ELECTRICAL REVIEW

FOUNDED 1872

Vol. CXXXVII. No. 3549 NOVEMBER 30, 1945 9d. WEEKLY

The right wire for the job...

Made to B.I. Callender's standards of quality, B.I. Callender's Cotton Covered Wires and Strips are justly renowned for their consistency of covering, and of space factor. Their uniformity counts with the discerning production engineer. Made with standard white cotton coverings or with coloured tracer thread, as desired.

B.I. Callender's

COTTON COVERED WIRES AND STRIPS

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

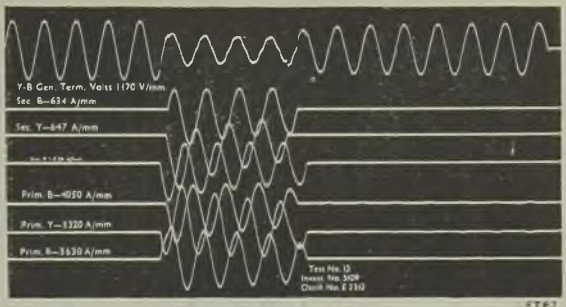
Generator TRANSFORMERS

The 80,000 kVA transformer used for the test. The forerunner of 5-80,000 kVA and 2-87,000 kVA 11/66 kV generator transformers for the London Power Company (Battersea Generating Station).

Ferranti Large High Voltage Generator Transformers are designed on facts confirmed by full-scale practical tests.

In 1935 a Ferranti Generator Transformer of 80,000 kVA 66 kV was tested to destruction by a series of 14 full-scale short circuit tests.

A typical oscillogram showing 1,420,000 maximum instantaneous kVA (720,000 kVA symmetrical r.m.s. value.)



LARGE POWER TRANSFORMERS supplied by Ferranti ——

Over 9,000,000 kVA for voltages 33 kV and above
Over 6,000,000 kVA for voltages 66 kV and above

FERRANTI LTD.

HOLLINWOOD · LANCS.

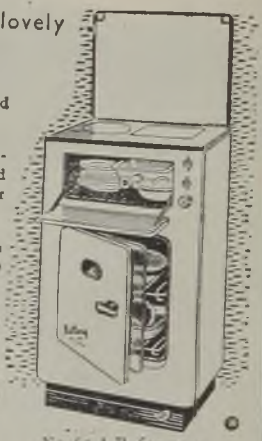
LONDON OFFICE: KERN HOUSE · KINGSWAY · W.C.2.

