from the service of the L.M.S. Railway on September 30th. He held the post of signal and telegraph engineer for the Northern Division of the L.M.S., in which he has been responsible for all mechanical and electrical signalling and communication systems over a large area. In 1907-8 he installed the equipment on the railway between Heysham, Morecambe and Lancaster for the electric train service.

Mr. Alfred Clark has resigned from the presidency and from the board of Electric & Musical Industries, Ltd., with which he has been associated for forty-seven years.

Mr. E. B. Palmer, chief technical assistant with the Warrington Corporation Electricity Department, has been appointed electrical engineer and manager to Leek (Staffs.) Urban District Council. He takes up his new duties on November 1st.

The following branch office appointments have been made as from October 1st by the Electrical Apparatus Co., Ltd., following the resignation of the company's London office manager, Mr. C. G. Dobson. **Mr. R. F. Mathieson**, previously Birmingham office manager, becomes London office manager, and **Mr. C. F. Jackson**, previously Bristol office manager, becomes Birmingham office manager.

Lt. Col. (temp.) A. E. Knights, D.S.O., M.C., M.M., T.D., Royal Norfolk Regiment, resident engineer to the East Anglian Electric Supply Co., Ltd., has been mentioned in dispatches in recognition of gallant and distinguished services while a prisoner of war.

Mr. Robert Bell, M.I.E.E., A.M.I.Mech.E., deputy borough electrical engineer of Barking, has been appointed to the position of borough electrical engineer of Erith, at a salary of £1,400 per annum, in succession to Mr. E. A. Logan, who is taking up a post with the Government of Burma.

Mr. Arthur Andrews, A.M.I.E.E., of F. Reid, Ferens & Co., Ltd., Newcastle-upon-Tyne, has retired after fifty-two years' service with the company which he joined as an apprentice and rose to be chairman and managing director. He was one of the first members of the Electrical Contractors' Association. The staff and employees of the company at Newcastle and Sunderland have presented him with a gold watch as a token of esteem.

At the September meeting of Scunthorpe Borough Council tributes were paid to the work of Mr. A. L. Boyle, who will shortly be retiring after 25 years as borough electrical engineer.

The following appointments are announced by the Jackson Electric Stove Co. Ltd.:—**Mr. F. H. Williams,** who founded the company in 1912 is chairman, and **Mr. W. L. Tregoning,** who during the war was Director of Ammunition Production at the Ministry of Supply, becomes managing director. **Mr. A. T. Piercy,** director and secretary is retiring, and **Mr. E. Penn, A.C.I.S.,** has been appointed secretary.

Mr. T. Kearns, of Blackpool, has been appointed technical assistant to the Thornton Cleveleys electrical engineer.

Alderman Harry Leason, chairman of the North West Midlands Joint Electricity Authority and of the Stoke-on-Trent Electricity Committee, is to be Stoke-on-Trent's next Lord Mayor.

Mr. T. W. Towers has been appointed acting operating manager, trams and trolley-buses, of the London Passenger Transport Board.

Mr. L. S. Kinnear, a director and secretary of the British Oxygen Co., Ltd., has been appointed a managing director. He is succeeded as secretary by **Mr. M. K. Arnott,** who has held the position of chief accountant.

Alderman J. L. Dirkin, who will be Lancaster's next mayor, has been chairman of the Electricity Committee since 1937, and was recently elected to the I.M.E.A. Council. He represents the Corporation on the District Joint Board and District Joint Council of the Electricity Supply Industry.

Mr. J. Malley and **Mr. T. Storrar** have been appointed directors of the Mirrlees Watson Co., Ltd.

Obituary

Mr. J. B. M. Gubbins.—We regret to record the death of Mr. J. B. M. Gubbins, deputy commercial manager of the Central Electricity Board, which occurred on Saturday last at the University College Hospital, London. Mr. Gubbins, who was in his early forties, joined the Board in 1930 and was appointed deputy commercial manager shortly before the outbreak of the war. Before joining the Board he was with Kennedy & Donkin, consulting engineers. He was an associate member of the Institution of Electrical Engineers, and was a Faraday Gold Medallist.

Mr. S. J. H. Hosgood.—It is with regret that we announce the death of Mr. S. J. H. Hosgood, which occurred at Plymouth on September 18th. Mr. Hosgood was branch manager at Plymouth for British Insulated Cables, Ltd., for many years and continued in that capacity for British Insulated Callender's Cables, Ltd., until January of this year, when he became branch manager for the company for the Bristol and South West Area.

Wills.—**Mr. J. B. Snell,** a member of the staff of the British Electrical & Allied Manufacturers' Association, formerly commercial manager of the South Metropolitan Co., at one time associated with the West Kent Electric Co., and branch manager at Liverpool of W. T. Henley's Telegraph Works Co., Ltd., son of the late Sir John Snell, G.B.E., left £4,811 (net personalty £2,802).

Mrs. Anna Volk, widow of Magnus Volk, of Brighton Electric Railway fame, who died on January 22nd last, left £648 gross, with net personalty £593.

Power-factor Improvement

UNDER the chairmanship of the president, Mr. F. W. Godden (city electrical engineer), the Coventry Electric Club held its first meeting of the 1946-47 session at the electricity show-rooms on September 24th. One of the Club's own members, Mr. L. deWynter, addressed the meeting on the subject of power factor improvement, stressing the economies which were to be effected thereby and mentioning that in the past many industrialists had improved the power factor in their works, but had neglected lesser savings which were to be obtained by correctly applied phase advancing equipment. Mr. deWynter also mentioned the importance to the distribution network of capacitors being switched in and out of circuit as and when required, and he illustrated a means of doing that automatically. The author left no doubt in the mins of his listeners that he favoured the use of static capacitors, and he mentioned that among their advantages over other types of phase advancing equipment were low installation cost and economy in floor space.

Russian Trade Prospects

Sir George Nelson on His Visit

IMMEDIATELY upon his return from Moscow last week, Sir George Nelson, chairman of the English Electric Co., Ltd., gave his views upon the future possibilities of trade between this country and Russia at a press conference. Sir George emphasized that he went to Russia, by express invitation of the Soviet Government, as an individual industrialist—not in any official or representative capacity. He took with him his own experts in the fields of steam and hydro-electric power station design and construction, power distribution and control equipment, traction and radio-communication. These experts discussed matters with their Russian opposite numbers and gave lectures.

Sir George said that his objects were to see the devastation caused by the Germans, examine Russia's industrial establishments and see what could be done to restore trade between our two countries through normal channels. Russia's vast immediate need of heavy electrical and other plant was disclosed to him, but he had had to point out that the productive capacity of Great Britain (and other countries) was at present fully occupied and Russia could only be assisted in a reasonably short time by very special efforts. He agreed that those efforts should be made as a contribution to peace and the raising of the standard of living.

He was aghast at the destruction which he saw; it had had a very serious effect domestically and industrially. We had suffered but the sufferings of Russia were incomparably greater. He admired the steps already taken before the war to develop the country; now a great part of the industrial resources had been destroyed. The Russians were anxious to give us an opportunity to help them in the reconstruction and industrialization of their country.

Considerate Treatment Requested

Again Sir George stressed the fact that he did not go to take orders but to discuss the general resumption of trade. He impressed upon the Russians the acute shortage of technical men and skilled labour in this country and asked them not to involve our limited resources in preparing tenders merely as a price check upon tenders from other sources and never to insist on short delivery periods for the sake of quick delivery. He also asked that decisions upon tenders should be made as soon as possible so that productive capacity could be allotted to the orders.

Throughout, the discussions were most frank and friendly. They were the forerunners of more detailed negotiations on such matters as general conditions of contract so that suitable compromises might be arrived at—and the Russians were willing to compromise. He had been free to go where he liked without restraint.

His visit confirmed his admiration of the Russians; they were certainly not warlike, they were anxious to get on with their reconstruction.

In his opinion substantial orders would be available for all kinds of heavy plant; the Russians would take as much as we could supply if prices and conditions could be agreed upon.

New Brighton Station

Ultimate Capacity of 300,000 kW

BRIGHTON Corporation has been instructed by the Central Electricity Board to commence work on a new power station which is estimated to cost £14,000,000. It will be known as Southwick "B" station and will adjoin the existing Southwick station. The first section is scheduled for completion by September, 1949, and it is expected that the Board will shortly issue a direction for the second section for completion by the winter of 1950. The two sections will bring the new station up to half its ultimate planned capacity of 300,000 kW.

It is also proposed to build a fleet of ocean-going steam colliers for bringing coal by sea from the North of England and considerable alterations may have to be made to Shoreham harbour to permit the use of colliers of 2,500 tons.

Mr. H. Pryce-Jones, the electrical engineer and manager, has been appointed consulting engineer for the new project.

Batti-Wallahs' Luncheon

Telecommunications in Wartime

THE principal speaker at last week's monthly luncheon of the Batti-Wallahs' Society was Col. H. J. Wellingham, London manager for Cable & Wireless, Ltd., who spoke on the overseas cable and wireless services during the war and gave some of his experiences.

Col. Wellingham opened his remarks by paying tribute to Sir Edward Wilshaw, chairman of Cable & Wireless, Ltd., whose foresight, initiative and planning were so largely responsible for the important part played by cable and wireless communications during the war. He referred to the establishment of emergency stations in this country to ensure that communications would not be interrupted. One of the features of electrical communication was its flexibility, so that if one route became ineffective messages could be sent over another.

While wireless communication had not the secrecy of cable communication, it had its uses and was frequently used to pass false information on to the enemy. The work of laying, maintaining and repairing submarine cable continued throughout the war and Col. Wellingham paid tribute to the crews of the cable ships who carried out the hazardous work, and to the magnificent work of the Royal Corps of Signals.

I.M.E.A. Council in Dumfries

FOLLOWING its custom of visiting the President's area, the I.M.E.A. Council held its September meeting in Dumfries on September 19th and 20th, this year's president being Mr. J. S. Pickles, the county electrical engineer. The opportunity was taken during the visit of inspecting the headquarters of the Electricity Department of the Dumfries County

were formally opened accommodate the automatic switches which control the supply transmitted throughout the county. The building has been erected at a cost of £4,000 and the equipment installed at a cost of about £8,000.

Alderman Sir William Walker, in performing the opening ceremony, said that it was rather unique to get a combination of a County



Members of the I.M.E.A. Council during their recent visit to Dumfries

Council at Marchmount. Also a new principal substation for the receipt of grid supply was officially opened by Alderman Sir William Walker, J.P. During the Thursday afternoon the Moffat and Thornhill districts of the Council's area were inspected. On the following day the party visited the hydro-electric stations of the Galloway Water Power Co., at Tongland, Earlston and Carsfad.

The new substation and control room which

Council and an electricity supply department. There were only two in the United Kingdom and the first was in Dumfriesshire. Throughout its extensions the department had had very little trouble with regard to wayleaves. That was evidence of the desire on the part of the community to assist in the development for their own benefit. Mr. Pickles had adopted a method which had been justified in spite of much criticism in the original stage.

Molybdenum Steam Pipes

A REPORT from the British Electrical and Allied Industries Research Association, Ref. S/T141 (1s. net), has as its subject, the "Cracking in Service of 5 per cent Molybdenum-Steel Steam Piping" which has recently been experienced in some power stations operated with high-temperature steam. The report draws attention to measures (the adoption of which is generally advisable for all alloy-steel piping at high temperatures) that would considerably reduce the risk of cracking. Research is proceeding with a view to finding the major factors responsible and eliminating material with a susceptibility to cracking.

In the meantime the following recommendations are made:—Nickel and copper contents of the steel should be as low as possible in order to minimize rooting of scale. Lagging in contact with the pipes should be chemically inactive. Final stress-relief treatment should be given to any parts that have been subjected to welding by heating them to and soaking them

at 600–620 deg C followed by slow cooling to 450 deg C and then by cooling in still air. No surface damage (as by hammering) which would create local residual stress should be permitted after this stress-relief treatment. Hammering should not be allowed when a part is under hydraulic stress.

Surface irregularities, which would cause stress concentration, should be prevented or removed. Corrugations must present smooth surfaces for the operation; all sharp radii and changes in contour must be avoided. Notches at fillet welds should be machined or ground away. Working stress at operating temperatures should be minimized by making thermal-expansion stresses small; "cold pull up" should approximate to full thermal expansion. Circumferential stress at bends, which is proportional to thermal expansion loading, adds materially to circumferential stress due to steam pressure. Peaks of high temperature in operation increase thermal expansion stresses.

National Load Curve

Change in Peak Periods

IN the accompanying diagram the load curve for the whole country for September 18th is compared with that for January 21st (reproduced from the *Electrical Review* of February 1st), on both of which dates load shedding became necessary owing to insufficient effective capacity of generating plant. On the earlier occasion, the load rose sharply at 8 a.m. and during the next half hour increased to 98 per cent of the maximum, which was recorded at 9.30, remaining fairly level for about four hours, slackening off just before noon. In the more recent instance the 8.0-8.30 a.m. load was 93

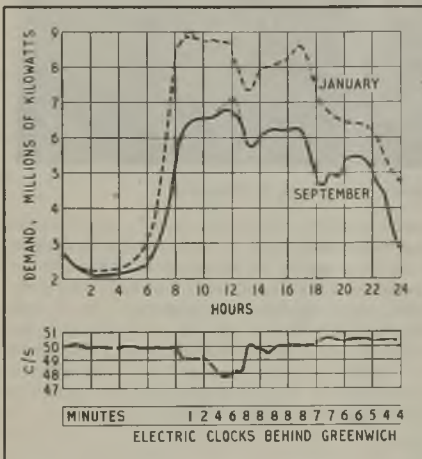
output capacity of 10,452 MW. This deficiency is accounted for as follows:—In overhaul, 2,442; breakdown, 779; unsuitable fuel, 270; other causes, 224. The net effective capacity of 6,737 MW was able to meet the demand, which would have reached 7,137 kW at about 48 cycles, only through shedding 400 MW as an average over the critical half hour.

Load-Shedding Arrangements

The Electricity Commissioners have asked electricity supply authorities to consider the extension of voluntary arrangements with industrial concerns for the reduction of their demands at times of peak load. These arrangements have sometimes involved the transfer of load from the morning to the afternoon but the Commissioners point out that changes in the incidence of the peak load period make further transfers of this kind undesirable.

Where voluntary arrangements are insufficient to meet the situation undertakers should prepare a list of other power consumers whose supplies might have to be reduced. Regard must be paid to relative industrial priorities and in this connection advice should be sought from the Regional Boards of Industry (formerly the Regional Production Boards). Where there are no large industrial loads similar lists should be prepared, consideration being given to the necessity for avoiding complete interruption of supplies without adequate warning, particularly to factories, hospitals, etc.

Wherever possible the Central Board will give adequate preliminary warning of the possible necessity for reducing load so that, in turn, the warning can be passed on to consumers who are likely to be affected. The Commissioners again urge the fullest possible use of surplus private generating plant to reduce the risk of load shedding.



Comparative load curves for January 21st and September 18th. Frequency curve relates to September 18th

per cent of the 9.30-10.0 figure and only 85.5 per cent of the comparatively sharp peak, which did not occur until about noon. Thereafter the demand fell for a while to not much less than the 8 a.m. figure before taking a downward plunge shortly before 1 p.m.

In the afternoon, load recovery was less pronounced than it was in January when, as usual at that time of the year, a peak resulted from the over-lapping of power and lighting loads towards 5 p.m. Weather conditions on September 18th were particularly unfavourable. Over the whole country there was 100 per cent cloud cover and an average temperature 7.21 deg. F. below normal for the time of the year.

The capacity of the generating plant available between 11.30 and noon, roughly the period of the cuts, on Wednesday, September 18th (*Electrical Review* September 27th) was 6,737 MW, being 3,715 MW less than the gross

World's Power Production

THE *Monthly Bulletin of Statistics* which has hitherto been published by the League of Nations is now under the aegis of the United Nations Organization, its first number being that for August last, which is largely devoted to details of the world output of electric power between 1936 and 1945. Due to the demand for munitions the production of electricity in most countries underwent a marked increase during the war period. Thus, it is estimated that the output in the United States between 1939 and 1944 went up by 73 per cent, in Great Britain and Canada by 43 per cent, India by 57 per cent, and New Zealand by 39 per cent. Increased outputs are also recorded for Sweden, Portugal, Switzerland, Australia and Latin America.

Building Licences

Guidance for Electrical Contractors

IN May last Mr. L. C. Penwill, director of the Electrical Contractors' Association, circulated to his members some notes on the arrangements for the licensing of building work (including electrical contracting). He has now issued a memorandum on some further aspects of the subject. Contractors are reminded that all work costing more than £10, plus £2 a month on a non-cumulative basis, requires a licence. Work in private dwellings carried out with unpaid labour is exempt from the requirement. Licences cover specific work and if the stated cost is likely to be exceeded a supplementary licence should be applied for. Generally licences are issued in the name of building owners but the main contractor or architect may make the actual application.

Supplementary licences will only be granted to the original licensee. If, therefore, a sub-contractor finds that he has to do additional work he must ask the original licensee to apply for a supplementary licence and, in cases of urgency, telephone the facts of the position to the Regional Licensing Officer. The sub-contractor should protect himself by confirming his request to the original licensee in writing, setting out the facts, and should forward a copy by registered post to the Regional Licensing Officer, quoting the number of the original licence. He may then carry on with the work unless he hears to the contrary from the original licensee or the Regional Licensing Officer.

Separation of Items

If applications for licences show the separate amounts for each sub-contractor the Ministry of Works will endorse the "break-up" on the licence. Provision for contingencies is not generally included in licences, except in appropriate cases when an amount to cover attendance on specialist trades is included. If particulars of additional controlled materials are given when supplementary licences are applied for, the Regional Licensing Officer will deal with the application at the same time as the application for a supplementary licence.

It is provided in Defence Regulation 56A that it will be a defence for a person charged with exceeding the figure stated in a licence if he can prove that at the time the work was begun he had reasonable grounds for believing that the cost at completion would not exceed the licensed amount. This might cover a situation in which a sub-contractor's costs are increased through waiting for materials or for other trades to complete work. The contractor will be required to prove that he has done everything possible to keep within the authorized amount. This defence will not apply when work has been carried out beyond the scope of the licence. Specialists and sub-contractors, in the case of conviction, are liable only for their own work and penalties will be based on the part of

the work which they have carried out and not on the whole job.

The installation of machinery, etc., is not in itself subject to a building licence, but if a concrete base is required or other building work is undertaken in connection with the installation to a value of over £10, a licence will be needed except where the work is authorized by an annual maintenance licence.

Forthcoming Events

Monday, October 7th.—LONDON.—At Institution of Electrical Engineers, Savoy Place, 5 p.m. Institution of Post Office Electrical Engineers. "Piezo-Electric Quartz and its Use in Telecommunications," by C. F. Booth and J. L. Creighton.

BRISTOL.—University, Physics Laboratory, 5 p.m. I.E.E. Western Centre. Chairman's address by R. W. Biles.

Tuesday, October 8th.—LEEDS.—Electricity Department, Whitehall Road, 6 p.m. I.E.E. North Midland Centre. Chairman's address by A. G. Connell.

Wednesday, October 9th.—LONDON.—I.E.E. London Students' Section, 2.30 p.m. Visit to the Electrical Research Association, Perivale.

LONDON.—Royal Society of Arts, 6, John Street, Adelphi, 7 p.m. The Engineers' Guild. Discussion, "The Registration of Professional Engineers," to be opened by C. L. Champion

BIRMINGHAM.—James Watt Institute, Great Charles Street, 6.45 p.m. I.E.E. South Midland Students' Section. "The Stability of D.C. Machines," by H. R. Ogle.

Thursday, October 10th.—RUGBY.—Electricity Showrooms, 6.45 p.m. I.E.E. Rugby Sub-Centre. "Frequency Modulation," by Dr. K. R. Sturley.

MANCHESTER.—Engineers' Club, Albert Square, 6 p.m. I.E.E. North Western Centre (Radio Group). Lecture summarizing papers and lectures given at the Radiolocation Convention, by Dr. R. A. Smith.

Friday, October 11th.—LONDON.—St. Stephen's Tavern, Bridge Street, S.W.1, 6.30 p.m. Electrical Power Engineers' Association (Meter Engineers' Group). "Low Load Accuracy," by S. H. Richards.

BIRMINGHAM.—Imperial Hotel, Temple Street, 6 p.m. Illuminating Engineering Society (Birmingham Centre). Chairman's address by R. Mackenzie.

Monday, October 14th.—ST. ALBANS.—Peahen Hotel, 3.30 p.m. Association of Supervising Electrical Engineers (St. Albans Branch). "Fractional H.P. Motors," by A. N. D. Kerr.

NEWCASTLE-ON-TYNE.—Neville Hall, Westgate Road, 6.15 p.m. I.E.E. North Eastern Centre. Chairman's address by T. M. Ayres.

Tuesday, October 15th.—LONDON.—L.C.C. South-East London Technical Institute, 8 p.m. Electrical Engineering Society. "Sir Ambrose Fleming, His Life, and Professional Work," by Prof. MacGregor Morris.

MANCHESTER.—Engineers' Club, Albert Square, 6 p.m. I.E.E. North Western Centre. "The Control of Electrical Installation," by W. R. Watson.

Design in Industry

Study of Export Markets' Needs

ONE of the speakers in last week's Conference of Industrial Design held under the chairmanship of Sir Thomas Barlow, G.B.E., was Mr. Leslie Gamage (G.E.C.), chairman of B.E.T.R.O. and president of the Institute of Export. His subject was "Design in Our Export Trade" and in the course of his address he said that having regard to the fact that a sellers' market existed at present we should not pride ourselves too highly because our export figures seemed to have surpassed all official estimates. They were, however, an indication of the virility of our manufacturers who were restricted by shortage of labour and certain materials.

A great proportion of our increasing export trade was in capital goods. When the immediate arrears were overtaken the volume might not be maintained. In many cases, too, these goods demanded long credit which this country could not offer under present conditions. As regarded consumer goods, some of our greatest future competitors were at present meeting the hungry demands of their own home markets. It was possible that later there would be impenetrable tariff walls.

Preparing for Future Struggle

This was a grim picture but it was warranted by the facts. The British people, and British manufacturers were no exception, always rose to the challenge of a crisis when they knew the facts. But they were apt to be slow in action and it was essential to lay plans now for the tough battle of to-morrow.

In this struggle we should take the initiative and choose the ground most favourable to us; this in our case meant quality—of materials, workmanship and design. We had two great assets—our long experience and exceptional standard of human talent and capacity. With these we must endeavour to adapt ourselves to our customers' requirements. Differences in taste were probably greatest in the field of pattern and decorated design. In such industries as his own there was not so much scope for individual designs, which were costly to produce, but the engineering and metal-working industries could exploit all their qualities of elasticity and adaptability. Mr. Gamage claimed that these industries proved in wartime their ability to adapt themselves quickly to ever-changing circumstances and this adaptability should be retained in their design and production policies. They must not, however, go too far in pursuit of variety of design or their costs would become uncompetitive.

The speaker thought that an intelligent examination of the needs of our most highly developed markets would disclose frequently that we could capture custom for goods of a

type and design for which the great home market would show a ready appetite. There were other markets with more marked individual requirements; it was in this direction that the smaller specialist firms would find their opportunities.

His advice for a design policy for export was first to find the designer, train him, use him and pay him rightly. Then study markets at home and abroad and find the right balance between standardization and variety, being prepared to adopt special policies where necessary and employ the services of smaller specialist firms. It was important that this should be done immediately.

Speaking of the various factors which influenced machine tool design, Mr. T. P. N. Burness (Wm. Asquith, Ltd.) said that the increased range of speed meant more power and greater mechanical efficiency; a much greater range of feeds was required. Centralized control would increase production. All operating levers, handwheels and electric push-buttons should be within easy reach of the workman and should be capable of easy and safe operation. To facilitate maintenance all important parts should be readily accessible. General appearance was also of great importance.

The conference was organized jointly by the Council of Industrial Design and the Federation of British Industries.

Commonwealth Engineers

Conference in London

A CONFERENCE of Commonwealth engineering representatives, which has been held in London at the invitation of the Councils of the Institutions of Civil, Mechanical and Electrical Engineers, has just been concluded.

Invitations were sent to the major engineering institutions of Canada, Australia, New Zealand, South Africa and India to send two delegates from each of these countries to attend the Conference (from September 14th to 28th) at which mutual co-operation between the Institutions of this country and those in the Commonwealth was discussed and plans were laid for continuing co-operation in the future. The three principal objectives were co-ordination of standards of engineering education and training; an improvement in the interchanges of scientific information and papers, and the discussion and evolution of a policy of development in the services which the engineer renders to the community.

The discussions took place in rotation at the three institutions, and the delegates also visited major engineering projects in London and elsewhere and places of historic interest.

COMMERCE and INDUSTRY

Municipal Radio Set Sales. Bolton Salary Dispute.

AT last week's meeting of the Hammersmith Borough Council the Electricity Committee reported that a letter had been received from the borough electrical engineer of Fulham as secretary of the Joint Committee of Local Authorities on Radio and Television. The letter stated that the Joint Committee, comprising six Councils, had been formed to carry on the business of selling and servicing radio and television receivers from municipal electricity showrooms, and Hammersmith Council was invited to join. The Electricity Committee recommended that no action should be taken, but that the chief electrical engineer should submit a report at a later meeting with regard to the Electricity Department undertaking the sale of radio and television sets.

Stoke Newington Electricity Committee has had a report from its Charges Sub-Committee in connection with the scheme being inaugurated by the Fulham Council for the sale of radio sets by local authorities. Certain manufacturers have promised to co-operate, but it is not considered desirable at this stage to divulge their names. The intention is that as many local authority undertakings as possible, both inside London and outside, should participate. Specimen sets have been inspected by members of the sub-committee who report that they appear up to the standard of those now on the market. The scheme was approved by the Council at its meeting last week.

Recognition of Contractors

Since the St. Pancras Electricity Committee decided that tenders for electrical installation work should only be invited from contractors of the National Register of Electrical Installation Contractors, the Committee has had a request from the Electrical Contractors' Association, which has withdrawn its support from the Register, asking that that Association shall be given equal recognition with the National Register when tenders are invited. Having heard a deputation from the Association, the Committee has decided to defer a decision until it has received further information from the I.M.E.A. and at the same time has expressed the hope that in the meantime the I.M.E.A. will arrive at an agreement on the points at issue. The Committee is also of opinion that strong representations should be made to the Ministry of Fuel and Power urging the introduction of compulsory registration of all electrical installation contractors in order to protect the public against unsatisfactory workmanship.

Fulham Stator Arrives

The arrival of the stator of the final turbine at the Fulham power station on September 16th marks the completion on time of an unusual effort. In March the Metropolitan-Vickers Electrical Co., Ltd., informed Fulham Council that owing to acute labour difficulties the completion of the alternator would be behind schedule, the chief contributing factor being the winding of the stator. To overcome this

difficulty it was decided to call for volunteers from among women employees at Fulham who might be spared for an emergency period to go to Manchester for two months to do the winding. Sixteen women volunteered and went to Trafford Park on March 25th. These women were cleaners, Renovation Department workers and transport drivers. They were housed in a hostel outside Manchester where their comforts were attended to by the canteen supervisor from Fulham power station, who was one of the



Arrival of the stator for the final turbine at Fulham power station

party. The winding was completed in two months and the women returned on June 8th, and were given a week's extra holiday.

A small informal ceremony marked the arrival of the stator on the site. As many of the women as were available were at the power station gate and afterwards Mr. W. C. Parker, the borough electrical engineer, entertained them to light refreshments in the canteen. The stator, which weighs about 95 tons, was one week on the journey from Manchester. The installation of the fifth turbine is progressing to schedule and is due to take load at the end of November.

Tin Price Increase

The Ministry of Supply announces that as from September 26th, the basic price of tin metal sold by the Non-Ferrous Metals Directorate for delivery in the United Kingdom was increased from £300 to £380 10s. per ton. At the same time the basic price of tin metal sold f.o.b. U.K. port for export from the U.K. was

increased from £357 to £380 10s. The basic price is for metal of minimum 99 to 99.75 per cent tin content, and prices for all other grades will be varied correspondingly.

Holders of valid licences to purchase tin for delivery in the U.K. or for export from the U.K. granted on or before September 25th, may on application to the Directorate, 20, Albert Street, Rugby, cover themselves by purchases where they have not already done so against such licences up to and including October 9th, at the Directorate's selling price ruling on September 25th. The selling price of Straits tin for export has been raised as from September 26th, from £351 to £372 per ton ex works Penang/Singapore.

Cable Makers' Guaranteed Week

We reported in our issue of May 24th last that the Joint Industrial Council for the Electrical Cable Making Industry had reached an agreement for the institution of a guaranteed 34-hour week in the industry. The memorandum of agreement has now been printed and copies are obtainable from the J.I.C. at High Holborn House, 52-54, High Holborn, London, W.C.1.

"Queen Elizabeth" Overhaul

During the war years the Cunard liner *Queen Elizabeth* went through some very strenuous times as a troopship and before being restored to her normal service had to be subjected to a thorough overhaul. Among the equipment to



Inspection of the warping-winch motors on the "Queen Elizabeth"

which special attention was paid was the great amount of electrical plant described in the *Electrical Review* of November 16th, 1945. The accompanying illustration shows the final inspection of the motors on the warping winch, a part of the equipment provided by Laurence, Scott & Electromotors, Ltd. Very little was found to be needed beyond routine maintenance work and the replacement of wearing parts, such as brushes.

Refractor Patent Extension

On June 8th, 1946, Mr. Justice Vaisey sitting in the Chancery Division granted an application by Holophane, Ltd., for the extension of the life of two patents covering the design of dome refractors for street lighting purposes for a period of five years. The two patents (Nos. 337398 and 398419) were taken out in the names of Holophane, Ltd., and Dr. S. English and

referred to single-piece and two-piece dome refractors, respectively. Owing to delay in hearing the application the original patents had already expired and the order took the form of a grant of new letters patent valid for five years from the date of expiry of the original patents, July 29th, 1945.

Demonstrators' Salaries

In view of the fact that no definite information has yet been submitted from the body dealing with the scale of salaries of electrical demonstrators, the Establishment Committee of Hackney Borough Council has recommended the adoption of provisional scales. Applications are to be invited for a senior demonstrator at a salary in accordance with Grade I of the A.P.T. Division, and a demonstrator at a salary in accordance with the Clerical Division, commencing at £252 per annum in each case, plus London weighting allowance and current cost-of-living bonus.

Iron and Steel Sheets

The demand for steel sheets is much in excess of supply, and it has been found necessary to introduce a separate allocation for them. In future, "M" forms authorizing the acquisition of steel will only be available for sheets when specifically marked. In the past, "M" forms for steel have been generally available for purchase of sheets, and as a result there is an excessive volume of orders on makers' books, which is interfering with the smooth operation of the distribution scheme. To remedy this, it has been arranged, with the co-operation of the industry, that all existing orders which cannot be executed by October 31st will be scheduled for review by the authorizing Department, and deliveries after that date against such orders will only be made where they have been re-authorized. Consumers will be notified by their suppliers of any orders so scheduled for review. This does not apply to existing authorized orders for export or for replacement of merchants' stock under licence, for which different arrangements are in operation.

The Bolton Vacancy

The Bolton Electricity Committee is persisting in its refusal to offer a salary of more than £1,600 a year for the post of borough electrical engineer. The last day for receiving applications for the position was Monday last week, and on the following Wednesday the Committee met to consider them. There were five and it was decided "that no appointment be made from among such applicants."

Resolutions were passed by the Committee protesting to the Minister of Fuel and Power against the action of the Standing Joint Committee of the Associated Municipal Electrical Engineers and the Electrical Power Engineers' Association in publishing a notice requesting engineers not to apply for the post on the grounds that the position was not advertised at a salary in accordance with the agreement made by the National Joint Committee of Local Authorities and Chief Electrical Engineers (Electricity Supply Industry). The protest is made on the grounds that the Corporation is not a party to the agreement and has never been a constituent member of the District

Joint Committee of Local Authorities and Chief Electrical Engineers, to whose establishment it was opposed. The Committee contends that the basis prescribed in the agreement is unreasonable and unsound, and by virtue of the operations of the Central Electricity Board a salary may reach a scale which is out of proportion to the responsibility for the work. The Minister is requested to intervene with a view to the agreement being rescinded or considerably modified.

A copy of the resolution is to be forwarded to all municipal authorities in England and Wales controlling electricity undertakings, with a request for support, and to the Members of Parliament for Bolton. The decision of the Electricity Committee was to come before the meeting of the Town Council on Wednesday last.

This meeting of the Committee considered applicants for the post of deputy electrical engineer and appointed Mr. E. W. Hewlett, at a commencing basic salary of £818, rising to £867 a year.

Electrical Machinery Traders

It is announced by the Association of Electrical Machinery Traders that the chairman, vice-chairman and treasurer of the Association have visited the Prague Fair to inspect electrical machinery exhibited there. If they are satisfied as to the merits and availability of the equipment they will probably approach the Board of Trade with a view to securing importation of machinery necessary for the rehabilitation of the home trade.

Members of the Association have been asked to make it a general practice not to charge higher prices for second-hand plant than they would normally quote for equivalent new equipment. Where special circumstances justify higher prices an explanation should be given when quoting.

The Association's first annual dinner is to be held at Grosvenor House, Park Lane, London, W.1, on November 27th.

London Electricity Tariffs

The charges for electricity in the London and Home Counties area are so varied that a publication which shows the tariffs of all the electricity supply authorities in the area will prove of considerable value to electricity supply engineers. The London and Home Counties Joint Electricity Authority has now issued a Statement (No. 14) of published tariffs for the supply of electricity, hire of meters, etc., in force in the London and Home Counties Electricity District as at July 1st, 1946. This is divided into four sections, dealing respectively with tariffs of local authorities, tariffs of company authorized undertakers, tariffs of the J.E.A., and meter rentals and minimum charges of all the supply authorities. Copies can be obtained from the J.E.A. (Brettenham House, Lancaster Place, W.C.2) at 5s. each.

Withdrawal of Essential Work Orders

The Ministry of Labour and National Service has informed organizations representing employers and workers concerned that the ship-building and ship-repairing industry (including the barge building and barge repairing industry) will be withdrawn from the scope of the Essential

Work Orders by the end of this year. Notices will be issued to the individual undertakings which are to be de-scheduled, giving them at least a month's notice. Until individual de-scheduling takes effect the provisions of the Essential Work Orders remain in force for all employers and workers in scheduled undertakings.

Industrial Lighting Exhibition

A "Lighting in the Factory" exhibition commences in the Industrial Demonstration Room of the Manchester Corporation Electricity Department showrooms, Town Hall, Manchester, on October 7th and will continue until October 18th. In order to illustrate the value of good industrial lighting, as required by the Factory Lighting Regulations, 1941, exhibits of machines inadequately illuminated by the old-fashioned methods are contrasted with modern fluorescent and incandescent installations. Two talks have been arranged, one on factory lighting and its legal requirements, and the other on modern applications of fluorescent lighting in industry.

Electrical Training in the Navy

To train officers and ratings for the "L" or Electrical Branch, which was established as a separate specialist service last January, H.M.S. *Collingwood* at Fareham is being converted into a Naval Electrical School. Eventually all officers joining the branch will undergo six years' training, the first three of which will be spent at Cambridge University.

A.S.E.E. Visit

A demonstration has been arranged to-morrow afternoon (Saturday, October 5th) at the South London works of Londex, Ltd., for the benefit of visiting members of the Association of Super-vising Electrical Engineers. Among the equipment to be displayed will be electrically lighted off-shore buoys, various navigation lanterns for air and sea use, a system of electrical remote control of water level without pilot wires and general products of the firm.

Supply Industry Workers' Wages

The County of London group of electricity supply companies, numbering twenty-one, have agreed to recognize the Clerical and Administrative Workers' Union as one of the negotiating bodies for their employees. The union's claim for recognition had previously been refused by the companies and a strike was threatened.

The companies stated that they were prepared to meet representatives of the union on Thursday this week to discuss claims regarding salaries and conditions. The union seeks a basic salary scale, with grading of all staff above the minimum, the establishment of a 37½-hour week, payment of overtime rates, and certain concessions with regard to holidays and sickness.

Suggested minimum wage scales which will form the basis for discussion between the union and the companies are:—For those who carry out routine work to clearly defined instructions under supervision, £78 at the age of 16 years, rising by stages according to age to a minimum rate of £325 at the age of 30. These rates are

plus cost of living payments which at present are 23s. a week for adults and 11s. 6d. for juniors. Other proposals are that there should be two senior and four supervisory grades, with salaries rising to £600 a year; two miscellaneous grades for those whose work is not entirely clerical, with salaries ranging from £247 to £325; and a special grade for shorthand typists and similar workers rising in seven stages from £156 to £273.

Demonstrator Training at Gravesend

Mr. G. V. Harrap, general manager and engineer of the Gravesend Electricity Department, has decided to establish a training scheme for demonstrators. Girls entering at 16 years of age with their School Certificate, will have a general training in costs and accounts, correspondence and clerical duties, and will spend some considerable time in the showrooms dealing with consumers' complaints. They will, under the chief demonstrator, receive tuition in operating equipment and on demonstrations. They will have to go to evening classes to take the City and Guilds Certificate in cookery, laundry and housecraft, and will study for the E.A.W. Demonstrators' Certificate. All course fees will be paid by the Corporation and the girls will, after a probationary period be indentured just like boys training to be craftsmen or junior engineers. They will receive apprentices' rates of pay approved by the trade union.

Service Unit Prices

In the notes on the activities of E.D.A. in our September 13th issue we stated that the price of the House Service Unit was 69s. 4d. each for quantities of 2,000 and over. The figure should have been 69s. 6d.

Consulting Engineers

The Association of Consulting Engineers has issued a new list of members, corrected to May, 1946. This gives the Committee and officers for 1945-46, a list of engineering subjects in which its members specialize, a list of members and firms, non-practising members, and a geographical list.

Lighting in Mines

Mr. J. W. Mould, in his presidential address at the annual meeting of the North Staffordshire branch of the Association of Mining Electrical and Mechanical Engineers at Stoke-on-Trent, said that their industry did not lend itself to "music while you work" conditions. One improvement which he thought would tend to make conditions a little better, however, was a great extension of mains lighting underground. He believed it would help to increase the efficiency of the workers and reduce the number of accidents. Good and well lighted roads would certainly help to make conditions better and increase output with safety. Possibly, in the near future they would see mains lighting at the coal face.

Public Ownership

In the course of a conference held last week at Eastbourne by the Association of Municipal Corporations a paper was read by Councillor C. E. P. Stott (Manchester) on the position of

the gas industry in relation to local government. He said that at present two-thirds of the gas undertakings were owned by companies and the rest by local authorities. He considered that the company-owned undertakings should be taken over by local authorities or groups of local authorities. He favoured regional organization with overall national control. Too much centralization would result in a control insensitive to public requirements and "remote from healthy influence."

While Alderman Mathewson (Chester) advocated nationalization of gas and electricity so as to make them available to everybody, the Mayor of Clitheroe (Alderman J. Wilkinson) opposed nationalization. He said that his own Council supplied gas, electricity and water almost as cheaply as any authority in the country and yet made a profit.

Automobile Lamp Prices

Owing to very substantial increases in production costs, E.L.M.A. members have found it necessary to advance list prices of group II (automobile) lamps as from October 1st, 1946.

Advertisement Correction

Owing to a printer's error in the advertisement pages of our issue of September 13th and 20th under "For Sale," it was stated that James McKenzie, Ltd., had headlamps for sale. This should have read *handlamps*.

Trade Publications

Evershed & Vignoles, Ltd., Acton Lane, Chiswick, London, W.4.—Technical brochure (No. 212a) combining full details of the "Bridge-Meg" as well as the "Bridge-Megger" testing sets for convenient comparison of their respective ranges, including circuit diagrams for their use for insulation testing, the measurement of conductor resistance and cable fault location by the Varley loop method.

General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.—A leaflet describing safety-type electrode holders for a.c. arc welding.

Trade Announcements

The Cardiff branch of James Howden & Co., Ltd., engineers, of Glasgow, will re-open on October 6th, at 91/93, St. Mary Street, Cardiff. This branch will be in charge of Mr. W. Mac-Owan, who will be responsible for the South Wales and South West England area.

Mr. G. F. Bolton and Mr. C. A. F. Shapcott have formed B. and S. Supplies, Ltd., electrical factors and distributors, with offices at 42-43, Manchester Road, Swindon. Both were at one time commercial apprentices with the G.E.C. Later Mr. Bolton was with Reyrolle's, and Mr. Shapcott, after military service, with Morphy Richards, Ltd.

B. Finch & Co., Ltd., announce that their Electrical Department is now at 238, Waterloo Road, London, S.E.1 (telephone: Waterloo 4117).

Frank Westerman (Wholesale), Ltd., 94, Dale End, Birmingham, 4 (telephone: Colmore 4252/3) have been appointed sole main distributors for Birmingham and district by Monmore Conduits, Ltd.

Farm Supplies

Five-Year Plan Costing £72,000,000

THE Liaison Committee of the National Farmers' Unions and the Electricity Supply Industry, at a meeting held in London last Friday, adopted proposals for providing supplies of electricity to all farms (including farmhouses, farm buildings and adjacent cottages) as a matter of national importance.

The Committee, comprising representatives of the National Farmers' Unions of England, Scotland and Wales, the Incorporated Municipal Electrical Association, Incorporated Association of Electric Power Companies, Provincial Electric Supply Association and the Conference of Joint Electricity Authorities and Joint Boards, has produced a five-year plan. The number of farms still without a supply is taken as 150,000 and the estimated cost of the scheme is put at £72,000,000.

Priority for Equipment

It is proposed that concerted effort shall be made immediately to obtain awards of priorities by the appropriate Government Departments for the materials required. It is felt that priority should be given to farmers for the necessary wiring, motors and apparatus equal to that for new housing schemes. Where practicable supply authorities should take full advantage of the relaxation of the Overhead Lines Regulations and as far as possible terms for a supply should cover the costs in some more suitable manner than the requirement of heavy capital contributions or guarantees. The adoption of a separate farming tariff is suggested, preferably of the two-part type, with a "unit" charge if possible of not more than 1d. for all purposes. There should be as few restrictions as possible on the size of motors and other apparatus.

The N.F.U. will use every endeavour to get all farmers to co-operate by facilitating the granting of wayleaves and by making full use of the services provided. It is proposed to embark upon a publicity campaign to show the advantages of electricity on the farm.

On the assumption that the average farm requires a single-phase service line of say 600 yards, 900,000 poles and 100,000 miles of copper conductor will be required. At an average of £300 per farm, the total capital expenditure incurred by supply authorities in providing the service would be £45,000,000. State financial aid will not be sought. The average cost of wiring the farmhouse, farm buildings and cottages is taken as £80, and the cost of motors and other apparatus as £100, giving a total of £27,000,000, which would include 750,000 H.P. of motors.

Representatives of the electricity supply companies have given their approval to the scheme but two constituent members of the Liaison Committee—the I.M.E.A. and the Conference of Joint Electricity Authorities—have not yet had full opportunity to consider it.

Amenity Preservation

Report of the C.P.R.E.

ONE point in a statement of policy appearing in the annual report for 1946 of the Council for the Preservation of Rural England is that low-voltage electricity transmission should be underground wherever possible and practicable. Expanding on this theme in another part of the report, the Council says that it has always been the policy of the C.P.R.E. to encourage the use of electricity in rural areas. Given the choice of a supply of electricity by overhead distribution or no supply at all, it is unreasonable to expect people not to demand a supply even at some cost to amenity. For that reason the C.P.R.E. and its branches have a working arrangement with the electricity undertakers in most areas to try to ensure that distribution takes place with the least possible harm to the landscape.

The Council cannot, however, fully accept the argument that overhead distribution is inevitable in all cases, or that it is necessarily the most economical in the long run. Even if it can be proved to be cheaper in specific cases, this should not be the sole criterion. "It is rare to find any disfiguring overhead distribution in urban areas, where the return on the supply for industrial and domestic use justifies the provision throughout of underground distribution, while still producing a handsome profit."

The same stage of co-operation has not been reached in respect of the siting of large generating stations and the Council has found it necessary to intervene and oppose the promoters on several important occasions. In this connection, reference is made to the Durham, Lincoln, Lea Valley, Llanover and Kingston stations. The Council says it "can see no valid reason why electricity supply should *ipso facto* take precedence over all other national interests. . . . They must be challenged in every case, where the circumstances warrant it, to prove a paramount need for their claim for precedence in a choice of site. Co-operation, on the other hand, should result in the avoidance of serious delays and interference with development."

Midland Electrical Engineers' Ball

THE annual ball of the Midland Electrical Engineers' Association will take place on November 22nd, in the Grosvenor Room of the Grand Hotel, Birmingham. As the usual mailing list of pre-war visitors is not available, it is hoped that this notice will serve in its stead. Mr. F. W. Lawton, city electrical engineer and manager, Birmingham, is the president, and Mr. F. W. Martin, the chairman. Applications for tickets should be sent to either of the above gentlemen, any member of the Committee, or the hon. secretaries, Mr. H. Hooper, Central Electricity Board, 53, Wake Green Road, Birmingham, 13, and Mr. W. J. Bird, General Electric Co., 125, Moor Street, Birmingham.

Telecommunication Practice

Impressions from a Visit to North America

REPRESENTATIVES of the Press met at the G.P.O. in London last week under the chairmanship of Sir Drummond Shields (Public Relations Department) with Mr. Townsend (head of the Telecommunications Section) in attendance to listen to Mr. W. A. Burke (assistant Postmaster-General) and Mr. A. J. Gill (deputy engineer-in-chief) outline the impressions they formed during a recent three weeks' visit to the United States and Canada.

The plant and operating methods of the Long Lines Department, the controlling centre of the U.S. trunk telephone system and overseas radio-telephone services were not appreciably different from those in this country, but there did not appear to be such difficulty in the recruitment of female operators as here, and the speed of service available on most trunk routes in the United States was in consequence greater.

In New York they saw demonstrations of the working of the new automatic telephone system using the "crossbar" switch now introduced in a large number of exchanges; also developments in dialling applicable to the "crossbar" system and a working demonstration of the automatic ticketing system. Other demonstrations included equipment designed for use on co-axial cables and a radio link transmission for television programmes using a frequency of 7,000 Mc/s. Four links of 21 miles and three intermediate amplifiers were used to transmit a test programme originating from the N.B.C.

In Washington, by courtesy of the Chesapeake and Potomac Telephone Co. and of the Federal Communications Commission, they were permitted to test before it had been licensed for public service the operation of a new mobile

telephone system for motor-cars. Calls made from a moving motor-car to the local telephone exchange at Washington were extended successfully by landline to New York and thence by the transatlantic radio telephone to Middleton, Lancashire, and to Twickenham, London. This service was to be made available in 47 cities, 4,500 sets to be installed in cars by 1947 and 19,000 promised.

So far as could be ascertained the number of intending telephone subscribers awaiting service in North America did not appear to be very different from that in the United Kingdom. In general it amounted to from 7 to 10 per cent of the number of telephones already connected; in the United Kingdom the proportion was about 8 per cent, representing between 310,000 and 320,000 applicants compared with between 1.8 and 1.9 millions in the United States. During the last six months new telephone connections in the United Kingdom have averaged 70,000 monthly.