The 'BELLING' Electric Streamline Cooker

NOW IN LIMITED PRODUCTION

The Beautiful 'BELLING' *Electric Streamline Cooker*

—will look just lovely in your kitchen



1 Finished in finest cream and black vitreous enamel.

2 Grand big oven with automatic temperature control and full size patent glass door for 'visible cooking.'

3 Fast boiling plates which you can turn right down to "simmer."

4 Very simple to use. So easy to clean.

5 Hinged hob cover lifts up and keeps the wall clean when cooking.

You can't beat a

No. 61 A.B. £29 5 0
Patent Nos.
476779 and 493736

Belling

BELLING & CO., LTD., BRIDGE WORKS, ENFIELD, MIDDLESEX

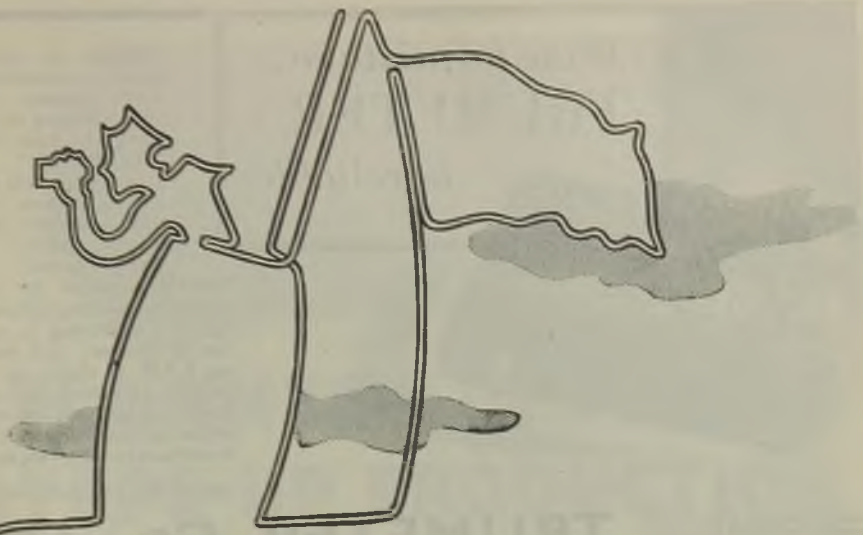
C.R.C.27

★ *This announcement is now appearing in the National newspapers and magazines*

You can't beat a Belling

BELLING & CO. LTD., BRIDGE WORKS, ENFIELD, MIDDLESEX TELEPHONE: HOWARD 1212

C.R.C.319



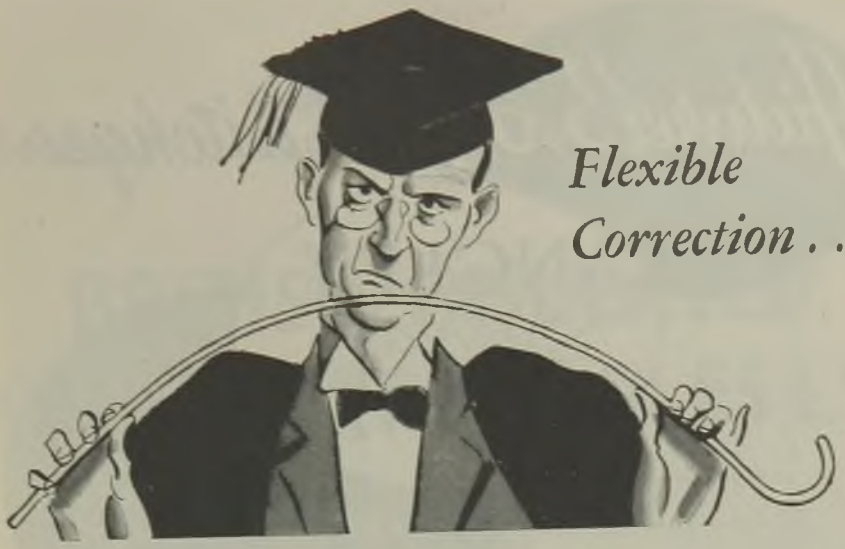
FOR SHIP WIRING...

"ALL'S WELL" WHEN IT'S

CROMPTON CABLES

CROMPTON PARKINSON LIMITED, ELECTRA HOUSE, VICTORIA EMBANKMENT, LONDON, W.C.2

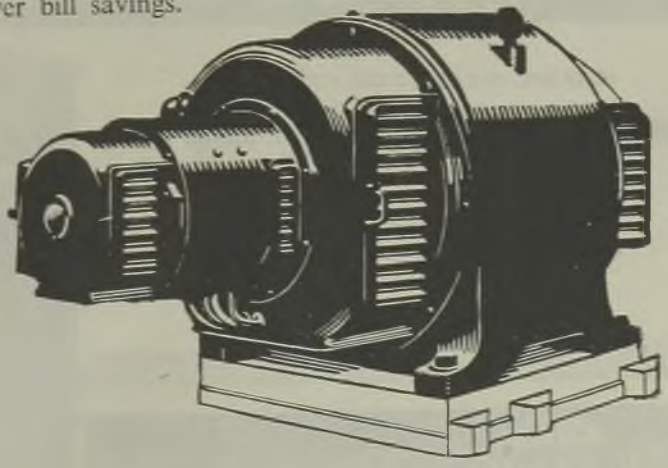
Telephone: TEMple Bar 5911 *Telegrams: Crompark, Estrand, London*



Flexible Correction . . .