A method of meeting the demands for trunk circuits by splitting existing circuits temporarily into two, each of admittedly inferior quality, seemed worth examining but the position here might not necessitate this expedient; in America the lines were longer and new circuits were very difficult to provide.

In general the visit indicated that no major development had taken place in North America in the last ten years which put the United Kingdom in a backward position. On the other hand, there were a number of developments undergoing trials which might prove to be of importance and which should be watched closely.

Swedish Electrical Progress

AT the opening meeting on September 25th of the twenty-eighth session of the Edinburgh Electrical Society, the president, Mr. E. Openshaw Taylor, delivered his address on "Some Electrical Developments in Sweden." After mentioning the electrified railways, which now carry about 80 per cent of the total traffic, and visits to the ASEA works at Vasteras and Ludvika, Mr. Taylor spoke of power generation and transmission developments. Nearly all the water power, which is almost the sole source of energy, is in the north whereas the load centres are chiefly in the south, necessitating power transmission over distances of several hundred miles. A 220-kV network comprising 1,440 miles of line is at present in being and consists chiefly of four trunk lines from north to south, about 300 miles long. That network differs from the British grid system in that it operates with an isolated

neutral point, involving the use of arc-suppression coils, as it is working very near the stability limit, so that the use of reactance to limit short-circuit currents is not possible. Values of short-circuit MVA of 3,000 or more are common so that the tank type of oil circuit breaker is regarded as obsolete and has been replaced by low-oil-content or air-blast breakers. The rate of load growth will necessitate the addition of about one trunk line per year to the above network and some will be considerably longer than 300 miles. Such a multiplicity of lines would soon prove unmanageable and it is therefore an urgent necessity for Swedish engineers to develop, within the next few years, transmission schemes operating at 400 or 500 kV, either 3-phase a.c. or by d.c. Both proposals are being examined and the latter has already gone so far as the setting up of an experimental 90-kV, 30-mile line to transmit 6,000 kW.

ELECTRICITY SUPPLY

Croydon Tariff Revision. Trolley-buses and Load Shedding.

Barmouth.—PROPOSED SUBMARINE CABLE.—

As part of its scheme for the electrification of South Merionethshire the North Wales Power Co. proposes to lay a submarine cable across Mawddach Estuary at Barmouth. At a meeting of the Urban District Council a petition was submitted from fishermen and boatmen urging that an alternative route should be considered. A deputation contended that the cable would interfere with the only anchorage and moorings available for shipping. Councillor Morris G. Roberts, of the Merioneth Industries Committee, said that a survey was being made with a view to the reopening of some of the North Wales ports, and Barmouth was included. It was decided to ask representatives of the company to meet the Council, and to acquaint the Board of Trade with the objections of the fishermen.

Birmingham.—REDUCED COAL STOCKS.—In an appeal to consumers to exercise the strictest economy, the Birmingham Gas and Electric Supply Departments state that during the past year the consumption of gas has risen by 10 per cent and that of electricity by 15 per cent. Owing to the greatly reduced coal stocks there is a grave danger that supplies will have to be restricted unless the co-operation of consumers is secured. Last winter the gas and electricity undertakings had reserves sufficient for four and seven weeks respectively. Heavy demands in the spring reduced these stocks to about one week's supply.

Blackpool.—TRANSMISSION IMPROVEMENTS.—To improve the transmission system the Electricity Committee has approved a scheme costing £270,000, to be completed over an eight-year period. It will entail laying larger cables from Peel Corner to the Blackpool works, and installing modern transformers.

Brighton.—ESTATE SCHEME.—The Electricity Committee is to provide a supply at a cost of £38,330 to the Hollingbury estate, where 1,000 dwellings and twelve factories are to be erected.

Chester.—INCREASED CHARGES.—The City Council is to revise electricity tariffs to bring in £28,000 to meet an estimated deficit of £20,000. The decision does not necessarily mean that all tariffs will go up by 10 per cent but that charges will be more equitable.

Cleethorpes.—CHEAPER ELECTRICITY.—As from October 1st, the Scale A flat rate lighting charge in Cleethorpes is being reduced from 5d. to 4½d. per kWh, and the fixed charge by 15 per cent.

Colwyn Bay.—DEVELOPMENT SCHEMES.—Having considered a report on rural development and extensions submitted by the borough electrical engineer and manager (Mr. J. V. Chaplin) the Electricity Committee has approved capital expenditure amounting to £72,105, for which loan sanction is being sought. The sum includes £25,252 for extending the supply to the rural area outside the borough boundary, terminating in the Fforddlas and Craig village, and £20,861 for replacement of the d.c. cable

system by 4-core cable. Other requirements are £5,162 for a supply extension to the village of Pydew in the Llandudno urban district; £6,164 for substations and switchgear at Rhos-on-Sea, Old Colwyn and Penmaenhead; £6,657 for substation and mains, Mochdre housing estate; £4,243 for h.v. cable extension and new substation, Llysfaen; £1,825 for centralized control apparatus; and £1,941 for transformers.

Croydon.—UNECONOMIC CHARGES.—It is reported that the present two-part tariff running charge of 0.6d. per kWh is insufficient to cover the cost of production; to do this it should be increased to at least 0.7d., but even at this figure the selling price is so close to production cost that the discounts which have hitherto been allowed to the larger consumers will have to be discontinued. To satisfy the Electricity Commissioners these increases will have to be compensated for by reductions in other charges. The Committee therefore recommends the revision of charges which after the compensating reductions will yield a net increase of £1,854.

CONNECTION OF FIRES TO LIGHTING CIRCUITS.—As consumers have been purchasing 1-kW electric fires with the apparent intention of using them from lighting circuits, the Electricity Committee has decided to issue a general warning to the public regarding the danger which may arise from this practice.

AIRPORT'S INCREASED REQUIREMENTS.—The Electricity Committee is to provide an increased supply to the airport at a cost of £1,464, towards which the Air Ministry will contribute £1,000.

COOLING TOWER IMPROVEMENT.—A new irrigation system is to be installed in one of the cooling towers.

Exeter.—SUPPLY TO ESTATE.—At a meeting of the Electricity Committee the city electrical engineer reported that four of the tenants on the Highfield estate, Topsham, were not prepared to give the required guarantee of minimum payment, nor were the remaining residents willing to increase the amount of their own guarantees. The Electricity Commissioners were of opinion that a supply should nevertheless be made available to the estate, and the Committee agreed to this.

COOKERS IN COUNCIL HOUSES.—The Housing Committee has rescinded a decision to provide gas or electric cookers free of charge at the choice of tenants in the houses to be erected on the Wonford estate. Instead, points will be provided to enable the tenants to hire or purchase gas or electric cookers as they desire. Similar action will be taken in the case of the Pinhoe estate.

Fulham.—GAS-WASHING.—Experiments in connection with the gas washing at the power station were originally estimated to cost £25,000, but a firm estimate from Simon Carves, Ltd., indicates that the cost will be about £60,000.

Hackney.—IMMERSION HEATERS.—In the new scheme of apparatus hiring it is not intended to extend further the installation of immersion heaters. At the moment there are approximately

100 of these installed throughout the borough on the simple hire basis. The apparatus, which has been on circuit for periods up to ten years, is beginning to cause a great deal of trouble in maintenance, and the tanks in which the heaters are fixed have frequently to be replaced. The Committee is of opinion that the heaters should be offered to the consumers free of further cost in the same way as kettles, irons, etc.

Isle of Man.—**WATER-POWER SCHEME.**—A commission of experts appointed by the Lieutenant-Governor has visited the island to examine the technical details of a scheme for developing an electricity supply from water power.

Leicester.—**TARIFF INCREASES.**—The Electricity Committee's recommendation for an increase of 0.1d. per kWh on the domestic tariff and $\frac{1}{4}$ d. on industrial and other tariffs has been approved by the City Council. The increased tariffs will operate for the Christmas quarter.

Middlewich.—**LIGHTING SCHEME APPROVED.**—The U. D. C. has approved a scheme for improved lighting in Holmes Chapel Road, Brook's Lane, Canal Terrace and King Street, submitted by the Mid-Cheshire Electricity Supply Co.

Morecambe.—**INCREASED CHARGES.**—The Electricity Commissioners have intimated that they are now in favour of increasing the charges to the extent suggested by the Electricity Committee.

Musselburgh.—**ALL-ELECTRIC HOUSE CHARGES.**—The Musselburgh & District Electric Light & Traction Co. has informed Musselburgh Town Council that the average consumption at Council's all-electric houses per day was 6.2 kWh, at an average all-in price per kWh of 1.035d., or less than 6 $\frac{1}{2}$ d. per day.

Norwich.—**LOANS.**—The Electricity Committee is seeking sanction to borrow £30,000 for mains and services, and £15,000 for transformers and switchgear.

Paisley.—**IMMERSION HEATERS.**—The Town Council has adopted proposals by the electrical engineer and manager (Mr. Daniel Ross) for the installation of immersion heaters (circulator type) in all new Corporation houses. These circulators are to be controlled by a time delay switch instead of the usual thermostat. It is anticipated that approximately 1,000 permanent houses will be erected annually during the next ten years.

Poplar.—**LOSS ON YEAR'S WORKING.**—The Electricity Committee reports a net deficiency of £21,672 for the year. Various tariff increases are recommended.

LOANS.—Application is to be made for sanction to borrow £20,000 for mains and services, and £12,000 for wiring installations.

PURCHASE OF APPARATUS.—The Electricity Committee has approved estimates for the next twelve months of £5,000 for wash boilers, water heaters, kettles and fires, and £10,000 for cookers.

COUNCIL CHAMBER LIGHTING.—It is proposed to instal a fluorescent lighting system in the Council Chamber.

Portland.—**DIESEL PLANT.**—The water engineer recently reported to his committee that he had obtained prices for Diesel generating plant for the waterworks to compare generating

costs with the proposed new electricity tariff. He was awaiting information from the Petroleum Board as to the trend of oil prices.

COOKER HIRE QUERY.—The question whether it was permissible for Council house tenants to hire both gas and electric cookers was raised at a meeting of the Electricity Committee, and it was decided to consider the point when details of specific instances were obtained.

St. Pancras.—**VERTICAL MAINS.**—Having considered the provision of the necessary vertical mains, services, etc., in connection with the erection of blocks of flats, the Electricity Committee says that it is very desirable that the Council should adopt a standard policy and it recommends that such mains should be provided free of charge.

SUPPLY EXTENSION.—The Electricity Committee is to provide a supply to London House, Guildford Street, at a cost of £42,292, subject to the Dominion Students' Hall Trust contributing £15,000.

Stafford.—**HIRE-PURCHASE SCHEME.**—The Corporation is to resume hire-purchase of electrical appliances and extend from three to five years hire-purchase repayments in respect of cookers and washing machines.

Stoke Newington.—**APPARATUS REPAIRS.**—The Electricity Committee has prepared a scheme for the establishment of a department to undertake repairs to consumers' apparatus.

IMPROVED STREET LIGHTING.—The Highways Committee is to proceed with another stage of the street lighting scheme at a cost of £6,000.

Tynemouth.—**ALTERATION OF METERS.**—The borough electrical engineer, reporting on the replacement of two-coil prepayment meters, stated that the alteration of such meters for use as quarterly meters would meet the requirements of the Act. The Electricity Commissioners had approved the proposed alterations and orders had been placed for material for converting 700 meters at an average cost of 3s. each. Consumers would have the choice of being assessed on the flat rate or on the residential tariff and would be charged on a quarterly basis. The cost of the replacement of two-coil meters by prepayment meters would be £54,000, while the cost of altering the meters would not exceed £3,000. The Electricity Committee approved the proposal.

TRANSPORT

Glasgow.—**RAILWAY ELECTRIFICATION.**—The Corporation Planning Committee is to open discussions with the railway companies and the Ministry of Transport with regard to the possibility of electrifying the local Glasgow services and the railway lines to the coast.

Newcastle-on-Tyne.—**TROLLEY-BUSES.**—The City Council is being recommended to purchase fifty trolley-buses.

South Shields.—**EFFECT OF LOAD SHEDDING.**—The Transport Committee, in conjunction with the Electricity Committee, is working out a plan to ensure that the town's trolley-bus service is maintained during periods when electricity supplies are cut by order of the Central Electricity Board. The Committees' action was taken following a recent incident when trolley-buses were held up during a busy period when electricity supplies were cut off.

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Electrode Holder

THE GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, is now manufacturing a safety-type electrode holder which is simple, robust and inexpensive, besides complying fully with the recommendations of the



Safety type electrode holder for a.c. arc welding

Factory Department. Capable of continuous welding duty at currents up to 300 A, the holder is designed to operate with electrodes up to 4 s.w.g. It consists of a body of tough moulded insulation, terminating in a head of anodized aluminium alloy provided with cooling fins. The electrode is inserted in a nozzle at the extremity and is firmly gripped by a spring-loaded copper plunger, which also conducts the current to it. The welding cable socket is screwed (and locked by means of a grub screw) into a terminal block. The inner ends of both the electrode-gripping plunger and the cable terminal block terminate in silver-faced contacts, which are efficiently insulated from each other and are separated by a space of $\frac{1}{8}$ in.

The supply is connected to the electrode by depressing a lightly loaded spring lever. This operates a self-aligning silver-faced bridge piece, which makes contact with the incoming terminal block at one end and the copper plunger at the other. On releasing the lever a spring causes the bridge to break contact, making the holder "dead." Electrodes can be inserted and withdrawn only when the switch is in the safety position.

Multi-tool Repetition Lathe

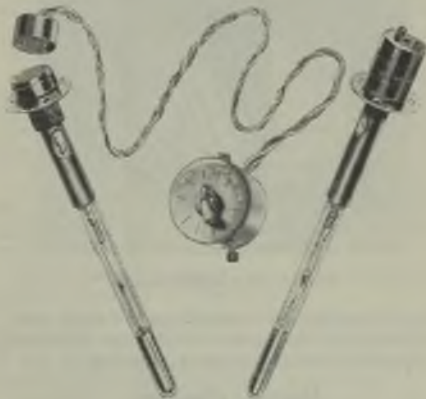
A multi-tool lathe, marketed by KERRY'S (GREAT BRITAIN), LTD., Warton Road, Stratford, London, E.15, has a special appeal to manufacturers who cannot justify the use and cost of a fully automatic machine, but at the same time want something much more adaptable than a normal capstan lathe.

The cast bedplate is accurately machined with all locations for the headstock, capstan head, tailstock unit, etc., jugged for interchangeability. The spindle is balanced and will run continuously at 6,000 r.p.m. without vibration, being fully capable of absorbing the violent torque reactions resulting from high speeds and rapid reversal. The rotation of the turret is automatic, foolproof and positive and an anti-spin device prevents over-indexing. The cutting tools are mounted in reversible adjustable tool holders and tool height is regulated by a special device.

Length and diameter control stops are incorporated in the turret, as well as multiple back stops. The tailstock body swings from front to back and in addition to the standard tools, will carry an auxiliary turret fitted to the standard tailstock shaft and having eight tools. The machine is driven by a special Higgs motor of a 4 to 1 ratio, 2-speed reversing type.

Electrical Thermometers

The range of temperature controllers, contact-making thermometers and mercury switch relays catalogued by ENGEL & GIBBS, LTD., 983, Finchley Road, Golders Green, London, N.W.11, include combinations which, it is claimed, have not hitherto been manufactured in this country. The thermometer "bullets" are of two kinds; the preset type, which cannot



Incubator thermometers, showing plug-in head (left) with regulator, and rotating head adjustment (right)

be adjusted or interfered with after delivery, can be guaranteed to within one-twelfth of one degree of a specified limit with a make and break (differential) of one-fifth of one degree. The other type can be recalibrated with the aid of a small mercury chamber which is sealed

on to the top end of the capillary tube. The latter is inside a protective outer glass case, while the contacts are made of platinum to carry safely non-inductive loads up to 35 mA a.c. or 25 mA d.c. at 230 V without relays.

The length of immersion can be specified by the user and interchangeable "bullets" are available for operation within different ranges up to 600 deg F. Various kinds of fixing head and protective stems are available. Model "STA" is designed for tropical conditions, sealed into a moulded bakelite head case and stem sheath with a rubber sac enclosing the mercury "bullet." Model "STE (A)" has six prefixed settings, adjustable by simply rotating the top of the head; and model "STE (M)" is a ten-way type with a plug-in head for remote control of the settings.

Model "STD" is a neatly contrived torch-like form with a moulded cylindrical casing containing an ordinary dry cell battery, which causes a miniature lamp bulb in the head to glow when contact is made by the thermometer; the sensitivity can be within one-twelfth of 1 deg F.

All-steel Toaster

A household bread toaster weighing 3.5 lb when packed is announced by G. T. WESTON, LTD., 130, Vaughan Road, Harrow, Middlesex. Its size is 6.5 in. by 6.25 in. by 3.5 in. with



Plated sheet metal toaster

450-W loading. It is constructed of sheet steel; the body is nickel plated and the base coloured, a three-core connector being provided.

Battery Chargers

PHILIPS LAMPS, LTD., Century House, Shaftesbury Avenue, London, W.C.2, announces a range of battery chargers catering for almost all needs. Type E 1378, for use by the private car owner, is suitable for mounting on a garage wall. It has a loading of 40 W, the charging rate being approximately 1.3 A. For over-night charging type E 162 has charging

rates of 6 A for 6-V batteries, and $4\frac{1}{2}$ A for 12-V batteries. The unit can be supplied without extra charge for use on 100/120-V 40/60-cycle supply. A charging indicator is incorporated



Philips heavy-duty battery charger, type E 1373

and operation is foolproof. A recessed lifting handle facilitates carrying.

The heavy-duty type E 1373 charger for garages and large charging stations is very simple to control and all operating instructions appear on the engraved panel on the front of the instrument. The equipment has been designed without variable resistances to ensure high efficiency under all load conditions. It is suitable for charging batteries of 6 to 72 V at from 6 to 15 A. A full-wave mercury vapour rectifying valve is incorporated and a 4-position tapping switch effects voltage adjustment to suit batteries to be charged. Final charging rate is adjusted by means of an 8-position tapping switch. In another heavy-duty unit (E 1377), for charging 6, 12 or 24-V batteries at 6 or 12 A, a six-position voltage tapping switch provides the only adjustment required. This charger is suitable for supply at 100/250 V 40/60 cycles.

New Television Console

E. K. COLE, LTD., Southend-on-Sea, is now marketing a new floor standing console receiver Model TSC 30 designed for "quality" sound reproduction, combined with a picture of high definition and good contrast. It incorporates eighteen valves and a 9-in. cathode ray tube. The attractive cabinet is of walnut veneer.

Miniature Toggle Switch

One of the latest products of ARCOLECTRIC (TWICKENHAM), LTD., Edwin Road, Twickenham, Middlesex, is a miniature toggle switch of the flat moulded pattern for flush inset mounting. It is suitable for controlling small a.c. appliances rated at not more than 4 A at 250 V.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

The English Electric Co., Ltd., which recently purchased 98½ per cent of the issued share capital of Marconi's Wireless Telegraph Co., Ltd., held by Cable & Wireless (Holding), Ltd., is now offering to purchase the remaining shares on the basis of 17s. 6d. for each 10s. share and 35s. for each £1 share. The offer remains open until December 31st, 1946.

Electrical Components, Ltd., has acquired the whole of the issued share capital of F. D. Newcombe & Co., electrical and radio distributors. The purchase involves the issue to the shareholders of F. D. Newcombe of the remaining 120,000 unissued 5s. shares at a premium of 5s. 6d. per share. Mr. F. D. Newcombe has joined the board of Electrical Components and the two companies will continue to carry on business independently.

Telephone Rentals, Ltd., reports a net profit for the year ended May 31st of £136,728, as compared with £139,794 for the previous year. Tax absorbs £65,432, general reserve receives £5,000, and employees' participation £17,824. As already announced, the final ordinary dividend is 6 per cent, maintaining the distribution for the year at 10 per cent. The balance carried forward is £38,996 (against £32,924 brought in).

Dubilier Condenser Co. (1925), Ltd.—The accounts for the year ended March 31st show a profit of £63,077 (against £47,068 for 1944-45). After deducting directors' fees and further remuneration £2,343 (£1,664), depreciation and obsolescence £8,958 (£6,779) and income tax £21,000 (£18,000) the net profit, already reported, is £29,822 (£19,917). A sum of £14,675 (£10,000) is allocated to reserve. The ordinary dividend for the year is unchanged at 20 per cent and £24,076 (£22,895) is carried forward.

The Renold and Coventry Chain Co., Ltd., reports a net profit for the past year of £174,356, as compared with £116,330. It is pointed out, however, that the accounts include £65,000 recoverable E.P.T., and also £85,000 for E.P.T. recoverable in respect of deficiencies of subsidiaries in previous years, after deducting income tax. The final ordinary dividend is 9½ per cent, plus a bonus of 2½ per cent, making a total distribution for the year of 15 per cent (against 12½ per cent). The balance carried forward is £30,920 (against £23,675 brought in).

Greenwood & Batley, Ltd., have given notice of their intention to redeem on April 1st next the whole of the debentures issued numbered 1 to 1,000, repayable at the price of £110 for each debenture.

Murex, Ltd., reports a considerable drop in profits for the year ended June 30th last, but this has been largely offset by a refund of taxation. This refund amounts to £125,000 and, with arrears of interest and dividends totalling £11,726, the profit for the year is £201,489, as compared with £213,032 for the preceding year, which also included a tax refund

of £55,000. In addition to the above profit a surplus of £70,000 has been brought into the accounts on the realization of investments in associated companies. The final dividend is 10 per cent and a cash bonus of 2½ per cent, less tax, makes a total for the year of 20 per cent, the same as for the previous year.

Morgan Crucible Co., Ltd.—The subscription list was to open and close on Wednesday in connection with the offer of 301,960 "A" ordinary shares of £1 at 51s. These shares will be converted into stock and with £400,000 issued "A" ordinary stock will be the subject of application for permission to deal. The new money is required for expansion, intensified research, and repayment of a bank loan.

The London Electrical and General Trust, Ltd., reports a net balance for the year ended June 30th of £37,886, as compared with £32,603 for the preceding year. General reserve receives £4,541, and the final ordinary dividend is 4 per cent (against 3 per cent), making 6 per cent for the year (5 per cent). The balance carried forward is £16,401 (against £16,355 brought in).

Solus Teoranta (electric lamp manufacturers, Eire).—From the profit of £13,729 for the year ended June 30th last (against £13,559 for the previous year) £6,144 (£6,160) is provided for depreciation and £4,400 (£3,900) for taxation. A final dividend of 2½ per cent is recommended, making the total for the year again 7½ per cent, and £1,431 (£2,231) is carried forward.

Madras Electric Tramways (1904), Ltd., reports a net profit for the year ended December 31st last of £26,612, as compared with £25,192 for the previous year, to which is added £21,640 brought in, making £48,252 available. The ordinary dividend for the year is maintained at 10 per cent and £33,564 is carried forward.

The Madras Electric Supply Corporation, Ltd., reports a net profit for 1945 of £74,799, as compared with £55,919 for 1944. The ordinary dividend for the year is 8 per cent (against 6 per cent), and the balance carried forward is £57,715 (against £36,478 brought in).

The Shropshire, Worcestershire & Staffordshire Electric Power Co. is maintaining its interim dividends on the "A" ordinary at 4 per cent and on the "B" ordinary at 2½ per cent.

The Wessex Electricity Co. is again paying an interim dividend of 2 per cent.

The South Wales Electric Power Co. is paying an interim dividend of 2 per cent (unchanged).

The Urban Electric Supply Co., Ltd., is maintaining its interim dividend at 4 per cent.

The Salisbury Electric Light & Supply Co., Ltd., has declared an interim dividend of 4 per cent, the same as last year.

The Llanelly & District Electric Supply Co., Ltd., is paying an interim dividend of 2 per cent. No interim was paid a year ago, but the final dividend was 6 per cent.

Newman Industries, Ltd., has announced an interim dividend of 7½ per cent. (unchanged).

W. T. Henley's Telegraph Works Co., Ltd., is again paying an interim dividend of 5 per cent.

The British Thermostat Co., Ltd., has announced an unchanged interim dividend of 7½ per cent.

The Globe Telegraph & Trust Co., Ltd., has declared an interim dividend of 1 per cent (same).

New Companies

British Communications Corporation, Ltd.—Registered September 20th. Capital, £10,000. Manufacturers and designers of and dealers, wholesale and retail, in radio and television transmitting and receiving sets and equipment, telephone, telecommunication and signalling equipment, etc. Subscribers: W. H. Boswell, and H. B. Smith. Solicitors: Titmuss, Sainer & Webb, 61, Carey Street, W.C.2.

Honor Bros., Ltd.—Registered September 20th. Capital, £10,000. To acquire the business of electrical and radio dealers, engineers and contractors carried on by J. E. S. E. Honor and C. W. H. Honor at 71, The Grove, Ealing, W. Directors: J. E. S. E. Honor and C. W. H. Honor. Regd. office: 71, The Grove, Ealing, W.

Frank H. Kenney, Ltd.—Registered September 20th. Capital, £1,000. To acquire the business carried on by F. H. Kenney at 111, Lancing Road, Sheffield, and to carry on the business of dealers in motor and electrical accessories and supplies, etc. Directors: F. H. Kenney and G. E. Blythe. Secretary: H. A. Morley. Regd. office: 26, Paradise Square, Sheffield.

Brooks Electrics, Ltd.—Registered September 17th. Capital, £2,000. Manufacturers of, and dealers in, electrical equipment, electrical contractors, rubber dealers and rubber and plastic goods manufacturers, etc. Directors: S. Brooks, Mrs. Lilian Brooks and F. G. Norman. Regd. office: Barclays Bank Chambers, 353, Lord Street, Southport.

W. O. Prescott, Ltd.—Registered September 21st. Capital, £1,000. To acquire the business of a repairer and manufacturer of, and dealer in, electrical and scientific instruments carried on by W. O. Prescott at 29-31, Cowcross Street, E.C.1. Directors: W. O. Prescott and Mrs. Ines M. A. J. Prescott. Secretary: R. H. Dutchman. Regd. office: 29-31, Cowcross Street, E.C.1.

A. W. Thompson (Electrical) Ltd.—Registered September 21st. Capital, £3,000. To acquire the business of a radio and electrical engineer carried on by Albert W. Thompson at 7, Church Street, Wath-upon-Deane, nr. Rotherham. Directors: A. W. Thompson and F. G. Callaghan. Regd. office: 7, Church Street, Wath-upon-Deane, nr. Rotherham.

Dawson & Gent, Ltd.—Registered September 5th. Capital, £1,500. Electrical engineers and contractors, ironmongers, mill furnishers, etc. Directors: A. Dawson and J. W. Gent. Regd. office: 86, Market Street, Farnworth, nr. Bolton.

Heat and Electrical Insulating Components, Ltd.—Registered September 3rd. Capital, £100. Machiners and manipulators of metals, bakelite and plastics, electrical, motor and general

engineers, etc. Subscribers: N. V. Morris and A. S. Husk. Regd. office: River Plate House, E.C.2.

F. A. P. Darke & Co., Ltd.—Registered September 3rd. Capital, £1,000. To acquire the business of an electrical engineer carried on by F. A. P. Darke at 1c, Chandos Road, and 119, Hampton Road, Redland, Bristol. Directors: F. A. P. Darke and H. T. Moody. Regd. office: 1c, Chandos Road, Redland, Bristol.

Firth Brothers (Morecambe), Ltd.—Registered September 5th. Capital, £1,000. Electrical engineers and general electrical installation contractors, etc. Permanent directors: J. H. Firth, R. H. Firth and W. Huntington. Regd. office: 74, Regent Street, Morecambe.

Darlington Armature Winding Co., Ltd.—Registered September 4th. Capital, £900. To acquire the business of an electrical engineer carried on by J. Rickaby at 9, Meadowfield Road, Darlington. Directors: J. Rickaby, G. H. Beesley and Freda M. Stabler. Regd. office: 9, Arden Street, Darlington.

Lauray Electrical Co., Ltd.—Registered September 17th. Capital, £500. To acquire a business carried on by N. Hart and A. F. H. Goss, at 57, Tait Street, E.1 and carry on business of electrical and radio engineers, etc. Directors: N. Hart and A. F. H. Goss. Solicitors: Daybell & Lynde, Stratford, E.

Liquidations

Paxford Electrical, Ltd.—Winding up voluntarily. Liquidator, Mr. A. L. Westbury, 14-18, High Holborn, London, W.C.1.

Aberdare Cables (Overseas), Ltd.—Meeting, November 15th, at 4b, Frederick's Place, Old Jewry, London, E.C.2, to receive an account of the winding-up by the liquidator, Mr. G. H. Carbutt.

Bankruptcies

A. B. Greenbaum, lately carrying on business under the style of Green's Electrical Supplies, at 110a, Highbury New Park, London, N.5, and at 2, Iliffe's Garages, 1, St. Patrick's Road, Coventry, and residing at 217, Leamington Road, Coventry.—Trustee, Mr. T. J. M. Macleod, 4, Bucklersbury, London, E.C.4. Released September 12th.

R. T. H. Brimfield, electrical contractor, lately of Wellington Cottage, Wellington Square, London, S.W.1, lately carrying on business as Richfield Electrical Components, at 73-78, High Holborn, London, W.C.1.—Last day for receiving proofs for dividend October 9th. Trustee, Mr. F. H. Langmaid, Bankruptcy Buildings, Carey Street, London, W.C.2, Official Receiver.

C. W. Sands, electrical and wireless contractor, High Street, King's Langley, Herts.—Application for discharge to be heard on October 22nd at the Court House, Town Hall, St. Albans.

A. Ambrose, electrical engineer, 137, Market Street, Chorley, Lancs.—Application for discharge to be heard on November 19th at the Sessions Hall, Lancaster Road, Preston. (Amended notice.)



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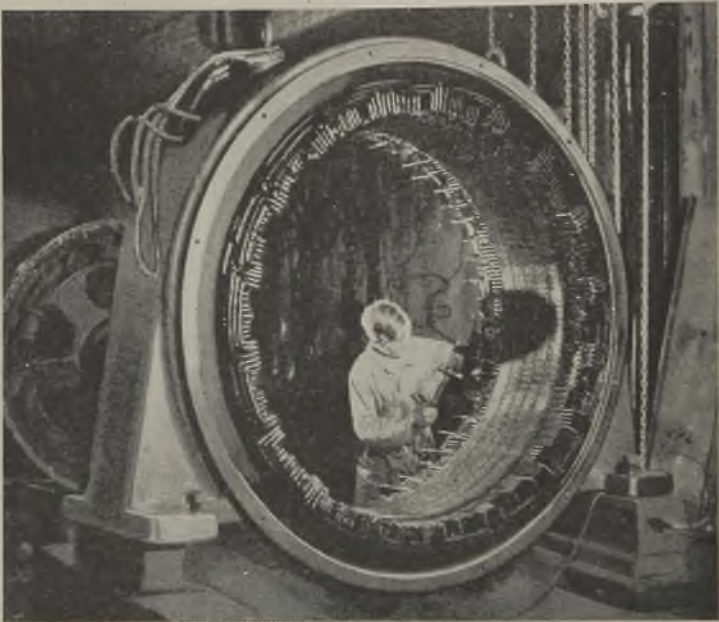
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STOCKS AND SHARES

STOCK Exchange markets have been upset and generally disturbed by further weakness in New York and by the aspect of politics abroad. These two factors, combined with others of minor consequence, conspired to put a check upon the buying movement that had been in progress for months past. The absence of support caused selling on the part of people who, seeing good profits on their previous purchases, decided to take what they could secure of these profits, rather than run the risk of seeing prices go down still further.

The speculative sections have been the most vulnerable, although few departments round the Stock Exchange escaped from the effect of the selling. Electrical equipment and manufacturing shares, radio issues, and industrial equities of all kinds have fallen fairly heavily. Stock Exchange opinion looks for a sharp recovery when the selling movement has ceased, but there is a sense of uneasiness that may take some time to eradicate. At the end of last week, a rallying disposition lifted prices above their previous lowest.

Repercussion from U.S.A.

That conditions of semi-panic in the Wall Street Stock Exchange should have any severe effect in the London markets, may appear illogical enough, although indirectly there is a modicum of reason at the back of it. The widespread strikes in America and the conditions of domestic nervousness engendered by politics—both in the United States and abroad—react upon many branches of trade that have a counterpart on this side. With industries so closely inter-related as they are at the present time, a succession of blows to confidence across the Atlantic might check the expansion of trade which had been expected.

Electricity Supply

With the nationalization factor already well discounted in the prices of electricity supply companies' shares, this market remained unmoved by Mr. Morrison's reiteration of the intention to socialize the industry during the lifetime of the present Government, or by Sir Robert Renwick's constructive reply. Surrounding market conditions had equally little influence on prices: indeed, the only changes of any consequence have been in the upward direction. Midland Electric Power, at 46s. are 2s. up and Southern Areas, at 22s. 3d., are a few pence better.

Company Results

The Engineering & Lighting Equipment Co. has been able to maintain the ordinary dividend at 8 per cent. The now familiar reconversion difficulties resulted in a reduction of the year's trading profit from £46,300 to £19,600. In part the fall is covered by an E.P.T. credit in place of a debit, and by the elimination of the

fixed annual contribution to the preference redemption fund. In terms of net profit, the decline is reduced to £8,000. At 3s. x.d. the 2s. shares give a return of £5 6s. 8d. per cent on the money. Radio Rentals are quoted at 34s. 6d. ex-rights to the new shares issued to shareholders at 30s. The latter are 3s. 3d. premium. They do not rank for the final dividend for the year ended last August. Interim dividends, unchanged from those of a year ago, left British Thermostat at 23s. 9d. and W. T. Henley's at 28s., while Newman Industries shaded off to 9s. Tube Investments are easier at 5 $\frac{1}{8}$.

Equipment and Manufacturing

Losses during the past week in the prices of electrical equipment shares have been general and of some substance. In the cable manufacturing group, Johnson & Phillips are down 2s. 6d., to £4, British Insulated Callender's 2s., to 45s., and Enfields 1s., to 57s. 6d. General Electrics at 96s. 3d., and Crompton Parkinsons at 30s. 6d., are both 2s. 6d. down. Aron Electrics at 54s. 6d., Associated Electricals at 66s. 6d., and Babcock & Wilcox at 60s. have shed 3s. each. Half-crown losses are shown by Chloride Electrical Storage at 96s. 3d., and by British Vacuum Cleaners at 26s. 3d. The radio group has been noticeably weak, with declines of 3s. 9d. in Decca at 53s. 9d., of 3s. in A. C. Cossor at 31s., a florin in E.M.I. at 29s. 9d. and 2s. 3d. in Pye deferred at 33s. 9d.

Miscellaneous Changes

De La Rue shares dipped to 12 $\frac{1}{2}$ before recovering to 12 $\frac{7}{8}$, which left them 5s. down on the week. Thus they have lost much of the advance which followed the proposal to split the shares into smaller units. Cable & Wireless stocks have sagged further, the ordinary to 107 $\frac{1}{2}$ and the preference to 115 $\frac{1}{2}$. Among traction stocks, Home Railway issues as a whole are firm, but B.E.T. deferred is a further 20 points lower at 1090. The preferred, on the contrary, is 5 points to the good at 183. Of the few issues to move against the week's general tendency, Victoria Falls at 5 $\frac{1}{2}$ have advanced half-a-crown, and Madras Electrics strengthened to 38s. 3d.

English Electric and Marconi's

Part of the object of English Electric's substantial increase of capital in July was to finance the acquisition of the Cable and Wireless Company's interest in Marconi's Wireless Telegraph. This interest covered all but 2 per cent of the latter company's issued capital. English Electric now offer to purchase the balance from shareholders at 17s. 6d. per 10s. share and 35s. per £1 share. Since the last official quotations were 12s. 6d. and 25s. respectively, shareholders are not likely to take long in making up their minds about acceptance of the offer. English Electric shares have sagged this week to 60s. 6d., at which the yield on the 10 per cent dividend is £3 5s. 8d. per cent.

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.

ALLMANNA Svenska Elektriska Aktiebolaget.—“Rapid reclosing compressed air-blast circuit breakers.” 12996/44. July 17th, 1943. (580609.)

Bendix Aviation Corporation.—“Electrical means for reproducing motion.” 154/44. July 11th, 1942. (580647.)

D. Blumlein (legal representative of A. D. Blumlein).—“Electrical circuit arrangements for effecting integration and applications thereof.” 7712. June 5th, 1942. (580527.)

British Mechanical Productions, Ltd., and F. C. Fuke.—“Connector pins for electrical plug and socket connections.” 20625/43. December 28th, 1944. (580492.)

British Thomson-Houston Co., Ltd.—“Windings for electrical apparatus and methods of making same.” 20499/44. October 23rd, 1943. (580675.)

British Thomson-Houston Co., Ltd. (General Electric Co.).—“Methods of consolidation of powdered metals.” 16909. October 14th, 1943. (580490.)

British Thomson-Houston Co., Ltd., and H. F. Jefferson.—“Control of electrically driven soot blowers.” 11887. June 22nd, 1944. (580605.)

British Thomson-Houston Co., Ltd., and T. H. Mackenzie.—“Direction finding systems utilizing electromagnetic waves.” 4508. April 3rd, 1942. (580482.)

British Thomson-Houston Co., Ltd., and D. J. Mynall.—“Electrical remote indicating systems.” 4510. April 3rd, 1942. (580483.)

British Thomson-Houston Co., Ltd., W. A. Bocoock and T. F. Robinson.—“Construction of high voltage transformer windings.” 19608. October 11th, 1944. (580673.)

British Thomson-Houston Co., Ltd., H. de B. Knight and D. F. Welch.—“Hermetically sealed spark gaps.” 10938. June 7th, 1944. (580655.)

Burndept, Ltd., and R. P. Richardson.—“Construction of inert electric batteries.” Cognate applications 25016/44 and 3827/45. December 13th, 1944. (580676.)

Cooke & Ferguson, Ltd., and R. N. Buttrey.—“Electric circuit breakers.” 13561. July 15th, 1944. (580634.)

Dubilier Condenser Co., (1925), Ltd., and A. T. Pitt.—“Protective waterproof coverings of electrical condensers and resistances and other objects of irregular prismatic shape.” 16802. October 13th, 1943. (580489.)

Ferranti, Ltd., and G. I. Thomas.—“Thermionic switching systems.” 12149. June 26th, 1944. (580575.)

E. Fries.—“Transformer with adjustable reactance for electric arc welding.” 13936. August 26th, 1943. (580600.)

M. E. Haine, J. M. Meek, J. D. Craggs and Metropolitan-Vickers Electrical Co., Ltd.—“Spark gap electrical apparatus.” 10010.

(Addition to 578510.) June 21st, 1943. (580533.) “Spark gap electrical apparatus.” 8624/45. (Divided out of 580533; addition to 578510.) June 20th, 1944. (580559.)

F. C. Heayberd, J. Krimholtz, and F. C. Heayberd & Co.—“Equipment for charging storage batteries.” 21577. December 24th, 1943. (580546.)

Igranic Electric Co., Ltd.—“Electric motor control systems.” 1345/44. January 23rd, 1943. (580548.)

Igranic Electric Co., Ltd., and S. R. Wright.—“Winding of lengths of material on ring-like articles.” 16618. August 31st, 1944. (580514.)

Landis & Gyr. Soc. Anon.—“Current transformer.” 13004/44. July 13th, 1943. (580610.)

T. M. Lewis, E. G. Rounce and A. E. Hills.—“Combined gear wheel pump and electric motor unit.” 13033. July 7th, 1944. (580614.)

Maschinenfabrik Oerlikon.—“Set screw for electrical connections.” 26118/44. December 18th, 1943. (580596.)

Philips Lamps, Ltd.—“Electrical measuring devices.” 13346/44. May 11th, 1943. (580626.)

A. Reyrolle & Co., Ltd., and D. F. Amer.—“A.c. electric circuit-breakers of the gas-blast type.” 19180. October 6th, 1944. (580672.)

Sangamo Weston, Ltd.—“Radio compasses.” 29096/39. August 11th, 1939. (580522.)

“Measurement of very small direct currents.” 11593/44. August 20th, 1943. (580656.)

Soc. des Aciers Fins de l'Est.—“Apparatus for butt-welding.” 7921/44. June 26th, 1939. (580523.)

Soc. Francaise Radio-Electrique.—“Systems for the transmission and reception of radio electric waves with great precision of standardization.” Cognate applications 12047/42 and 12048/42. January 26th, 1940. (580528.)

P. A. Sporing and Telegraph Condenser Co., Ltd.—“Method of and means for soldering.” 20707. October 25th, 1944. (580557.)

Standard Telephones & Cables, Ltd.—“Induction heating apparatus.” 4481/44. March 12th, 1943. (580495.) “Deposition of metallic selenium on a base element.” 1228/44. December 1st, 1942. (580648.)

Standard Telephones & Cables, Ltd., and H. P. Williams.—“Radio systems for guiding aircraft.” 9035. May 11th, 1944. (580502.)

Standard Telephones & Cables, Ltd., and E. O. Willoughby.—“Keying devices for high-frequency circuits.” 10183. August 11th, 1941. (580481.)

“Keying arrangements for radio frequencies.” 14724. (Addition to 580481.) October 20th, 1942. (580484.)

Standard Telephones & Cables, Ltd., and E. O. Willoughby.—“Radio navigational systems.” 6299. April 4th, 1944. (580567.)

“Aerial systems.” 7482. April 21st, 1944. (580569.) “Keying devices for high-frequency circuits.” 7628. (Addition to 580481.) April 24th, 1944. (580570.)

J. Starkiewicz, and C. S. Wright.—“Preparation of materials for the production of photo-conductive cells.” 3572. February 25th, 1944. (580551.)

J. Starkiewicz, R. L. Stow and C. S. Wright.—

"Production of thallium sulphide photo-conductive cells." 3571. February 25th, 1944. (580550.)

Switchgear & Cowans, Ltd., and A. Upton.—"Arc control devices for oil immersed electric circuit breakers." 18273. September 25th, 1944. (580670.)

Telephone Manufacturing Co., Ltd., and T. H. Whale.—"Electrical fused plug and socket connectors." 2968. February 17th, 1944. (580494.)

Westinghouse Electric International Co.—"Winding of electrical apparatus, for example, electric transformers." 19236/44. October 7th, 1943. (580585.)

Sir H. E. Yarrow.—"Steam temperature regulator for use in connection with water tube boilers." 12492. (Addition to 577297.) June 30th, 1944. (580657.)

Amended Specifications.

560564. Standard Telephones & Cables, Ltd.—"Means for forming deposited layers." 564980. Standard Telephones & Cables, Ltd.—"Rectification ratio in selenium elements."

566384. Dorman & Smith, Ltd., and another.—"Electrical connector plugs."

571304. M. Tama.—"Submerged resistor induction furnaces."

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.

Bolton.—October 7th. Town Council. Motor tower wagon. (September 27th.)

London.—Metropolitan Water Board. Diesel driven alternator plant. (See this issue.)

Manchester.—October 8th. Electricity Department. Substations and switchboards. (September 20th.)

Pudsey.—October 15th. Electricity Department. Paper-insulated cables. (September 27th.)

Southport.—October 14th. Electricity Department. Eighty cast iron short street lighting standards. (September 27th.)

October 26th. Corporation. Electric lighting installation, Floral Hall. (September 27th.)

Stalybridge.—October 14th. Town Council. Electric lighting equipment in Victoria Market Hall. Borough surveyor. Town Hall (deposit: 10s. 6d., returnable).

Orders Placed

Ashton-under-Lyne.—Electricity Committee. Accepted. E.h.v. 3-panel metalclad switchgear.—Ferguson, Pailin. One 750-kVA and one 500-kVA transformers.—Ferranti.

Brighton.—Electricity Committee. Accepted. Fire protection equipment, Withdean substation (£725).—Mather & Platt.

Lewisham.—General Purposes Committee. Recommended. Amplifying equipment at Town Hall (£219).—E.M.I. Service.

Manchester.—Electricity Committee. Accepted. Domestic appliance accessories.—Diamond "H" Switches; M.K. Electric; Simplex Electric.

Generation Sub-Committee. Accepted. Stuart Street power station: 420-V switchgear.—English Electric. 33-kV cables.—Standard Telephones; Johnson & Phillips.

Distribution Sub-Committee. Accepted. 36-H.P. motor and starter.—B.T.H. Co. 10,000-kVA transformers, Sale and Moss-side substations.—Ferranti.

Morecambe.—Electricity Committee. Accepted. Three transformers (£615 each).—Electrical Construction Co.

Northumberland.—Education Committee. Accepted. Electric lighting installations, Amble Council School (£144).—J. & E. Morton.

Norwich.—Works Committee. Accepted. Welding apparatus for Westwick depot (£104).—Murex Welding Processes.

Oldham.—Electricity Committee. Accepted. Transformers.—Ferranti. Switchgear.—Ferguson, Pailin. Cables, l.v. and h.v.—Lancashire Cables.

Poplar.—Contracts Committee. Accepted. Seven lifts at Abbott Road flats (£7,016).—Express Lift Co. Amended tender for 2,000 25-A meters (£13,550).—Metropolitan-Vickers Electrical Co. 100 concrete public lighting columns (£818).—Stanton Ironworks. 300 lanterns (£284).—G.E.C.

St. Pancras.—Contracts Committee. Accepted. 500 single-phase meters (£1,188).—Ferranti. 500 single-phase meters (£1,188) and 500 meter elements and components (£1,950).—Chamberlain & Hookham. Mercury switches (£225).—Mercury Switch Manufacturing Co. Wiring accessories (£572).—J. & N. Wade (London). 17,000 yards of v.i.r. cable (£763).—Enfield Cables.

Stoke Newington.—Highways Committee. Accepted. 230 lighting columns (£8 13s. 3d. each).—Concrete Utilities.

Tynemouth.—Housing Committee. Accepted. Wiring and fittings for Council houses: 36 houses at West Chirton (£985) and 30 in Lynn Road (£820).—Electrical Equipment, Ltd., North Shields. 16 houses in East End (£442).—George Swan, Ltd., North Shields.

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.

Abergele.—Houses (52), Rhuddlan Road (£59,000); Roger Hughes & Glyn Roberts, builders, Coast Road, Rhyl.

Barking.—Five blocks of flats, Mayesbrook Park estate; C. C. Shaw, borough architect, Town Hall.

Bexhill.—Fifty "Orlit" houses (£65,700); William Willett, Ltd.

Billericay.—Houses (16), Kennel Lane site; H. B. Mayhew, surveyor, Council Offices.

Bingley.—Houses (48), Gilstead estate (£50,901); F. W. Heaton (Builders), Ltd., Airedale Mount, Sandbeds.

Bishop Auckland.—Houses (274), St. Helen's estate; M. C. Robson, architect, Station Chambers.

Bloxwich.—Factory, Willenhall Lane; Bloxwich Domestic Boiler & Cylinder Co.

Bromsgrove.—Houses (100), Charford Road; J. Garrington, Ltd., Newton Works.

Caernarvon.—Houses (100), Maes Incla site; Williams & Williams, builders, Llys Meirion.

Chester.—Houses (148), Blacon estate; city engineer.

Chorleywood.—Houses (30), Capell Hamlet; A. W. Pryor, Ltd., builders, 30, High Street, Rickmansworth.

Cowes (I. o. W.).—Secondary school, Northwood Park (£49,340); Frank Batty & Smith, Ltd., Ryde.