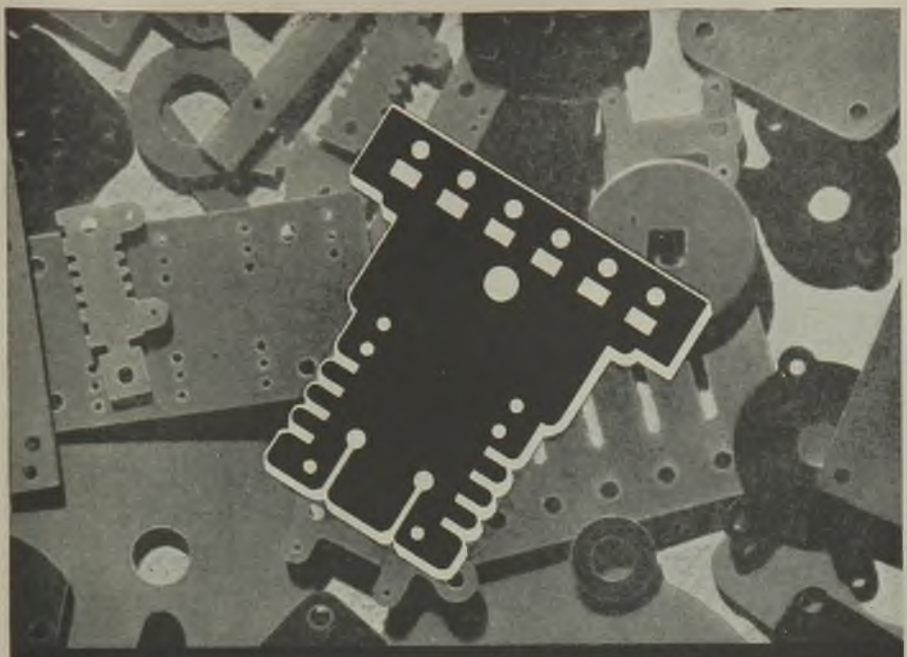
Where the aggregate load or power factor fluctuates widely, a Crompton Auto-Synchronous machine working as a synchronous condenser can maintain a constant improved power factor.

The leading power factor of the machine is regulated automatically to suit the changing character of the load. Such an installation is quickly paid for in power bill savings.



CROMPTON PARKINSON
LIMITED

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



A ROUTINE PIERCING AND BLANKING TEST

BAKELITE LAMINATED

THE piercing and blanking properties of Bakelite Laminated are checked as a matter of routine. Above is illustrated a piece of the material which indicates the design of tool used. Note the clean edges and the close proximity of the holes. The design generally represents a critical test of practicability. Samples and data of special punching grades for a variety of purposes will be furnished upon request.

BAKELITE PLASTICS

REGD. TRADE MARKS

Pioneers in the Plastics World

T38

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

different types

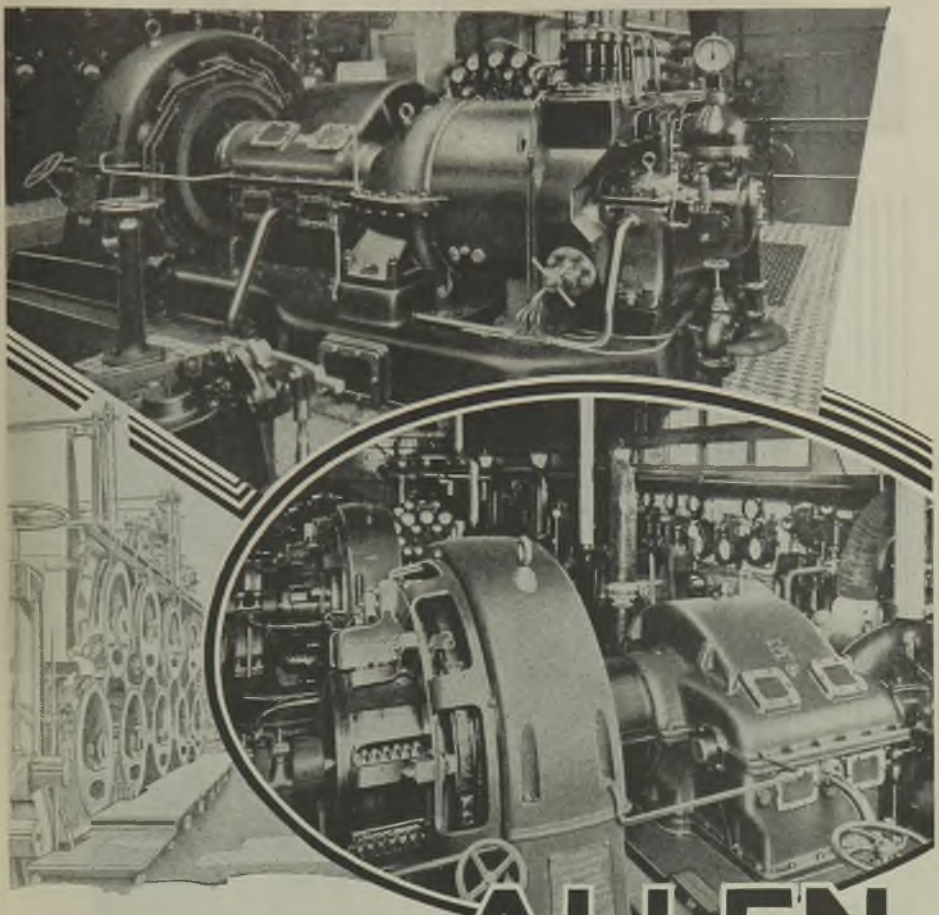
—suited to every kind of driven mechanism

NECO
TRADE MARK

GEARED MOTORS

Complete range for any voltage, almost any speed from 1 rev. in 12 minutes to 1,750 r.p.m. H.P. at the final shaft up to 1½; final shaft output from 25 lb. ft. on the smallest machine to 1,500 lb. ft. on the largest.

THE **NORMAND** ELECTRICAL CO. LTD.
NORTH STREET • CLAPHAM COMMON LONDON S.W.4 TEL: MACAULAY 3211-4



ALLEN TURBO PLANT

for INDUSTRIAL POWER

THE turbine plant illustrated provides power and process steam for manufacturing the LIGHTEST BRITISH-MADE PAPER at Messrs. Brittains Ltd., Cheddleton Paper Mills, Near Leek, Staffs. These are three 600 kW. Allen D.C. turbo-generators of the pass-out type, each supplying 12,000 lb. of process steam per hour at 15/30 lb. per sq. in. gauge. A fourth set of 750 kW. capacity is under construction for this installation.

The HEAVIEST BRITISH CYLINDER-MADE BOARD is also manufactured with the use of Allen turbo-generators totalling 8,000 kW., at Thames Board Mills, Purfleet.

This Company specialises in complete industrial turbine plant installations, especially for the generation of power from process or heating steam to suit the operating conditions and requirements of widely differing industries. The Allen range includes all types of machines for power outputs up to 5,000 kW. (7,500 b.h.p.).

W. H. ALLEN, SONS & CO LTD.

BEDFORD ENGLAND

ELECTRICAL REVIEW

November 30, 1945

Managing Editor:
Hugh S. Pocock, M.I.E.E.

Technical Editor :
C. O. Brettelle, M.I.E.E.

Commercial Editor:
J. H. Cosens

Contents :—

EDITORIAL, ADVERTISING & PUBLISHING OFFICES : Dorset House, Stamford St., London, S.E.1
Telegraphic Address : "Ageekay, Sedist, London." Code : ABC. Telephone No. : Waterloo 3333 (50 lines).
Registered at G.P.O. as a Newspaper and Canadian Magazine rate of postage. Entered as Second Class Matter at the New York, U.S.A., Post Office.
Annual Subscription, Post free : British Isles, £2 7s. 8d. ; Canada, £2 3s. 4d. ; Elsewhere, £2 5s. 6d.
Cheques and Postal Orders (on Chief Office, London) to be made payable to ELECTRICAL REVIEW LTD., and crossed "Lloyds Bank."

POWER FACTOR METERS

Single and Polyphase — Switchboard and Portable Patterns :—

EVERETT EDGCUMBE "Rotary" Power Factor Meters possess the following distinctive characteristics:—

- The scale extends over the whole circumference of the dial.
- They indicate "Leading" and "Lagging" power factor in both forward and reverse directions.
- No moving coils, ligaments or brushes are used.
- They are independent of ordinary variations of voltage, current and frequency.

"INKWELL" Graphic Power-Factor Recorders give a continuous record of the changes in power factor, and having roll charts and a constant ink supply, require a minimum of attention.