Derwent.—Houses (32), Fulford (£41,817); Sorrell (York), Ltd., builders, Emerald Street, Groves, York.

Durham.—Dining halls, at a further 32 schools; county architect, 34, Old Elvet.

Flaxton.—Houses (32) for R.D.C.; surveyor, 62a, Bootham, York.

Hindley (Wigan).—Factory, Leigh Road; Turner Bros. Asbestos Co., Ltd., Spotland, Rochdale.

Jarrow-on-Tyne.—Works extensions; Jarrow Tube Works, Ltd., Northbourne Road.

Kidderminster.—Flats (63), Birchen Coppice (£37,000); borough engineer.

Kinross.—Houses (26) for Town Council; Town Clerk.

Liverpool.—County secondary school, School Lane, Woolton; L. H. Keay, city architect, Blackburn Chambers, Dale Street.

Manchester.—Dining room and rest room at works; Etchells, Congdon & Muir, Ltd., 25, Mill Street, Ancoats.

—Additions to works; Muir Machine Tools, Ltd., Irwell Street, Strangeways.

—Factory, Maine Road, Moss Side; Mottram & Co., Ltd., 30a, Market Street, Stockport.

—Central kitchen and dining hall, Openshaw; L. C. Howitt, city architect, Town Hall.

—Houses (323), Wythenshawe (£395,000); city architect.

Menai Bridge.—Houses (90) on two sites for U.D.C.; R. T. Jones, architect, Midland Bank Chambers, Bangor, N. Wales.

Middlesbrough.—Houses (41), Stratford Crescent; J. Gilmore, builder, 179, West Lane.

Motherwell.—Greyhound racing track; P. Reid, 638, Merry Street.

Nottingham.—Four blocks, Mental Defective Colony, Aston Hall, Aston-on-Trent; R. M. Finch, city engineer, Guildhall.

St. Pancras.—Flats (72), Hampshire Street; borough engineer.

Sedgefield.—Houses (194), at Ferryhill; R.D.C. surveyor.

Sidcup.—Houses (50), Sydney Road (£72,958); E. O'Sullivan (Kenley), Ltd., Arterial Road, St. Mary Cray, Kent.

Spennymoor.—Factory, T. Summerson & Sons, Darlington; Clayton & Deas, architects, High Row Chambers, Darlington.

Tottenham.—Flats (84), Allington estate (£98,870); Moore & Wood, Ltd., 262, Langham Road, N.15.

Wakefield.—Houses (70), Flanshaw estate extension; city engineer, Town Hall.

Wigton.—Houses (35), at West Silloth; Reay, builder, Penrith.

Wokingham.—Houses and bungalows (24), Commons Road, Emmbrook; E. G. V. Hives, Council's architect, 3, Cork Street, Reading.

Wood Green.—Flats (18), Durnsford Road (£22,986); R. F. Peachey & Sons, Ltd., Hornfield Church Lane, N.17.

TRADE MARKS

APPPLICATION has been made for the registration of the following trade marks. Objections may be entered within one month from September 25th:—

GLISSITE. No. 639906, Class 7. Bearings and anti-friction pads, all for machines; dynamo brushes and driving pulleys. Also No. 639907, Class 9. Electric collectors, electrical contact and conducting devices and electrical contacts. —Aktiebolaget Pulverkemi, Stockholm. Address for service, c/o Frank Watson, Aldwych House, Aldwych, W.C.2.

RO-MO. No. 641349, Class 7. Motor-driven hydraulic pumps.—Rotoplunge Pump Co., Ltd., 58, Victoria Street, S.W.1.

LONDOL. No. B 638926, Class 9. Electrical instruments and apparatus and parts thereof, all being goods included in Class 9, but not including electrical relays.—Lonsdale & Co. (Electric), Ltd., Wharf Street Mill, Heaton Norris, Stockport, Cheshire.

BESCOL. No. 640924, Class 9. Electric kitchen utensils included in Class 9; flexible conductors and resistances, switches, bells, buzzers, coils, batteries, transformers, fuses, soldering irons, smoothing irons, kettles, vacuum cleaners, terminals and contacts, all being electrical goods.—Bescol (Electric), Ltd., 118, Parkfield Road, Saltley, Birmingham, 8.

ARTILON. No. 641820, Class 11. Electric torches and electric lamps, and parts thereof not included in other classes.—Artima (London), Ltd., 121, Charlotte Street, W.1.

Export Inquiries

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

France.—An ex-Service man with connections in France wishes to buy wiring materials, switches, motors and starters, generators and lamps. (X.163.)



FAMOUS HYDRO-ELECTRIC STATIONS

The Bouquet Canyon Dam is situated immediately above the San Francisquito Canyon Power Plants which have a generating capacity of 135,000 h.p. The capacity of the reservoir above the outlet is 36,500 acre-feet. The purposes of the reservoir are emergency storage for domestic use and power generation along the route of the Los Angeles Aqueduct.



MEASUREMENT LIMITED

Electricity and Water Meters of Quality

TERMINAL HOUSE, LOWER BELGRAVE ST., LONDON, S.W.1

Osram

THE WONDERFUL LAMP

A G.E.C. PRODUCT

A new era of brightness in the home, office and factory! Brightness, cheerfulness, cleanliness, fresh air, good health and good lighting are the order of the day. Good lighting is a tonic—especially with Osram!



Advt. of 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**, at Dorset House, Stamford Street, London, S.E.1.

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

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

Original testimonials should not be sent with applications for employment.

OFFICIAL NOTICES, TENDERS, ETC.

METROPOLITAN WATER BOARD

Tenders for Diesel Alternator Plant

THE Metropolitan Water Board require Diesel-driven Alternator Plant, sizes varying from 350 kW to 100 kW, 400/440 volts, 3-phase, 50 cycles. Reliability is the first consideration and slow speeds are preferred. Particulars of plant available should be forwarded from time to time enclosed in sealed envelopes addressed to the undersigned at the offices of the Board (Room 122), and endorsed "Tenders for Diesel Alternator Plant."

C. W. STOKER,

New River Head, Clerk of the Board. 2768
Rosebery Av., London, E.C.1.

BOROUGH OF REDCAR ELECTRICITY DEPT.

TENDERS are invited for the supply, laying and jointing of Extra High Tension and associated Pilot Cables. Forms of tender and general conditions may be obtained from the Borough Electrical Engineer, Electricity Offices, 112, High Street, Redcar.

Tenders must be enclosed in a plain sealed envelope, endorsed "Tender for Cables," and should be delivered to me not later than November 2nd, 1946. The Council does not bind itself to accept the lowest or any tender.

H. CALDWELL,

Municipal Buildings, Redcar. Town Clerk. 2776
25th September, 1946.

SITUATIONS VACANT

COUNTY BOROUGH OF DARLINGTON ELECTRICITY DEPARTMENT

Appointment of Shift Charge Engineer

APPPLICATIONS are invited for the above appointment from candidates with a sound technical education to a standard equal to Corporate Membership of the I.E.E. Experience in a modern generating station is essential and workshop training will be an advantage. The salary and conditions will be in accordance with N.J.E. Agreement, Class H, Grade 8, commencing salary being £401 per annum. The successful candidate will be required to pass a medical examination.

Applications should be submitted not later than 15th October, 1946, on forms which can be obtained from the Borough Electrical Engineer, Haughton Road, Darlington.

2781

ROBERT GORDON'S TECHNICAL COLLEGE, ABERDEEN

Department of Electrical Engineering

Head of Dept.: Eric Wilkinson, B.Eng., Ph.D., A.M.I.E.E.

APPPLICATIONS are invited for the post of Junior Lecturer in Electrical Engineering. Applicants preferably should be Honours Graduates and should have specialised in some branch of heavy electrical engineering. Practical experience would be an advantage. Salary scale £400 x £15 to £596 per annum.

Applications, accompanied by copies of three testimonials and the names of three referees, should be sent to the undersigned, from whom further particulars may be obtained, not later than 25th October, 1946.

A. C. WEST, Director.

2775

LONG EATON U.D.C. ELECTRICITY UNDERTAKING

Appointment of Electrical Engineer and Manager

THE Urban District Council of Long Eaton invite applications for the position of Electrical Engineer and Manager of their Undertaking. Applicants must be Corporate Members of the Institution of Electrical Engineers, and prepared to satisfy the Council as to their organising ability and business capacity.

The salary will be in accordance with the Scale of Salaries fixed by the National Joint Committee of Local Authorities and Chief Electrical Engineers for the Electricity Supply Industry, dated July, 1941, based on the output from time to time of the Undertaking. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the person appointed will be required to pass a medical examination.

Copies of the terms and conditions of appointment and form of application may be obtained from me. Applications on the prescribed form, duly completed, accompanied by three recent testimonials, must be delivered to the undersigned in a sealed envelope endorsed "Electrical Engineer and Manager" not later than October 19th, 1946. Canvassing members of the Council, either directly or indirectly, will be a disqualification.

WM. E. STANLEY,

Town Hall, Long Eaton. Clerk to the Council. 2669
19th September, 1946.

DERBYSHIRE EDUCATION COMMITTEE

Chesterfield Technical College

Principal: N. Harwood, B.Sc.(Hons.), A.M.I.Mech.E.

APPPLICATIONS are invited for the position of Lecturer in Electrical Engineering. Candidates for the post should hold a University Degree in Engineering and/or Corporate Membership of the Institution of Electrical Engineers, and should have had experience in the electrical engineering industry. Salary in accordance with the Burnham Scale for Technical Institutions.

Application forms and further particulars may be obtained from the undersigned on receipt of a stamped addressed foolscap envelope, and to whom completed forms should be returned as soon as possible, and not later than Thursday, 24th October, 1946.

NORMAN F. C. THORN,

Technical College, Clerk to the Governors. 2757
Infrmary Rd., Chesterfield.

BINGLEY U.D.C. ELECTRICITY DEPARTMENT

Appointment of Meter Tester and Repairer (Class 1)

APPPLICATIONS are invited for the above permanent position. Conditions of employment will be in accordance with No. 2 Area, District Joint Industrial Council, Section B, the present rate of pay being 2s. 3½d. per hour, 47-hour week.

Applicants must be capable of and fully experienced in repairing and testing all types of A.C. meters. The person appointed will, subject to satisfactory medical examination, be admitted to the Council's Superannuation Scheme.

Applications in writing, stating full details of training and subsequent experience, and accompanied by testimonials, to be addressed to the undersigned on or before Monday, the 14th October, 1946.

OSWALD G. COOK, A.M.I.E.E.,

Electricity Offices, Chief Engineer and Manager. 2785
Bingley.

**METROPOLITAN BOROUGH OF ISLINGTON
ELECTRICITY DEPARTMENT**

A PPLICATIONS are invited from persons not less than 21 years of age for the position of Male or Female Sales Assistant.

The salary for the position will be at the rate of £255 per annum, plus temporary cost-of-living bonus, at present amounting to 23s. a week for men and 18s. 6d. a week for women, but the salary will be reviewed on the application of the scale of salaries laid down in the National Joint Council Scheme of Conditions of Service.

Preference will be given to candidates having had experience in the showrooms of an Electricity Supply Undertaking. The appointment will be subject to the National Joint Council Scheme of Conditions of Service and to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Applications, stating age, whether married or single, qualifications and experience, accompanied by copies of not more than three recent testimonials, must be sent to the Engineer and General Manager, 341/343, Holloway Road, N.7, so as to reach him not later than the 19th October, 1946. Candidates are required to disclose in writing whether, to their knowledge, they are related to any member or holder of any senior office under the Council.

The Council are unable to make any arrangements whatsoever for the provision of housing accommodation for the successful candidate. Canvassing, either directly or indirectly, will be a disqualification.

W. ERIC ADAMS,

Town Hall, Upper Street, N.1. Town Clerk. 2770

BOROUGH OF SUTTON COLDFIELD

Appointment of Electrical Engineer and Manager

A PPLICATIONS are invited for the above appointment from persons suitably qualified. The full salary at the rate of £1,035 per annum (which is in accordance with the Agreement dated 9th July, 1941, between the National Joint Council for Local Authorities and Chief Electrical Engineers and is based on the present unit assessment) will be paid from the date of commencing duties. The cost of living bonus, at present £59 16s., will also be paid, together with a suitable car allowance.

Recent experience in the management of Electricity Supply Undertakings is essential, and applicants must have a sound knowledge of design and operation of 33-kV, 11-kV and 6.6-kV and L.T. underground and overhead distribution, networks and substations.

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

Forms of application may be obtained from the undersigned, to whom applications shall be sent so as to be received not later than Saturday, the 12th day of October, 1946, in envelopes marked "Electrical Engineer." Canvassing, directly or indirectly, will disqualify.

R. WALSH,

Council House, Sutton Coldfield. Town Clerk. 2645
September, 1946.

**METROPOLITAN BOROUGH OF SOUTHWARK
ELECTRICITY DEPARTMENT**

Shift Charge Engineer

A PPLICATIONS are invited for the appointment of a Shift Charge Engineer at Penrose Street Generating Station. Candidates must have had good practical and technical training in mechanical and electrical engineering and experience in the running and maintenance of a power station.

The salary and conditions will be in accordance with the National Joint Board Schedule (Class E, Grade 8), the present salary being £413, plus 5% (London Area) per annum.

Applications, in candidates' own handwriting, stating age, training and experience in date order, together with copies of three recent testimonials or names of three persons to whom reference can be made, are to be endorsed "Shift Charge Engineer" and must reach the undersigned not later than first post on Thursday, 10th October, 1946.

D. T. GRIFFITHS,

Southwark Town Hall, Town Clerk.
Walworth Road, S.E.17.
24th September, 1946. 2737

PAISLEY CORPORATION ELECTRICITY DEPT.

Appointment of Two Mains Assistants

A PPLICATIONS are invited for the following positions: (1) **FIRST MAINS ASSISTANT**, at a salary in accordance with Grade 7, Class F, of the N.J.B. Schedule (at present £479 rising to £489 per annum).

(2) **MAINS ASSISTANT**, at a salary in accordance with Grade 8a, Class F, of the N.J.B. Schedule (at present £413 rising to £429 per annum).

Applicants, who should preferably be Corporate Members of the I.E.E., must have had a sound technical and practical training in the operation and construction of E.H.T. and L.T. distribution systems. Knowledge and experience in the maintenance, routine testing and erection of substation equipment, fault localisation, etc., is essential. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Applications, stating age, whether married or single, training and present position, together with copies of recent testimonials, should be sent to the undersigned not later than 12th October, 1946.

DANIEL ROSS, A.M.I.E.E., F.I.E.S.,

27, Blackhall St., Electrical Engineer and Manager.
Paisley. 2747

BOROUGH OF WIMBLEDON ELECTRICITY DEPT.

A PPLICATIONS are invited for the position of Mains Assistant in the above Undertaking. Candidates must have technical qualifications not less than Higher National Certificate in Electrical Engineering and possess experience in the installation and maintenance of L.T., H.T. and E.H.T. cables, transformers and switchgear. Salary in accordance with Grade 8b, Class H, N.J.B. Schedule No. 10 (Greater London) District (at present £450 per annum). The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the person appointed will be required to pass a medical examination.

Applications, giving age, particulars of training, qualifications and experience, accompanied by not more than three recent testimonials, should be addressed to the Chief Engineer and Manager, Borough of Wimbledon Electricity Department, Electricity House, Durnsford Road, Wimbledon, S.W.19, not later than Friday, 11th October, 1946.

EDWIN M. NEAVE, Town Clerk.

2759

**METROPOLITAN BOROUGH OF FULHAM
ELECTRICITY DEPARTMENT**

THE Council invites applications for the following positions in their Base Load Generating Station, Townmead Road, Fulham, S.W.6.

ASSISTANT OPERATING ENGINEER, in Class L, Grade 7, of the National Joint Board Schedule, at a commencing salary of £676 4s. per annum. Applicants must be under 40 years of age.

TEMPORARY ASSISTANT TECHNICAL ENGINEER, at a salary of from £8 to £10 per week, according to ability. Candidates must be under 45 years of age.

Forms of application and general conditions of appointment may be obtained by sending a stamped addressed foolscap envelope to me. Completed applications must be returned to me to arrive not later than 12 noon on Monday, 21st October, 1946.

CYRIL F. THATCHER,

Town Hall, Town Clerk.
Fulham, S.W.6. 2752

**COUNTY COUNCIL OF DURHAM EDUCATION
DEPARTMENT**

Stockton Technical School and Evening Institute

A PPLICATIONS are invited for the post of Principal of the above Technical School and Evening Institute. Candidates must be graduates of a British University and should have had experience in the work of a similar institution.

Salary £650, rising by annual increments of £20 to a maximum of £900 per annum. For further particulars and forms of application (which must be completed and returned as soon as possible) apply, enclosing stamped, addressed foolscap envelope, to the Director of Education, Shire Hall, Durham.

THOS. B. TILLEY,

Shire Hall, Durham, Director of Education.
18th September, 1946. 2694

CITY OF PORTSMOUTH ELECTRICITY SERVICE

APPLICATIONS are invited for the following positions :
(a) COMBUSTION SHIFTE ENGINEER at a salary in accordance with Grade 8, Class J, of the N.J.B. Schedule, at present £521 per annum.

(b) TWO DISTRICT MAINS ENGINEERS at a salary in accordance with Grade 8, Class J, of the N.J.B. Schedule, at present £521 per annum.

(c) THREE JUNIOR ENGINEERS, one in the Distribution Department and two in the Power Station, at a salary in accordance with Grade 10 of the N.J.B. Schedule, at present £355 per annum.

R. H. COATES, Engineer and Manager.

111, High Street, Portsmouth. 25th September, 1946. 2765

AER RIANTA (IRISH AIRWAYS) TRANSATLANTIC DIVISION

AER Rianta (Irish Airways), Transatlantic Division, invite applications for the following post—Telecommunications Engineer.

Applicants should possess (a) a University degree (or its equivalent) in Engineering or Science, the course for which included electrical subjects or physics; (b) wide and responsible experience of aeronautical radio and of modern radio technique generally, including at least 5 years' experience in a responsible capacity in the design, construction, installation, testing and maintenance of aeronautical radio equipment for communications and as aids to air navigation; (c) considerable experience in organisation, control of staff and administration generally.

Applications must be in writing and must state age, experience, educational and other qualifications, range of salary expected, the date on which candidates are free to take up duty if selected, and the names of two persons who can be quoted as references. The applications must reach the Secretary, Aer Rianta Tta. (Transatlantic Divn.), 43 Upper O'Connell Street, Dublin, not later than Monday, 21st October, 1946. 2767

CROWN AGENTS FOR THE COLONIES

Colonial Government Appointments

APPLICATIONS from qualified candidates are invited for the following post: Meter Superintendent required by the Nigerian Government Electricity Undertakings for one tour of 18-24 months, with prospect of permanency. Salary £630 rising to £720. On salary of £630 local allowance of £24 and, for married men, separation allowance of between £60 and £180 a year according to number of dependants. Free passages and quarters. Candidates, not over 40 years of age, must be fully conversant with the fixing, testing and maintenance of all types of A.C. and D.C. (single and polyphase) meters, and with protective systems and the testing and maintenance of operative and protective gear. They should also have had good general administrative experience. Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience, to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting M/N/16840, on both letter and envelope. 2791

THE LANCASHIRE ELECTRIC POWER COMPANY

Appointment of Control Room Attendant

APPLICATIONS are invited for the position of Control Room Attendant at Padiham Power Station. The salary will be in accordance with the N.J.B. Schedule, Class G, Grade 9a.

Applications should be addressed to the Resident Engineer, The Lancashire Electric Power Company, Electric Power Station, Padiham, Lancs. 2793

CITY OF MANCHESTER ELECTRICITY DEPT.

APPLICATIONS are invited for the position of Resident Engineer at Barton Power Station, at a salary in accordance with Class K, Grade 3, of the N.J.B. Schedule (£839 p.a. rising by two biennial increments to £877 p.a.), together with the free tenancy of a house from December, 1947.

Applicants must have had a good engineering training, followed by experience in the operation and maintenance of plant in large Selected Stations. They should be under 45 years of age, possess administrative ability, and be Corporate Members of either the Institution of Electrical Engineers or the Institution of Mechanical Engineers.

The appointment will be subject to the City Council Superannuation Scheme, and the successful candidate will be required to pass a medical examination.

Applications, on a form to be obtained from Mr. R. A. S. Thwaites, Chief Engineer and Manager, together with copies of recent testimonials, should be endorsed "Resident Engineer," and addressed to the Chairman of the Electricity Committee, Town Hall, Manchester, 2, not later than 10 a.m. on Monday, 21st October, 1946. Canvassing, directly or indirectly, will disqualify.

PHILIP B. DINGLE, Town Clerk

Town Hall, Manchester, 2. 25th September, 1946. 2774

CITY AND COUNTY OF KINGSTON-UPON-HULL ELECTRICITY DEPARTMENT

Technical Assistant

APPLICATIONS are invited for the above position from persons possessing a sound knowledge and experience of electrical power engineering, who should have served a works apprenticeship and possess an honours degree in engineering. Experience in consulting work would be an advantage.

Salary in accordance with N.J.B. Schedule, at present Class J (but subject to reclassification at the end of the year to Class K), with commencing salary based on Grade 3, Class J, £785 per annum, and that of Class K, £839 per annum. The appointment is subject to a medical examination.

The person appointed must reside within the city boundary (waived during present conditions) and after three months' satisfactory probation will be required to contribute to the Local Government and Other Officers' Superannuation Scheme.

Applications should give names of references who may be consulted, and should be submitted to the General Manager, Electricity Offices, Ferensway, Kingston-upon-Hull, by the 18th October, 1946. 2822

BOROUGH OF REIGATE ELECTRICITY DEPT.

APPLICATIONS are invited for the position of Mains Assistant Engineer. Candidates must have the Higher National Certificate in Electrical Engineering (or equivalent qualification) and possess experience in the installation of L.T., H.T. and E.H.T. cables, transformers and switch-gear.

Salary in accordance with Class E, Grade 8a, N.J.B. Schedule, No. 9 Area, at present £387 per annum, plus £50 per annum (car allowance). The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the person appointed will be required to pass a medical examination.

Applications, stating age, training, qualifications and experience, accompanied by three copies of recent testimonials, must reach me by the first post Saturday, 19th October, 1946, and must be endorsed "Mains Assistant Engineer." Canvassing, directly or indirectly, will disqualify.

HEBER DAVTES, Town Clerk

Town Hall, Reigate. 2824

WHITWORTH U.D.C. ELECTRICITY DEPARTMENT

ELECTRICAL Engineer required to take charge of and manage the Council's Undertaking. The Council purchases in bulk from Rochdale Corporation. The person appointed will be required to submit to a medical examination and if appointed to contribute to the Superannuation Scheme. The salary offered will be commensurate with the recommendations of the National Agreement. Candidates should be Corporate Members of the Institute of Electrical Engineers or possess equivalent technical qualifications. Applications, marked "Electrical Engineer" to be delivered to the undersigned by 19th October, 1946.

HARRY HOYLE, Clerk of the Council.

Council Offices, Whitworth, nr. Rochdale. 2792

BOROUGH OF WILLESDEN ELECTRICITY DEPT.**Appointment of Assistant Substation Superintendent
(Amended Advertisement)**

APPPLICATIONS are invited for the above appointment from engineers who have had a sound technical education and technical and practical experience of all work connected with rotary, rectifier and static substations, who will assist the Substation Superintendent with the design of substations, equipment, protective and supervisory systems, preparation of estimates and forms of tender, and the erection of all equipment and the operation and maintenance of all substations. Applicants must be Corporate Members of the Institution of Electrical Engineers, or possess examinations leading to Corporate Membership.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, after a probationary period of six months. The selected applicant will be required to pass a medical examination. The salary and conditions of service will be in accordance with the schedule of salaries and conditions of employment, National Joint Board of Employers and Members of Staff, Electricity Supply Industry, Class H, Grade 8, at present £505-£532 per annum, plus car allowance in accordance with the Council's scale, at present £75 per annum.

Applications must be made on the application forms to be obtained from the undersigned, and should be returned to the undersigned, together with copies of three recent testimonials, not later than Monday, 28th October, 1946, endorsed "Assistant Substation Superintendent." Canvassing in any form is prohibited and will disqualify.

W. T. PIRIE,

Town Hall, Dyne Road,
Kilburn, N.W.6. Town Clerk. 2802

BOROUGH OF FINCHLEY ELECTRICITY DEPT.**Appointment of Senior Demonstrator (Female)**

APPPLICATIONS are invited for the above appointment on the permanent establishment at a salary of £304 per annum, plus London weighting £16, plus cost of living bonus, at present £48 2s., in accordance with the Higher Clerical Division (Female Grade) of the National Joint Council's Conditions for Local Authorities' Administrative, Professional, Technical and Clerical Services.

Candidates must have a good general education and hold a recognised diploma in Domestic Science, and, preferably, the E.A.W. Electrical Housecraft Diploma. They must be competent to arrange and conduct lecture-demonstrations both in the showrooms and on consumers' premises, and to advise consumers on the selection and use of all domestic electrical appliances. Experience in the control of showroom staff and buying will be an advantage.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination by the Council's Medical Officer of Health.

Forms of application are not being issued, and applications to the undersigned, containing full details of age, qualifications, past and present appointments and experience, should be submitted not later than 31st October, 1946, endorsed "Senior Demonstrator." Canvassing any member or any officer of the Town Council, either directly or indirectly, will be deemed a disqualification.

C. R. WESTLAKE, M.I.E.E.,

Squires Lane, Finchley, N.3. General Manager and Engineer. 2821

BOROUGH OF CHESTERFIELD ELECTRICITY DEPT.

APPPLICATIONS are invited for the position of Shift Charge Engineer in the Generating Station of the Corporation. Candidates must have had previous experience in the operation and maintenance of water tube boilers, turbo-generators and auxiliary plant, rotary converting plant, and high and medium voltage switchgear.

The salary will be in accordance with Grade 8, Class F (E.P.E.A. Schedule), which is at present £442 per annum. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Applications, endorsed "Shift Charge Engineer," stating age, qualifications and experience, together with copies of three recent testimonials, to be addressed to and reach the undersigned not later than Monday, October 14th, 1946.

RICHARD CLEGG,

Town Hall, Chesterfield. Town Clerk. 2825

BOROUGH OF FINCHLEY ELECTRICITY DEPT.**Appointment of Assistant Distribution Engineer**

APPPLICATIONS are invited for the position of an Assistant Distribution Engineer in the Electricity Department at a salary in accordance with the National Joint Board Scale, Class G, Grade 8a/1, at present £458 17s. per annum.

Candidates must be Graduate or Corporate Members of the Institution of Electrical Engineers and have had experience in A.C. three-phase and D.C. distribution, estimating for switchgear and cable extensions. Experience in the operation and maintenance of static, rotary and mercury arc rectifying substations would be an advantage. The appointment is subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination by the Council's Medical Officer of Health.

Forms of application are not being issued, and applications to the undersigned, containing full details of age, qualifications, past and present appointments and experience, should be submitted not later than 31st October, 1946, endorsed "Assistant Distribution Engineer." Canvassing any member or any officer of the Town Council, either directly or indirectly, will be deemed a disqualification.

C. R. WESTLAKE, M.I.E.E.,

Squires Lane, Finchley, N.3. General Manager and Engineer. 2822

**METROPOLITAN BOROUGH OF WOOLWICH
ELECTRICITY DEPARTMENT****E.H.T. Plumber-Jointer**

APPPLICATIONS are invited for the position of E.H.T. Plumber-Jointer from Plumber-Jointers with experience in cables up to 22 kV.

Conditions of service will be in accordance with those laid down by the District Council (No. 10), Greater London Area, Electricity Supply Industry, and the rate of pay prevailing at the present time is 2s. 8.5d. per hour per 47-hour week. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937.

Applications, stating age and experience, should be received by the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, not later than Saturday, 12th October, 1946. Canvassing members of the Council, either directly or indirectly, will be a disqualification.

DAVID JENKINS,

Town Hall, Woolwich, S.E.18. Town Clerk. 2738

BOROUGH OF DOVER**Meter Repairer-Mechanician**

APPPLICATIONS are invited for the above appointment, terms and conditions as laid down by the No. 9 Area Joint Industrial Council; wages 2s. 4d. per hour. Applicants must be thoroughly experienced in the repair and testing of all types of quarterly and prepayment meters.

Applications, with copies of recent testimonials, are to be endorsed "Meter Repairer-Mechanician," and must reach the Borough Electrical Engineer, Electricity Offices, Ladywell, Dover, not later than Wednesday, the 16th October, 1946.

JAMES A. JOHNSON,

Brook House, Dover. Town Clerk. 2819
27th September, 1946.

WEST GLOUCESTERSHIRE POWER CO. LTD.

APPPLICATIONS are invited for the position of Assistant in the Company's Meter Testing Department at Gloucester. Applicants must be experienced in the repairing and testing of all types of A.C. single-phase meters. Salary, dependent upon age and experience, according to the Company's Grading Scheme, will be from £221 to £260 per annum, plus Cost of Living Bonus.

The selected applicant will be required to join the Company's Superannuation Scheme.

Full particulars of experience, age, education and technical training should be addressed to:—The Meter Engineer, West Gloucestershire Power Company, 126 London Road, Gloucester. 2807

COUNTY BOROUGH OF ROCHDALE

Birch Hill Institution and Hospital

APPPLICATIONS are invited from persons not exceeding 45 years of age for appointment as Assistant Engineer at Birch Hill. Applicants should be competent engineers and able to take control and maintain the boiler plant, central heating services, electrical appliances, laundry machinery, etc., etc.

The post is superannuable and is subject to medical examination. Salary £325 per annum rising, subject to satisfactory service, by two increments of £25 per annum to £375 per annum. No bonus is payable. Canvassing, directly or indirectly, will be a disqualification. Candidates must disclose whether to their knowledge they are related to any member or senior officer of the Council.

Applications, giving full particulars of qualifications and experience, and accompanied by copies of not more than three recent testimonials, should be forwarded so as to reach the Director of Social Welfare, Townhead Offices, Rochdale, by 9 a.m. on Monday, 14th October, 1946.

G. F. SIMMONDS, Town Clerk.

Town Hall, Rochdale.
26th September, 1946.

Town Clerk. 2797

CITY OF BULAWAYO, SOUTHERN RHODESIA,
ELECTRICITY DEPARTMENT

Generation Engineer

APPPLICATIONS are invited for the above appointment from Chartered Mechanical Engineers with power station experience at six hundred pounds pressure or more, to take charge of the Council's two power stations.

The salary will be £700 rising by increments of £25 to £850, plus cost of living allowance. A house will be provided at £8 monthly rental. Contract for not less than three years under usual service conditions.

Applications, by air mail, giving full details of experience, accompanied by an unmounted photograph, should be received by the undersigned not later than October 20th, 1946. The successful applicant's passage money will be refunded and salary paid from date of leaving England.

H. J. COOK, Town Clerk.
2831

A Showroom Assistant required for electrical shop, Great Yarmouth. Apply, stating past experience, age and commencing salary.—Box 9666, c/o The Electrical Review.

A Young Assistant with some experience wanted for estimating office. An opportunity with prospects for capable young man. State age, salary and experience.—Electrical Installations Ltd., 65, Vincent Square, Westminster, S.W.1. 2833

AN Estimating and Supervising Engineer for London contractors' office. Permanent position for enterprising man with knowledge of good class work. Applications will be treated confidentially. State age, salary to—Box 2834, c/o The Electrical Review.

APPPLICATIONS are invited for the position of Designer for A.C. motors up to 250 h.p. Should be top-line man capable of taking complete charge of design at works of a large manufacturer in the North of England. Applicants should be between 30 and 45 years of age and possess knowledge of all types of induction motors, both single and polyphase. Excellent prospects and permanency for the right man. Please state age, details of education, training, experience and salary expected.—Box 2773, c/o The Electrical Review.

APPPLICATIONS are invited from Transformer Designing Engineers (Senior and Junior) for employment with the Metropolitan-Vickers Electrical Co. Ltd., Trafford Park, Manchester. Applicants should state age, full particulars of education, general and technical, apprenticeship, practical training and design experience (the latter not essential for junior applicants). Apply in writing to—The Personnel Manager, Metropolitan-Vickers Electrical Co. Ltd., Trafford Park, Manchester. 2762

ARMATURE Winder for repair shop.—Boys Ltd. 187, Goswell Road, E.C.1. 2720

ARMATURE Winder or good Improver required, used to all types of motors. Knowledge of dismantling and assembly of motors a good advantage. Apply to—Messrs. Charles H. Harwood & Co. Ltd., 32, Meyrick Road, Willesden, N.W.10. 114

ARMATURE Winders and Improvers required, A.C. and D.C., top rates, good working conditions.—Electrical Power Repairs (Gillingham) Ltd., Strover Street, Gillingham, Kent. 9664

ARMATURE Winders and Improvers urgently required. Top rates and good conditions.—Box 113, c/o The Electrical Review.

ARMATURE Winders wanted, experienced on A.C. and D.C. repair work.—The Midland Electric Installation Co. Ltd., Cyprus Works, Upper Villiers Street, Wolverhampton. 2749

ASSEMBLY Shop Foreman required by small electrical components manufacturer, Merseyside area.—Box F.977, Lee & Nightingale, Liverpool. 2764

ASISTANT Foreman for winding department, A.C. D.C. Motors, fractional to 500 h.p. Permanent progressive position to suitable applicant.—Higgs Motors, Witton, Birmingham. 106

ASISTANT Mains Engineer. Applicants must have a sound knowledge and experience of mains development, construction and maintenance in an extensive rural area. The salary will be in accordance with the N.J.B. Schedule, at present Class F, Grade 8, commencing at £442 per annum. Applications, with full details of education, training, experience and qualifications, to be sent, by October 8th, to—Buckrose Light & Power Company Limited, Central House, Kingsway, London, W.C.2. 2676

ASISTANT Saleswoman required in electrical contractors' showroom (London).—Box 2783, c/o The Electrical Review.

BRITISH Engine Boiler & Electrical Insurance Company Limited, 24, Fennel Street, Manchester 4. The Company has vacancies for Electrical Plant Inspectors in the Middlesbrough district. Permanent positions carrying progressive salary scale and non-contributory pension. Candidates, age 30-35, with apprenticeship and experience in the manufacture, repair and industrial use of electrical machinery and technical education at least Higher National Certificate standard, are invited to apply in own handwriting, stating age, qualifications and experience. 2810

BRITISH Engine Boiler & Electrical Insurance Company Limited, 24, Fennel Street, Manchester 4. The Company has vacancies for Lift and Crane Inspectors in the North East Coast district. Permanent positions with progressive salary scale and non-contributory pension. Candidates, age 30-35, with sound training in lift or crane construction and having electrical and mechanical experience, are invited to apply in own handwriting, stating age, qualifications and experience. 2810A

CABLE Joiner. Electrician required with sound knowledge of laying and jointing L.T. paper insulated lead covered cables, together with experience of general electrical installation work and the maintenance of a bulk supply distribution station. Applications, stating age and experience, to be submitted to the Engineer and Manager, Electricity Dept., Bo'ness, West Lothian. 2809

CLERICAL Assistant required for stores office. Must have good knowledge of electrical material.—London Electrical Co., 92, Blackfriars Road, S.E.1. 104

CLERK, experienced in the preparation of accounts for large electrical installation contracts. Preference given to one able to measure work on site. Salary £350-£400. Apply, giving full particulars to—Box 2828, c/o The Electrical Review.

CLERK required for electrical department of well-known London builders' merchants. Must be experienced in wholesale handling of lighting fittings, fires and accessories, cable, etc. Good permanent position with increasing prospects. Five-day week. Write, stating age, experience and salary required, to—R. F. W. N. Froy & Sons Ltd., Brunswick Works, Hammersmith, W.6. 2730

COPYWRITER required for technical and service instruction manuals, catalogues and sales literature, for light engineering company producing semi-automatic machines, in West London. Technical knowledge essential. Main qualification must be ability to write in concise and easily readable manner. Position offers every scope. Please submit details of experience, salary required, age, etc., to—Box 2746, c/o The Electrical Review.

CRAFTSMEN in Industrial Power urgently required. Apply to—Premier Electric Services, Friar Works, Willow Street, Leicester. 2830

DESIGNER-Draughtsman required to work on range of ironclad oil circuit breakers for voltages up to 11,000 and conforming to standard specifications. Position offers excellent prospects for advancement for capable draughtsman able to make all calculations and work on own initiative. Salary according to qualifications and experience. Write, giving full details.—Box 2771, c/o The Electrical Review.

DRAUGHTSMAN required, must be experienced in all types of transformers up to 1,000 kVA. Apply, stating age, experience, salary required, to—Brentford Transformers Ltd., Windmill Road, Brentford, Middx. 2691

DESIGNER-Draughtsman for supervisory position for developing lift control gear. Only fully experienced men need apply. Permanent position with good salary and prospects for the right man. Northern district. State age, experience and salary required.—Box 2602, c/o The Electrical Review.

DESIGNER-Draughtsmen, age 25 to 45, required, with sound engineering training and good drawing office experience in one or more of the following: Industrial building construction, heating and ventilating, calenders, coating and reeling machinery, electrical power and lighting installations, oil heating, refining and general chemical plant. Applications, accompanied by full details of education, training, experience and positions held, with salaries, should be addressed to—The Personnel Manager, Jas. Williamson & Son Ltd., Lune Mills, Lancaster. 2726

DRAUGHTSMAN, Assistant, London, W.C.1, for work on audio-frequency equipment and associated high-grade light engineering products, progressive salary for young applicant with some technical training. State age, experience, salary required.—Box 2800, c/o The Electrical Review.

DRAUGHTSMAN required by cable manufacturers at Hebburn for design and development of electrical accessories. Applicant for this progressive post must have potential administrative ability sufficient to take charge of and expand small drawing office. Starting salary up to £400 p.a. according to age and suitability.—Box 2772, c/o The Electrical Review.

DRAUGHTSMAN, to take senior position in small office, London, must have completed sound works training, instruments or light electro-mechanical design, electrical knowledge an advantage. State full details, age, salary required.—Box 2801, c/o The Electrical Review.

DRAUGHTSMEN, preferably with telecommunications experience, required by large firm in the Midlands. Maximum salary £350 plus cost of living bonus. Write, giving details of experience, age, and salary required.—Box 11, c/o The Electrical Review.

DRAUGHTSMEN. R. B. Pullin & Co. Ltd., Phoenix Works, Great West Road, Brentford, have vacancies for the following personnel: (a) Senior Draughtsman, thoroughly experienced in f.h.p. motor development and production design, to take charge of and be responsible for output, limiting and accuracy of small section, under development engineer; (b) Designer-Draughtsman, thoroughly experienced in small electro-mechanical and instrument work. Only versatile men able to work under verbal instruction and capable of taking full responsibility for their work need apply. Applications should be in writing, and contain full details of educational and commercial experience. Good salary and prospects are offered to the right men. 2789

DRAUGHTSMEN (Senior) required for large A.C. and D.C. machines, including turbo and waterwheel alternators, also for medium type A.C. and D.C. machines. Applications from men with suitable technical qualifications and good general mechanical drawing office experience will be considered. Salary dependent upon qualifications and experience. Apply, giving full details of the qualifications, experience, age and salary required, to—Chief Draughtsman, Engineering Drawing Office, The General Electric Co. Ltd., Witton, Birmingham, 6. 2661

DRAUGHTSMEN with experience in cable layouts required. Salaries in accordance with experience, plus 25% war bonus, plus staff bonus. Apply in writing, giving age and full particulars, not later than 16th October next, to—The Associated Portland Cement Manufacturers Ltd., Works Dept., 192, Ashley Gardens, London, S.W.1. 2756

EASCO Electrical Ltd. have vacancies for (a) Production Assistant, capable of laying out and supervising assembly of electrical equipment, must possess full electrical and technical knowledge L.F. and H.F. circuits and rectifying equipment; (b) Toolmaker, for sheet metal section, to design and make own jigs and tools and supervise same. Both positions are permanent and progressive. Apply in writing.—Brighton Terrace, Brixton, S.W.9. 2742

ELECTRIC lamp factory requires Maintenance Engineer, should have knowledge of all electrical and mechanical problems relating to repetition machines and general factory maintenance. Applicants should state salary required and previous experience.—Box 9665, c/o The Electrical Review.

ELECTRICAL Draughtsman required immediately at industrial works in Kent. It is desirable that the applicants should possess the Higher National Certificate in Electrical Engineering or its equivalent. Work involves technical knowledge of surveys and estimating schedules. Apply, stating age, to—Box 2663, c/o The Electrical Review.

ELECTRIC Motor Fitters required, dismantling and assembling motors in repair shop.—The Midland Electric Installation Co. Ltd., Cyprus Works, Upper Villiers Street, Wolverhampton. 2750

ELECTRICAL Accessory Designer required by company with excellent programme and resources. Must be capable of basic design on electrical lighting fittings, electrical appliances, and accessories. Reply, stating previous experience, salary required, and include testimonials.—Box 2619, c/o The Electrical Review.

ELECTRICAL contractor with large business has vacancy for responsible man having knowledge of buying, invoicing, etc. Permanency. State age, experience and wages.—Box 2835, c/o The Electrical Review.

ELECTRICAL Remote Control Engineer required with first-rate knowledge of relays and timers, capable of preparing estimates and dealing with correspondence, by electrical manufacturers South-East London area. State age, experience and salary required.—Box 2652, c/o The Electrical Review.

ELECTRICIAN, thoroughly experienced in motor car and radio work.—Edwards & Co. (Bournemouth) Ltd., 189-193, Old Christchurch Road, Bournemouth. 2636

ENGINEERS and Draughtsmen are invited to apply to a large electrical engineering firm in the Midlands which has vacancies in the switchgear department for Technical Sales, Contract, Costing and Design Engineers; also experienced Technical Engineers capable of handling large projects for generation, transmission and distribution. Vacancies also exist for Draughtsmen for circuit diagram and general work.—Box 69, c/o The Electrical Review.

EXPERIENCED Lady Clerk required in electrical contractors' office (London).—Box 2782, c/o The Electrical Review.

EXPERIENCED Oil Engine Fitter required by small rural electricity undertaking in South-West. S.D.R. 26.27d. per hour; higher rate for first-class man. House will be available.—Box 9674, c/o The Electrical Review.

FOREMAN Stem-maker required. Must be able to take charge of whole department and be conversant with different types of stem-making machines, particularly those for standard lamps; also special miniature stems for fluorescent lamps, etc. Good salary. Modern factory. Applicants to apply to—The Manager, British Luma Co-op. Elec. Lamp Society Ltd., Hardgate Road, Glasgow, S.W.1. 2787

JUNIOR Draughtsmen required for North London area, preferably experienced on transformers. Five-day week. Write giving full details age and salary required.—Box 9671, c/o The Electrical Review.

JUNIOR Engineer required for the laboratory of a London firm of radio component makers. Degree or equivalent essential. Salary £400 upwards according to qualifications.—Box 2711, c/o The Electrical Review.

JUNIOR Research Engineer required for HV insulation and other investigational work in connection with switchgear and associated products. Minimum educational standard, Higher National or Ordinary H.Sc. in electrical engineering, and some previous industrial experience preferable. Apply, stating age, qualifications and salary required, to—Box 2793, c/o The Electrical Review.

LABORATORY Assistant for experimental and development work in connection with watt-hour meters and instruments of a like nature. Salary £350 per annum. Write stating age and experience.—Box 2594, c/o The Electrical Review.

LARGE firm in London area has vacancy in its research and development department for a mechanical or electrical engineer, to carry out the design and experimental work in connection with small electro-medical devices.—Box 2786, c/o The Electrical Review.

LEADING engineering organisation requires Sales Manager for battery electric vehicles. Engineering education to degree standard and subsequent industrial experience are essential. Ability required to organise and control sales and service, undertake market research and sales campaigns. Exceptional prospects.—Box 2723, c/o The Electrical Review.

MANAGER or Managers of good appearance and personality required for high-class electrical and radio retail and art goods business, 30 miles from London. Must be thoroughly capable and able to take full control. Write with particulars, stating age, experience and salary required.—Box 115, c/o The Electrical Review.

MANAGING Director. Applications are invited from qualified Electrical Engineers for the position of Managing Director of an electrical manufacturing company. High executive experience and an established position in the industry essential. Remuneration £5,000 per annum, with good prospects. Pension scheme. State age, qualifications, experience.—Box 2675, c/o The Electrical Review.