WRITE FOR CATALOGUE SHEETS 180 AND 308

EVERETT EDGCUMBE
COLINDALE WORKS
LONDON, N.W.9
Telephone: COLINDALE 6045

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

ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXVII. No. 3549. NOVEMBER 30, 1945 9d. WEEKLY

Public Ownership

Desirability of Announcing Proposals

LITTLE light was thrown upon the Government's plans for the nationalisation of certain industries by Mr. Herbert Morrison in his statement to the House of Commons last week. The King's Speech in August contained a reference to the Government's intention to " nationalise the coal industry as part of a concerted plan for the co-ordination of the fuel and power industries." This was taken to suggest that there would be a certain delay before the turn of the gas and electricity supply industries came. Mr. Morrison said that the coal nationalisation Bill would be presented during the present session and that the necessary measures for dealing with the gas and electricity industries would be introduced " at a later stage in the lifetime of the present Parliament," which may be any time within the next four or five years.

Terminological Subtleties

Mr. Morrison definitely referred to "national ownership"; hitherto much of the discussion of the subject has been based on ideas of " reorganisation " or " co-ordination " which could conceivably be achieved without the undertakings actually changing hands. Again, public ownership is not synonymous with nationalisation, for a majority of the undertakings are already publically (*i.e.*, municipally) owned and many municipalities are no happier about national ownership than the electricity supply companies.

Mr. Morrison has stated that the Government does not propose to issue a White Paper on its coal plan and so detailed discussion will have to await the appearance of the Bill. Presumably the same will apply in the case of electricity, but if the interval is likely to be long the parties concerned would like some notice of the proposals and a White Paper would serve the purpose of clearing the air and possibly saving much Parliamentary time.

No " Sabotage "

It was all very well for Mr. Morrison to threaten penalties (in the assessment of compensation) for those who failed to maintain their undertakings up to the time of transfer, but uncertainty of tenure is not conducive to bold enterprise. No electricity supply undertaking will attempt to " sabotage the public interest " (to quote Mr. Morrison's rather theatrical term). Their tradition of public service will be maintained, but they will feel that they are entitled to some indication of the Government's plans.

Some of the spokesmen of the electricity supply companies have announced their intention of fighting the proposals. This opposition is, of course, a matter of principle aimed, quite naturally, at securing the best terms. But it is pretty certain that any plan which is put forward will go through under the pressure of the Government's substantial majority.

Opportunities will occur for opponents of nationalisation to impress upon the Government the fact that the industry, in spite of ill-informed and politically-coloured criticism, has a good standing with the public and is basically efficient. It has certainly not reached perfection but

it is debatable whether change of ownership will bring it to that goal. It will be the duty of members of all parties to secure that the public interest (in this case a freely-available supply of electricity for all purposes at a reasonable price) is not "sabotaged" for the sake of a mere experiment in socialism.

Small Appliances

THERE is really nothing inconsistent between the call for greater electrification and warnings as to the present need to use electricity with strict economy during certain hours. Much spade work now will be necessary in order to maintain even the normal rate of growth of output, just as the manufacture of plant to meet the resulting demand a few years ahead must be put in hand immediately. Moreover, progress in electrification that is measurable only in kWh sold is incomplete. There are innumerable services that can be rendered only by electricity which make inappreciable demands on plant capacity but which should, nevertheless, be regarded as essential to a reasonable standard of living.

Fuel Utilisation

A COMPREHENSIVE view of what making the most of the national fuel resources entails can be obtained from the Report prepared originally by Dr. G. E. Foxwell and others for the Liberal Party and presented at a meeting of the Glasgow sections of the Institute of Fuel and the National Smoke Abatement Society. The coal saving through the substitution of electric for steam winders at collieries is quoted at 8 million tons per annum—approaching the gain of 10 million tons from railway electrification, which is also advocated. Caution regarding district heating, like that shown by Professor R. O. Kapp in an address this week before the Midland Section of the Institute (as in his earlier lecture reported in our issue of June 8th), should correct too facile assumptions regarding the extent of its field.

Different Coals

THE case for electricity does not rest on coal saving alone. There is in addition convenience in the broad sense of enabling the user to perform other tasks more efficiently. Yet it is "convenience" that Dr. Foxwell's committee holds to be reprehensibly responsible for much of the popularity of electric heating, despite the relatively high thermodynamic efficiency of carbonisation processes. The Committee's proposals for co-ordinating electricity and gas do not make it clear how the low-grade coal consumed for generating electricity could be used if the far more valuable coking coal (the better grades of which, as the report states, are approaching exhaustion) is to be used in one form or another for providing domestic heating as well as—it is to be inferred—fuel for power stations.