MATHER & Platt Ltd., Park Works, Manchester 10, require Draughtsman, experienced in the mechanical design of large D.C. machines and rotaries. Write, stating age, experience, and salary desired to Employment Department. 2814

OLD-established consulting mechanical and electrical engineers, London, seek Junior Partner, age 30/45, chartered mechanical and/or electrical engineer, preferably university degree. First-class previous experience essential, either as contractor, consultant or purchaser of some or all of the following mechanical building services—heating, air conditioning, electrical equipment. Working knowledge building concrete and drainage desirable. Only highest calibre applicant considered. First-class testimonials and proof integrity required. Remuneration by share in profits with guaranteed minimum depending status and qualifications. No investment required. Strict professional confidence maintained.—Box 2788, c/o The Electrical Review. 2814

PACKER and Storekeeper required, first-class, thoroughly experienced.—M. F. & Co. Ltd., 37, Aylmer Parade, N.2. 2812

PLUMBER-Jointer required for L.T. and H.T. mains. N.J.C. rates paid (Area No. 9).—Farnham Gas & Electricity Co., East Street, Farnham, Surrey. 2659

POWER Station Shift Charge Engineers, age 30 to 45, required for new industrial power station. Practical experience in operating high pressure water tube boilers and turbo-alternators essential. Applications, to be accompanied by full details of education, training, experience and positions held, with salaries, should be addressed to—The Personnel Manager, Jas. Williamson & Son Ltd., Lune Mills, Lancaster. 2725

PRODUCTION Manager required by electrical and general engineering firm in Lancashire manufacturing domestic appliances. Must be qualified technically and practically in modern production methods and processes, be thoroughly experienced in all stages of production, capable of operating factory at highest efficiency on mass production lines. Good salary and prospects offered. Full details of experience, posts held and work done, together with remuneration required, to—Box 2567, c/o The Electrical Review. 2725

PRODUCTION Superintendent required by leading engineering organisation to take full control of department producing medium electrical equipment. Education to degree standard and experience in works management are essential. Exceptional prospects available for man with vigorous personality and successful record.—Box 2724, c/o The Electrical Review. 2724

QUALIFIED Engineer for electrical design work in connection with high voltage equipment. Age 25-35. B.Sc. or equivalent, with ability in application of mathematics to design problems. Write, giving full details of training, experience and salary required, to Staff Officer, British Insulated Callender's Cables Ltd., Erith, Kent. Ref. SR/7. 2754

QUALIFIED Engineer, with B.Sc. or other degree, electrical, mechanical, marine, has opportunity increasing responsibilities and remuneration with British firm trading in East. Commencing remuneration £800-£1,000, plus current cost-of-living allowance according to qualifications. Outfit allowance, free passages, full pay on leave, pension and other benefits. Preferably single, not over 32. Reply, giving full details experience, qualifications, to—Box No. 174, Foster, Turner & Everetts Ltd., 11, Old Jewry, London, E.C.2. 2766

RATE-fixer and Process Engineer required by firm manufacturing low frequency amplifiers and kindred equipment. Previous experience in a similar capacity essential. West London district. Write, stating age, experience and salary required, to—Box 2748, c/o The Electrical Review. 2748

REPRESENTATIVE calling on provincial houses required to handle high-class wrought iron fittings and lampshades for well-known London manufacturer. Write—Box PP4585, Samson Clark, 57/61 Mortimer St. W.11. 2794

REPRESENTATIVES for high-class lampshades and domestic heaters wanted, to call on wholesalers and stores, for the following districts: Cheshire, Lancs., Norfolk, Suffolk, Northampton, Shropshire, Hants and whole of West of England.—Box 2743, c/o The Electrical Review. 2743

REQUIRED an Assistant Electrical Engineer for mining concern in South India. Applicants should be corporate members of I.E.E., and should have received a thorough practical training in a large supply undertaking or mining concern. Preference will be given to man with experience of the maintenance of large steam and Diesel Power stations and experience in mining electric equipment and electric hoists. Apply with full particulars of training and experience to—Box No. B.301, c/o Streets, 110, Old Broad St., London, E.C.2. 2796

REQUIRED by large oil company for duty in Palestine, Iraq, etc.: Electrical Engineer. To possess either electrical engineering degree, membership or associate membership of the Institution of Electrical Engineers, or equivalent technical qualifications. Extensive practical experience with medium-sized H.T. and L.T. Diesel-driven generating stations, distribution systems and switchgear is essential; and drawing office experience and practice in the administrative routine of estimating, correspondence and the control of staff is also required. Age desirably not exceeding 40. Salary not less than £1,000 per annum, with free quarters (or allowance in lieu) and certain temporary and variable allowances related to living costs. No married accommodation would be provided for at least the first three years. Applications, quoting reference EEPL, to—Box 1337, c/o Charles Barker & Sons Ltd., 31, Budge Row, London, E.C.4. 2784

SALES Manager required for London office with good experience in the home market for the sale of bakelite electrical accessories, advertising experience advantage. Write in first instance with full particulars to Imp Radio Ltd., 378, New Cavendish Street, London W.1. 2804

SENIOR Cost Clerk required for company in London manufacturing electric wires. Experience in this industry preferred, but not essential. Write full particulars, including age and salary required, to—Box 2731, c/o The Electrical Review. 2731

SENIOR Draughtsmen required for: (a) Steam, hydraulic and air services network, co-ordinated with plant layout and foundations. (b) Design of special purpose machinery, including mechanical handling equipment, etc. (c) Electrical distribution draughtsman to co-ordinate this service with plant layout. Applications, stating age, qualifications, experience and salary, to the Personnel Manager, The Firestone Tyre & Rubber Company Limited, Great West Rd., Brentford, Middx. 2803A

SENIOR Engineer required for the laboratory of a London firm of radio component makers. Degree or equivalent with industrial experience essential. Salary £500 upwards according to qualifications.—Box 2712, c/o The Electrical Review. 2712

SERVICE Engineer wanted for electro-medical trade. Must have sound electrical and practical experience. State salary. Particulars to—Electro-Medical Supplies Ltd., 205b, Great Portland Street, London, W.1. 2751

SHORTHAND Typist required for electrical contractors' office, filing and telephone. Good prospects for smart young lady.—Rogers, 7/8, Bloomsbury St., W.C.1. 2634

SPEEDY & Eynon Ltd. offer an attractive proposition to a first-class Representative with electrical experience, and with own car, to obtain contracts for all types of electrical installations in Brighton, Bournemouth and South Coast areas. Liberal commission will be paid, and the representative appointed will receive the maximum technical and commercial support from a highly efficient organisation. Applications, giving full details of experience, etc., should be addressed to—Speedy & Eynon Ltd., 163a, Strand, W.C.2. 9605

STOREKEEPER for contractors, must also be able to drive, state experience and wages (own handwriting). London.—Box 2808, c/o The Electrical Review. 2808

SUPERINTENDENT of Test Gear Section required by London firm of radio component makers. The responsibility involves design and maintenance of electronic test equipment. Degree or equivalent with industrial experience essential. Salary £500 upwards according to qualifications.—Box 2710, c/o The Electrical Review. 2710

TRANSFORMER Engineer-Estimators urgently required by Johnson & Phillips Ltd. Experience essential in the preparation of tenders for all classes of power transformers, large and small. One appointment will particularly concern export work and details of experience in this should be stated. The Company is also still open to consider applications from experienced transformer draughtsmen. Apply, stating age, experience, training and salary required to the Employment and Welfare Dept., Johnson & Phillips Ltd., Victoria Way, Charlton, S.E.7. 2798

WANTED for a Research Establishment at Elstree:— 2 Designer Draughtsmen, experienced in the development of mechanical and electrical precision mechanisms. Good knowledge of electrics an advantage. 2 Junior Draughtsmen, capable of detailing from development drawings of mechanical and electrical precision mechanisms. Opportunity for advancement to up-graded positions. Draughtsman experienced in the preparation of factory maintenance drawings, and who is capable of detailing. Apply, stating age, experience and salary required to—Box 2799, c/o The Electrical Review. 2799

TECHNICAL Estimator, with electrical engineering training up to National Certificate standard, required for firm of electrical engineers in Essex. Write, stating age, experience and salary, to—Box 2753, c/o The Electrical Review.

TRANSFORMER Designer (Junior) required for all types of transformers up to 3,000 kVA, 33 kV. Reply, stating age, experience and salary required, to—Works Manager, Transformers & Welders Ltd., Sandown Road, Watford. 2741

WORKS Manager (British) of established electric cable factory in the East requires an Assistant possessing practical experience and theoretical knowledge of V.I.R. and P.V.C. cable manufacture, embracing wire drawing, turning, stranding, rubber compounding, tape spreading, longitudinal covering, armouring and testing. Knowledge of wire enamelling an advantage but not essential. Excellent opportunity for the right man. Free furnished quarters, free medical attendance and participation in provident fund. Three years' agreement (with probationary clause) and option of renewal. Passage paid out and home to selected applicant. Apply giving following particulars: (1) Qualifications; (2) Position held past ten years; (3) Age; (4) Married or single; (5) If married, state if desirous of family accompanying; (6) Names of two references as to ability; (7) Salary required.—Box 2655, c/o The Electrical Review.

WORKS Manager required for light electrical engineering factory in South London area. Should be qualified engineer able to take complete control of factory. Experience in improving production methods, institution and control of progress, planning and rate-fixing systems, etc., essential. Experience in electric motor production and ancillary apparatus, although not essential, would be an advantage. Reply stating age, qualifications, experience and salary required.—Box 2572, c/o The Electrical Review.

YOUNG Electrical Engineer required by Electrical Motor Manufacturers, to assist in the Estimating and Design Department, S.E. London area.—Write, stating age, experience, and salary required.—Box 2692, c/o The Electrical Review.

YOUNG man required for electrical dept. of large wholesale firm to serve as Counter Hand with view to training as outside Sales Representative in London area. Applications, giving details of experience and age, to—Box 2763, c/o The Electrical Review.

APPOINTMENTS FILLED

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

BOX 2570—Lady Clerk. All applicants are thanked.

SITUATIONS WANTED

ADVERTISER, aged 34, requires position in good-class Electrical and Radio concern. Can take full charge. West End buying and selling experience. Good practical knowledge electrical appliances and radios. Ex-R. Signals.—Box 9679, c/o The Electrical Review.

BUYER (31), 12 years' experience electrical engineering. Seeks change. Sound knowledge of sources of supply, accustomed to control of staff.—Box 9667, c/o The Electrical Review.

CAPABLE Electrician, civilian and R.A.F. experience. Seeks progressive situation, home or overseas.—Box 9627, c/o The Electrical Review.

CHIEF Designer-Draftsman desires position London, 17 years' experience on research and production design of radio equipment and measuring instruments, domestic appliances, light mechanisms, etc.—Box 9608, c/o The Electrical Review.

CHIEF Electrical Engineer of large steelworks, successful and wide experience, previously 18 years with electrical plant manufacturers, giving satisfaction to present principals but desires change to South or S.W. England. Technical representation required where executive ability is called for.—Box 8661, c/o The Electrical Review.

COOKERY Sales Demonstration. Young man (33), with E.D.A. certificate, offers services to a go-ahead Electricity Showroom or Manufacturer.—Box 8651, c/o The Electrical Review.

ELECTRICAL/Mechanical Engineer (42), A.M.I.E.E., ex-public school, desires permanent, progressive, executive position in the South. Works experience covers both production and plant maintenance, layout of all types electric furnaces, hydraulic presses, machine tools.—Box 9672, c/o The Electrical Review.

ELECTRICAL Engineer, age 40, seeking change of position, requires post in supervisory capacity where wide experience in installation and maintenance could be used to advantage.—Box 9614, c/o The Electrical Review.

ELECTRICAL Engineer, A.M.I.E.E., aged 34, released R.A.F. Class A, desires appointment (preferably with consulting engineers). 15 years' experience electrical plant inspection and maintenance. Qualified to advise on maintenance planning and efficient plant operation, including compliance with regulations. Considerable technical and business ability and able to prepare reports and schemes. Must be position with scope for increased responsibility with resulting remuneration.—Box 9620, c/o The Electrical Review.

ELECTRICAL Engineer, A.M.I.E.E., aged 34, released R.A.F. Class A, desires senior appointment with scope and first-class opportunities to attain managerial position. 15 years' experience electrical and mechanical plant inspection, maintenance, repair and installation work. Has ideas for planned maintenance of plant. Considerable technical and business ability. Highest references.—Box 9619, c/o The Electrical Review.

ELECTRICAL Engineer requires change; seeks responsible progressive position; 17 years' experience in general and marine electrical engineering, including installation, manufacture and maintenance.—Box 9685, c/o The Electrical Review.

ELECTRICAL Engineer (41), active and versatile, with practical, technical and commercial experience motors, control gear, transformers and instruments, seeks position with scope in commerce or industry, at home or abroad.—Box 9622, c/o The Electrical Review.

ELECTRICIAN with 21 years' practical experience of industrial and general electrical power, lighting and plant installation, maintenance and inspection, seeks permanent progressive change. Present position held eleven years. Single, good appearance and address. Willing to travel home or abroad.—Box 8682, c/o The Electrical Review.

ELECTRICIAN, 23 years' experience, desires change or partnership. Installation work, all classes, also household refrigerator and radio repairs.—Box 9680, c/o The Electrical Review.

ELECTRICIAN, 25 years' exp., industrial installation, A.C. and D.C. motors, automatic control, switchgear, cabling and jointing, complete installations, first-class work.—Box 9681, c/o The Electrical Review.

EX-Branch Manager of electrical wholesalers seeks post, buying, managing, orders; 4 years with Superlamp Ltd., age 37, married, ex-R.A.F. Commence at once. Office, or travelling considered. Over 20 years' experience.—J. Banks, 63, Constable Av., New Malden, Surrey. 8635

EX-R.E.M.E. officer (26), Grad. I.E.E., Higher National Diploma Electrical Power Engineering, seeks progressive appointment in electrical industry. Experience in manufacture and testing of generators, motors and power transformers, also maintenance and repair of many types radar and communications equipment; responsible workshop and staff appointments held.—Box 9613, c/o The Electrical Review.

EX-Squadron Leader R.A.F. (25), B.Sc. (Electrical Engineering), First Class Honours, seeks progressive post in or near London with prospects in Technical Sales or Production side of light electrical engineering company. Technical, organisational and executive experience in R.A.F. Radar work. Widely travelled. Willing to undergo period of training.—Box 9683, c/o The Electrical Review.

EXPORT Engineer (35), conversant with foreign specifications, Continental Engineering Degree (British national), A.M.I.E.E., excellent linguist, ex-Admiralty Interpreter, registered Disabled Person (no visible disability) after R.N.V.R. service (Electrical Branch), seeks responsible position with Technical Export organization.—Box 8662, c/o The Electrical Review.

FOREMAN Electrician (50), just completed large contracts, seeks similar situation, used to control planning, estimating; 34 years' experience all classes of work.—Abraham, 9, Dale Road, Crayford, Kent. 8655

GRAD. I.E.E. (23), indentured apprenticeship. Higher and ordinary N.C. desires progressive position, home or abroad.—Box 9617, c/o The Electrical Review.

HONOURS Graduate (Mechanical Sciences Tripos) A.M.I.E.E., seeks a position offering good prospects and opportunity to use 16 years' experience in design and application of Motor Control and Protective Apparatus.—Box 8678, c/o The Electrical Review.

KEEN Electrical Engineer, 21½ years, desires further experience, H.N.C., 7 years' apprenticeship in all branches of public distribution authority. Would accept suitable post in any district and give service to obtain required experience.—Box 9669, c/o The Electrical Review.

MAN with 30 years' experience London wholesale trade, dealing with orders and assisting buying, would be glad to hear from interested houses in London and Home Counties area.—Box 8636, c/o The Electrical Review.

PLUMBER Joiner, experienced E.H.T. and L.T. cables, wiring, services, etc.—Box 9677, c/o The Electrical Review.

STOREKEEPER (Chargehand), 18 years' experience of the electrical trade, desires situation with prospects. Willing to take situation outside London.—Box 8636, c/o The Electrical Review.

WELDING Engineer (38), extensive experience of welded design and production, welding plant design and layout, sales and sales organisation, seeks position offering scope for ability, either home or abroad.—Box 9668, c/o The Electrical Review.

AUCTION NOTICES

G. R.

By direction of the Ministry of Supply.

FULLER, HORSEY, SONS & CASSELL

are instructed to offer for Sale by Auction in lots at Woolwich Arsenal, London, S.E., on Tuesday, October 22nd, and day following, at 11 o'clock precisely each day:

GENERAL INDUSTRIAL EQUIPMENT AND SURPLUS STORES

including: 105 Electric Exhaust Fans, 650 Grindstones, 75 Hand Trucks, 2,300 Pigeon Baskets, 120 Vices, 90 Anvils and Swage Blocks, 1,750 Trays, 40 Engine-driven Foam Generators, 250 Grease Guns, 30 tons Bolts and Nuts, 100 Engines, 250 Electric Motors, 700 Pumps, 350 Pressure Gauges, 650 Sledge Hammers, 600 Mattocks, 2,100 Wire Cutters, 4,500 Lamps, 1,000 Sheave Blocks, 500 Drawing Boards, 4,000 Leather Straps, 2 tons Emery Cloth, Physical and Chemical Laboratory Equipment, and a wide range of other Stores and Equipment.

Catalogues (6d. each) may be had when ready from Fuller, Horsey, Sons & Cassell, Industrial Auctioneers, 10, Billiter Sq., E.C.3 (Telephone No. ROYal 4861). 2589

FOR SALE

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

GOVERNMENT SURPLUS STORES

THE Ministry of Supply has for immediate disposal the following Petrol Engine-driven Generating Sets, located as shown below.

AR3349, AG/G/-458/65/541-712, H.D. A565236/43/E.52, A/C 741, Depot Serial No. 61/3/130. 172 Petrol Engine-driven Generating Sets, 14 b.h.p., J. A. Prestwich (A. Lyon) engine, 0.36 kW, 14/20 volts D.C.: Lancashire Dynamo generator. Condition unused, with canvas covers, spares in cases for 156 sets only. Located at 61 M.U., R.A.F., Handforth, Cheshire (Blister Hangar, bottom of shed opposite rack 21-24, 17-18, 1-2, Bay 29-28). For sample inspection only by appointment contact Wing-Commander Supply, 61 M.U., R.A.F., Handforth, Cheshire (Tel. No. Bramhall 2020, extn. 129).

AR 3349, AG/G/-458/65/101-314, H.D. 42S67, Depot Serial No. 25/6/275. 214 14-b.h.p., J.A. Prestwich engine, 0.36 kW, 14/20 volts D.C., Lancashire Dynamo generator. Condition unused, complete with canvas cover, spares in cases. Located at 25 M.U., Hartlebury, Worcs. (Bay 4 and Shed 22, 1 Shed 6 Site). For sample inspection only, by appointment, contact Officer Commanding, R.A.F. 25 M.U., Hartlebury, Worcs. (Tel. No. Kidderminster 3411).

Arrangements for sample inspection only can be made by prior application to the addresses named. Purchasers must take delivery free on rail location within two weeks of the date of issue of release instructions.

Offers for any or all of these items are invited. No forms of tender are necessary, and letters should be addressed to Ministry of Supply, Director of Contracts, Great Westminster House, Horseferry Road, London, S.W.1, to arrive not later than 10 a.m. on 28th October, 1946.

Envelopes must be marked "Tender No. 285901," returnable 10 a.m. on 28th October, 1946. Failure to mark the envelope correctly may result in a tender not being considered.

Any contracts made as the result of this tendering will be subject to the Department's conditions of sale, copies of which may be obtained, if desired, from the Ministry of Supply, Directorate of Disposals (RE), Room 603, Great Westminster House, Horseferry Road, London, S.W.1. Reference 12/Sales (RE), Tender No. 285901, should be quoted when applying for these forms. 2736

NORTH-WEST MIDLANDS JOINT ELECTRICITY AUTHORITY

OFFERS are invited for 150 Met. Vick. 2.5-ampere, 230-volt, 50-cycle, type N.A. 1s. coin "off-circuit" Meters. Offers to F. Favell, M.I.E.E., Chief Engineer and Manager, Kingsway, Stoke-on-Trent. 2733

A. Conkley & Co. Ltd. offer large selection of used Electric Motors, A.C. and D.C. Write—21/25, Tabernacle Street, London, E.C.2 (Monarch 3357/58). 46

A number of Lighting Sets from 1/10 kW, Petrol and Diesel driven, 110 or 220 v. D.C., of various descriptions. Further details from—The Electropiant Co., Wembley, Middx. 2780

A number of unused portable petrol-driven Welding Sets suitable for use with electrodes, sizes 6 to 12.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 2816

A quantity new 7/029 V.I.R. Flat Twin Cable, £25 per 1,000 yards.—Imperial Lighting Co., Pockock Street, London, S.E.1. (Tel. Wat. 4782). 9663

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

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

A C. and D.C. Motors, 1/2 h.p. to 15 h.p. Service Electric Co. Ltd., of Abbey Manufacturing Estate, Alperton, have a few motors available for immediate delivery. 2806

A C./D.C. 5-valve Superheterodyne Sensitive 3-wave Band Receiver. Excellent tone. Attractive modern cabinets in "Plastele" or polished wood, £16 16s. Usual trade terms and facilities. Early delivery. Trade only.—Morgan, Osborne & Co. Ltd., Southview Road, Warring-ham, Surrey. 110

A C. Motor and Control Gear, 150 h.p., 575 r.p.m., 400 volts, 3-phase, 50 cycles, with B.L. and S.C. gear and double hel. red. gear, 575 to 136 r.p.m., on one bed-plate with control gear. All by Metropolitan-Vickers.—Box 2722, c/o The Electrical Review.

A C. Motors for 400/440-volt, 3-phase, 50-cycle supply. One 100-h.p., 550 rev. G.E.C. slip-ring. Eight 30-h.p., 720 rev. Met. Vick. slip-ring. One 60-h.p., 480 rev. Westinghouse, slip-ring. Two 35-h.p., 580 rev. Crompton, slip-ring. One 14-h.p., 960 rev. Wright, squirrel cage.—Newman Industries Limited, Yate, Bristol. 2622

A C. Motors, 1/75th h.p. to 5 h.p., all voltages. Also D.C.—The Johnson Engineering Co., 319, Kennington Road, London, S.E.11. Telephones, Reliance 1412/3. 57

A Ttractive Lampshades, exclusive designs available for the Christmas trade. Prompt deliveries.—The British Bright Light Co. Ltd., 266-268, Battersea Park Road, S.W.11. 2734

A UDAX Ltd. now have available an extensive range of new season's designs of high-class Lamp Shades in Plastics and Parchment, together with a range of Table Lamps. Prompt delivery available to all parts of the country. Enquiries particularly invited from wholesalers and electrical factors.—84, Preston Road, Brighton (Tel. Preston 5565). 9523

B & W. Water Tube Boilers for disposal. Two 50,000 lbs. evaporation, 310 lbs. w.p.; two 50,000 lbs. evaporation, 220 lbs. w.p.; one 20,000 lbs. evaporation, 175 lbs. w.p.; one 12,000 lbs. evaporation, 200 lbs. w.p.; two 16,000 lbs. evaporation, 190 lbs. w.p.; one 9/10,000 lbs. evaporation, 200 lbs. w.p. We install complete, including brickwork. Economisers, Pumps, Piping, Valves, Generating Sets and Motors in stock. Please send us your enquiries; we can give immediate delivery.—Burford, Taylor & Co. Ltd., Boiler Specialists, Middlesbrough, Telephone, Middlesbrough 2622. 32

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

BEANTEE Festoon Striplight Holders, made of X20 Bakelite, for use with 7/029 T.T.R. cable, require no tools or screws for wiring. Immediate delivery of any quantity. Passed by the fire authorities. Used by corporations and supply companies all over the world. Large quantities of British made Electric Lamps and Cable always in stock.—The Beantee Illuminations (London) Ltd., Temporary Address, 6, Upper Street, Islington, London, N.1 (Phone, Canonbury 4555). 71

BT.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. 92

BURDETEE & Co. Ltd. stock Reconditioned A.C. and D.C. Motors and Starters equal to new. Day and night service.—Stonhouse St., Clapham, S.W.4. Mac. 4555. 17

CHOKES, suitable for 80-w. Fluorescent Tubes, 220/230 v., 50 c. Reputable manufacture, immediate delivery.—Hardman & Co. Ltd., The Baum, Rochdale, Lancs. Telephone No. 4151. 2704

"CLEFA" Hall Lanterns, Pendant Fittings and Wall Brackets; also Shade Makers, Gymbals, etc. Actual manufacturers.—Central London Engineering (Fabrications) Ltd., 120, Old Street, E.C.1 (C.L.E. 2586). 108

D.C. Motors, new, 200/230 volts, 1,400 r.p.m.; 8 to 31½ h.p., also 110 volts, D.C., 21 h.p., several available with starters.—Stewart Thomson & Sons (L'pool) Ltd., Fort Road, Seaford, Liverpool, 21 (Telephone Number, Bootle 2697) or 28, Victoria Street, Westminster, London, S.W.1 (Telephone Number, Abbey 2101). 96

D.C. 220-volt Automatic Contactors by Allen West, for operation with 4-h.p. and ½-h.p. Motors.—T. Porter & Co. (Salford) Ltd., Weaste Works, Salford, 5. 9624

DYNAMOS, 100 v., 15 kW, compound, lead bearings.—15, Kingsley Grove, Audenshaw, Manchester. 2689

ELECTRIC Arc Welder, also Douglas Automatic Coil-Winder. Both used but in first-class condition. Call or write—Crosby & Co. Ltd., Farnham, Surrey. 2813

ELECTRIC Convector Heaters. Home and Export markets supplied. Prompt deliveries from Weatherhead & Company (Glasgow) Limited, Electro-Engineering Manufacturers and Distributors, 153, Oxford Street, Glasgow, C.5. 2612

ELECTRIC Fans (2), new, 36", heavy duty, 400 v., 3-phase, 50 cycles, totally enclosed motors, 226 10s. each; also 5 oil-immersed Transformers, G.E.C., 230 v., 100 v., 5 kVA, in new condition, 26 each.—Page & Miles Ltd., 60, Western Road, Brighton, B'ton 3221. 9678

ELECTRIC Lamps, Flashlights, Flashlight Bulbs, Portable Fires, Accessories. Prompt delivery.—Suplex Lamps Ltd., 50, Gray's Inn Road, London, W.C.1. Holborn 0225. 116

ELECTRIC Motors, A.C. and D.C. We supply all types and sizes of electrical machinery. Slow speed reduction gears can be supplied to customers' requirements with short deliveries. Send your enquiries to—Be-Be Engineering, 3, Retreat Close, Kenton, Middx. (Wordsworth 4928). 42

ELECTRIC Motors, 1/3 h.p., 3,000 r.p.m., D.C. 110 volts. Also 220 volts. Stock delivery, 26 each.—John Steel, Clyde Mills, Bingley, Yorks. 84

ELECTRIC Motors and Dynamos. We hold one of the largest stocks of new and secondhand motors. Secondhand machines are thoroughly overhauled. Inspection and tests can be made at our works. For sale or hire. Send your enquiries to—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, City Road, London, N.1 (Phone, 5512-3 Clerkenwell). 13

ELECTRIC Welding Plant, Engine and Electric, A.C. driven, 300 amps, output, complete with weather-proof covers.—Box 34, c/o The Electrical Review. 13

ELECTRICAL Fittings, Ironclad Bells, 110 and 220 v. D.C. Handlamps, Industrial Shades, Floodlights, etc., all new. Special prices quoted for quantities.—James McKenzie Ltd., Oxton Road, Birkenhead. 2790

ELECTRICAL Testing Equipment. Offers invited for one 5-panel Test Board; one 5-kVA Transformer, 440-2,000 volts, for H.T. test; one 30-kVA Testing Transformer; all for carrying out tests on domestic electrical cooking/heating appliances. Can be inspected at—Lane & Girvan, Bonnybridge, Scotland. 2745

ELLISON Circuit Breaker, 733 amp., T.P., I.C., 440 v., 50 cycles, Serial No. 363087, complete with 200-ft. cable; Ellison Circuit Breaker, 300 amp., T.P., I.C., 440 v., 50 cycles, Serial No. 372213; Ellison Oil Circuit Breaker, 60 amp., D.P., Serial No. 367475; Secondhand Cable, 124 yards (in two equal lengths), low tension 4-core, 4 . 4 . 4 . 04 sq. in., impregnated paper insulated, lead covered, compounded paper taped, compounded jute served, single wire armoured and compounded jute served cable with shaped conductors, 680 volts class. All living at Dundee. Expanded Rubber Co. Ltd., 675, Mitcham Rd., Croydon, Surrey. 2672

FLUORESCENT Chokes, 80 watt, wax filled, silent in operation. Prompt deliveries.—Micramatic Ltd., Meico Works, Congleton, Cheshire. 73

FLUORESCENT Lighting complete with P.F.C. tapped choke and tube, 26 15s.—Leon's Electric, 90, Queen Victoria Street, E.C.4 (Phone, City 5879-1593). 9566

FLUORESCENT Fittings. Wholesalers can offer immediate and regular deliveries of Super Quality 5' Trough and Distributive Type Units, complete with all gear.—Box 2548, c/o The Electrical Review. 2672

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FLUORESCENT Lighting. Special offer, wholesalers only: Fittings without tubes. Minimum order, 12 of each type; 20-gauge stove enamelled white, fitted Constead or ballast unit control gear, Industrial Trough Unit, 25 15s. each nett; ditto, Built-in Flush to Ceiling Unit, 25 10s. each nett. Immediate delivery.—Scemco Ltd., 6/7, Soho Street, London, W.1 (Tel. Ger. 2034). 120

FLUORESCENT Lighting in all several designs—can be supplied from stock to meet all requirements. Send your enquiries to—John Phillips & Co. (Electrics), 31, Fortune Green Road, N.W.6 (Park 4772). 2540

FLUORESCENT Lighting: 18" 15-w., 24" 25-w. and 36" 45-w. Fittings, complete with tubes. Colours: White, Warm White, Daylight and Pink.—Scemco Ltd., 6/7, Soho Street, London, W.1 (Tel. GER. 2034). 118

FLUORESCENT Lighting Fittings. Extensive range, including Trough and Flush type, fitted with "All in One" "Constead Unit," Delivery 7 days, with tubes. Write—Scemco Ltd., 6/7, Soho Street, London, W.1. Phone, GER. 2034. 100

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INSTALLATION Tester, 500 v. Record Minor, 211. From stock.—Robins Electric, 222 & 222b, West End Lane, N.W.6. 83

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LEAD-Covered Cable, 1/.044 single, var. cam. insulated. App. 4,000 yds., various lengths, not been used, 4d. yd.—Wilkes, Derby Rd., Stapleford, Nottingham. 8660

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

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

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NEW 18-c. Gold Chronographe Wrist Stop Watch, split second timekeeper, calibrated 1/1,000 sec. flyback, etc., etc. (cost 125 guineas), superb looks and performance, guaranteed, 265; Eversharp (U.S.A.) 14-c. Gold Streamline Model Fountain Pen, 212 10s.; ditto Pencil, 28 10s.—E. W. Thomas, 40, Kensington Park Gardens, London, W.11. 8646

NEW or Secondhand A.C./D.C. Motors can be supplied from stock or at short notice. Specialists in rewinds and repairs. Send your requirements to—John Phillips & Co. (Electrics), 31 Fortune Green Rd., N.W. 6 (Park 4772). 2538

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PHONE 98 Staines. 90-kW Ruston Diesel Set, 110 vo. D.C.; 25-kW Mirreles ditto, 110 vo.; 7/9-kW Ruston ditto, 110 vo.; 5-kVA Ruston ditto, 400/1/50; Weir Feed Pump, 8 $\frac{1}{2}$ " \times 6" \times 13".—Harry H. Gardam & Co. Ltd., Staines. 60

PLATING Generators, unused, several ranging from 350 to 700 amps., 8 to 12 volt, plain or with A.C. or D.C. motor drive. Particulars from—Stewart Thomson (Liverpool) Ltd., Fort Road, Seaforth, Liverpool, 21 (Boote 2697); or 28, Victoria Street, London, S.W.1 (Abbey 2101). 63

QUANTITY of Double Roller Chain 1 $\frac{1}{2}$ " wide, $\frac{3}{4}$ pitch $\frac{1}{2}$ " rollers.—15, Kingsley Grove, Audenshaw, Manchester. 2690

REBUILT Motors and Generators. Long deliveries can often be avoided by purchasing rebuilt secondhand plant. We can redesign or replace surplus plant of any size. Send us your enquiries. Over 1,000 ratings actually in stock here.—Dynamo & Motor Repairs Ltd., Wembley Park, Middlesex (Telephone, Wembley 3121, 4 lines); also at Phoenix Works, Belgrave Terrace, Soho Road, Handsworth, Birmingham (Telephone, Northern 0898). 26

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

ROTARY Converters, 200-kW, 6,600/3/50 input, 230 volts, 2-wire D.C. output, complete with Transformer and switchgear, seen running in Liverpool, 2,000-kW, 6,600/3/50 input, 418/462 volts, three-wire D.C. output, complete with transformers, starting panels, D.C. machine panels. First-class condition. Two sets available.—Stewart Thomson & Sons (Liverpool) Ltd., Fort Road, Seaforth, Liverpool, 21 (Boote 2697); or 28, Victoria Street, London, S.W.1 (Abbey 2101). 72

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SPIRALS, 230/50 volt, 1,000 watts, 106s.; 750 watts, 80s.; 600 watts, 60s. per gross, carriage paid.—Box 9675, c/o The Electrical Review.

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1,200-ton Upstroke Moulding Press, David Bridge & Co. Steel Steam Heated Platens, 8 ft. \times 5 ft., 33" daylight, 6 rams, 2 ton working pressure. Seen working. £6,000.—Box 2805, c/o The Electrical Review.

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[Continued on page 72.]

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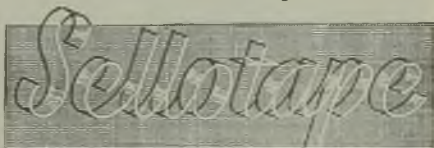
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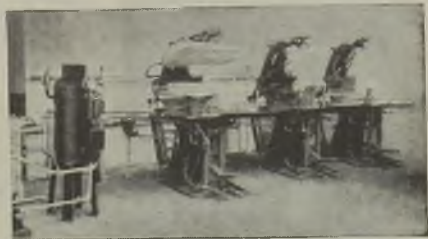
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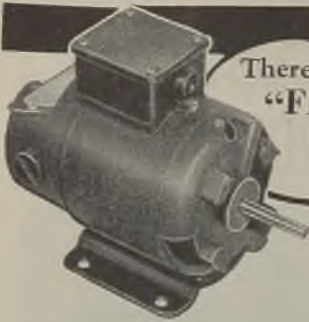
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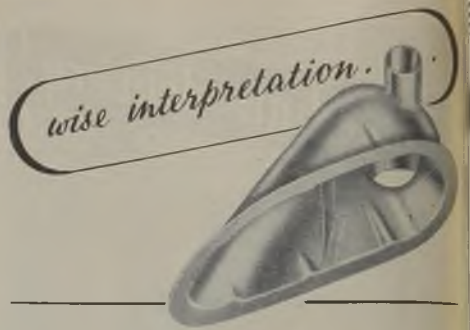
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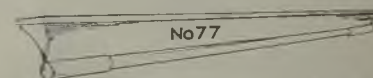
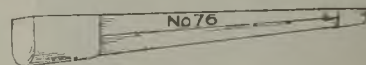
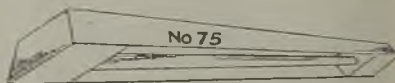
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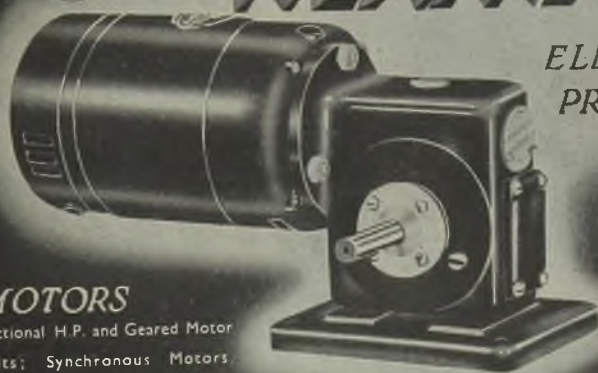
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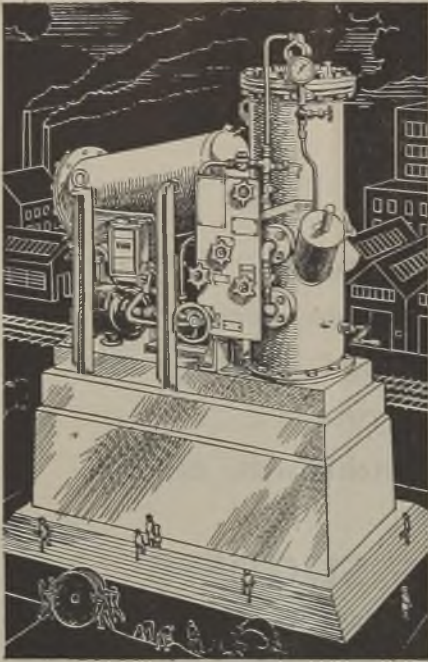
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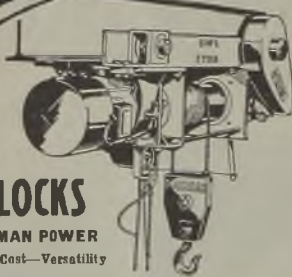
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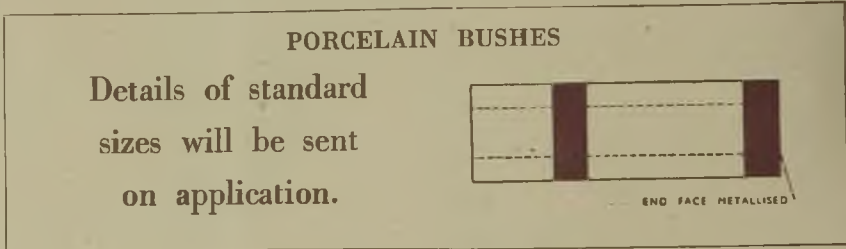
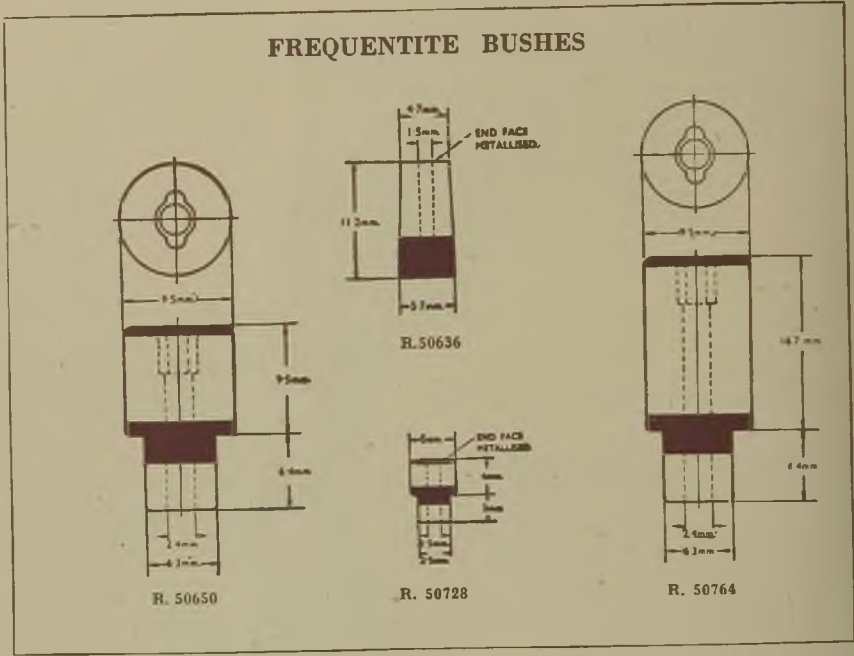
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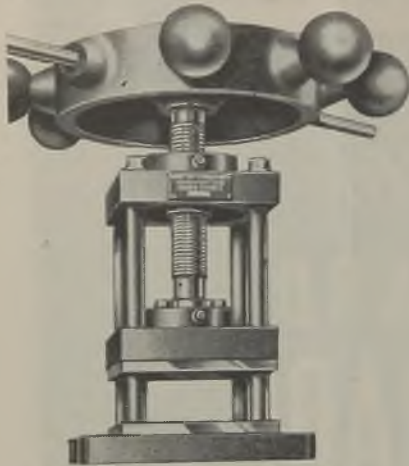
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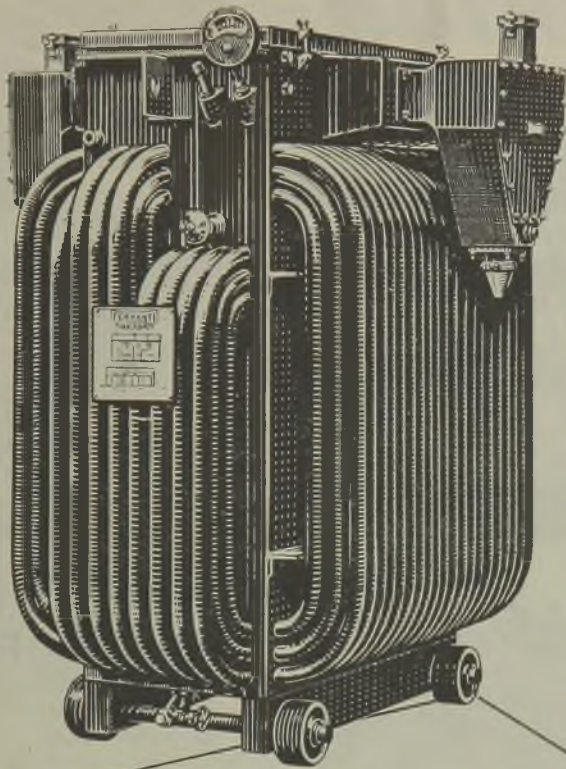
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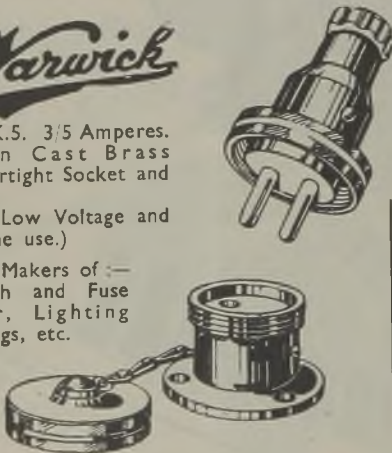
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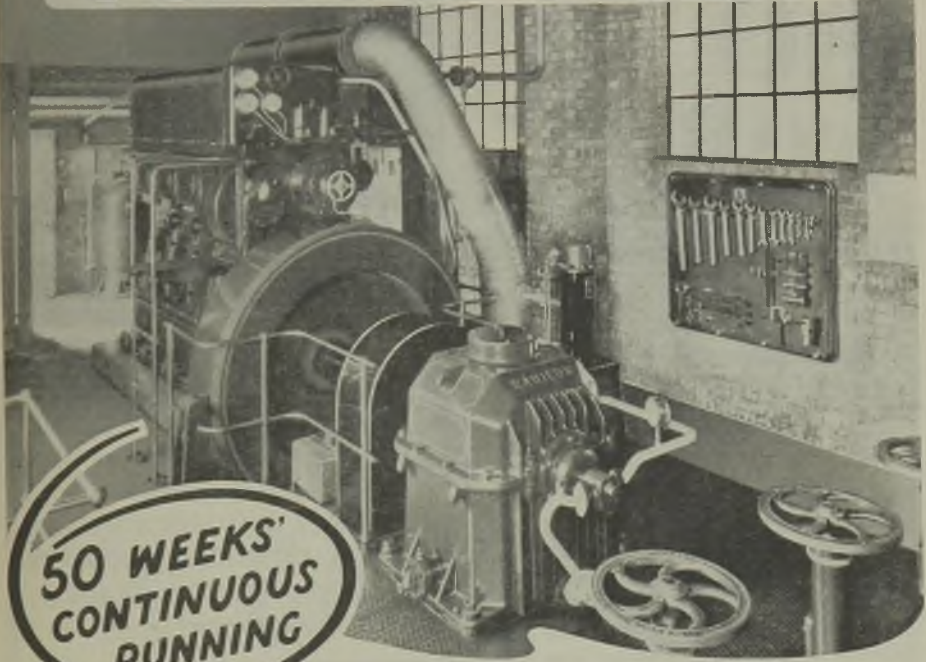
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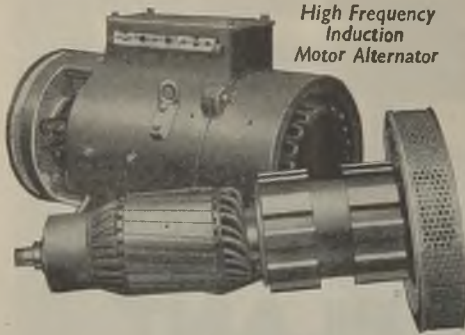
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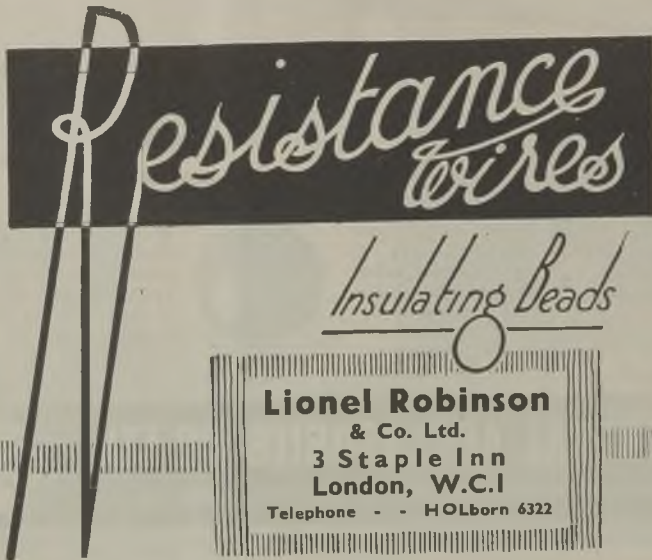


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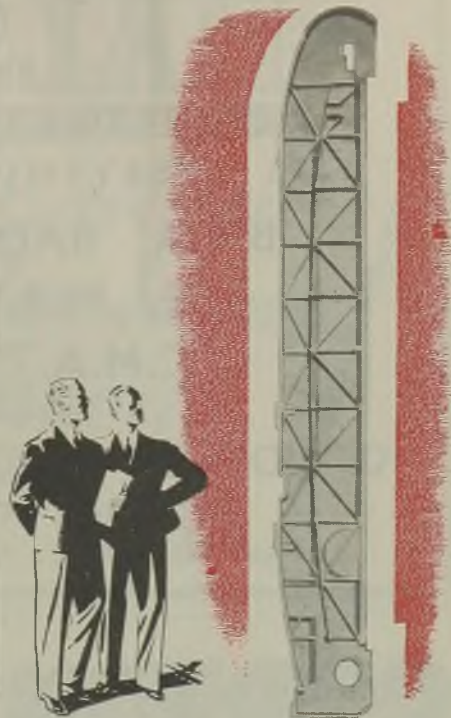
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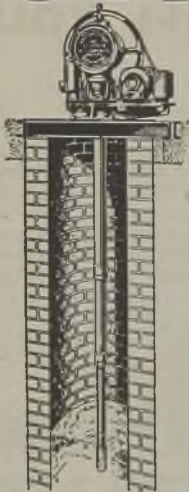
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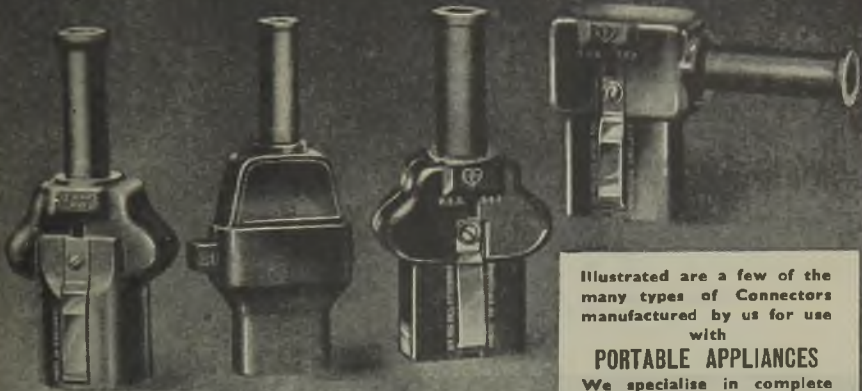
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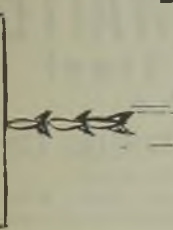
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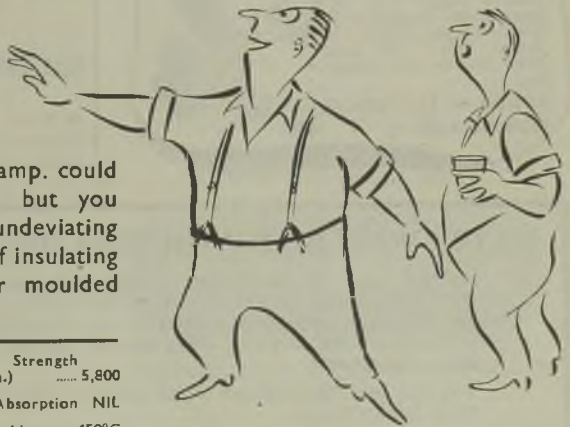
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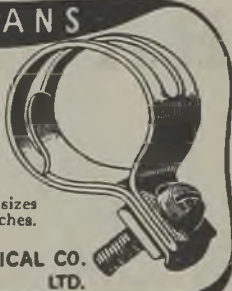
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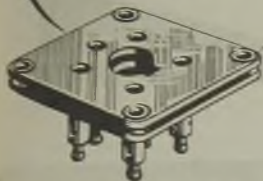
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