Mining Research

A REVIEW issued last year by the Ministry of Fuel and Power (47702-1) outlined future needful research relating to electrical apparatus in mines. Further progress in regard to flame-proof enclosure and intrinsic safety in low-power circuits up to 25-V is now recorded in the Report of the Safety in Mines Research Board for 1944 (Stationery Office, 1s. net). It is there shown that the safe gap between a case and its cover is unaltered when both are heated and is the same amount for (uncharred) synthetic resin or steel flanges. Also when the current in a circuit exceeds 1·0 A no effective protection is afforded by condensers or resistances. Bells and relays must therefore have high impedance and low consumption for intrinsic safety.

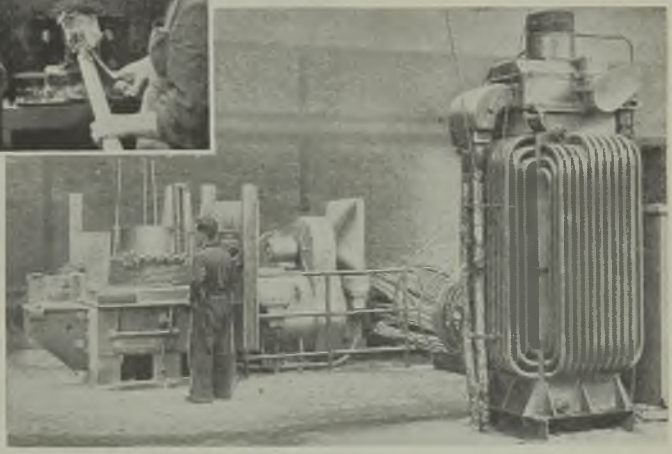
Call-up of Skilled Men

IN a letter published in this issue a Sapper captain in the M.E.F. (using the pen-name "Deferred") takes us to task for suggesting that the District Man-Power Boards are prejudicing industry by continuing to call up young "key" men. We fully sympathise with his view that unless men are called up those in the Services who have sacrificed several precious years of their lives cannot be quickly released. Our feeling was that it was not impossible to exercise discretion in this matter, even at the risk of being charged with unfair discrimination. If industry is prevented from regaining its feet by the loss of men who are needed for the reconversion process large numbers of Service men will come out only to find that there are no jobs to go to. Support for this view comes from Mr. Walter Higgs, chairman of Higgs Motors, Ltd., who told the Birmingham Chamber of Commerce last week that the calling-up of skilled workers was reducing factory output by from 15 to 20 per cent.

Making Bolts and Studs

Electrical Applications to Specialised Processes

WE were recently able to see at the works of A.P. Newall & Co., Ltd., Glasgow, the great part which electricity plays in the production of modern bolts and studs which are called on to meet increasingly heavy loading conditions with progress in structural engineering. The major raw materials for the factory are carbon and manganese-molybdenum steels, received at the factory as annealed rod and hot rolled round and hexagon bars. The rod, after pickling and washing, is dipped one or more times in a lime solution to create on drying a skin on the rod, which prevents "firing up"—metal sticking to the dies—in the operations subsequently carried out.



Above: The driving motor for this draw bench was originally a totally-enclosed motor, but has since been modified for pipe ventilation Right: Drawing machine, driven by an AC commutator motor, which requires a widely varying speed on starting up

Drying takes place in an electrical flash baker—a "Birlec" furnace in which air is heated by being blown over banks of elements, and the hot air stream is continued through the lime-coated coils. The temperature is thermostatically controlled at about 600 deg. F. The furnace is rectangular, with top swinging counter-weighted doors which open inwards under the weight of the metal on charging and outwards on discharging.

The rod is cold drawn, in various types of machines, one being a Marshall Richards equipment which deals with 0·5-in. to 1-in. rod which it reduces in cross-sectional area by 15 to 20 per cent. This machine is driven by a Laurence Scott 90-HP 1,500-RPM (maximum) variable-speed AC commutator motor served by a 115-kVA double-reduction voltage regulator. With 0·8-in. rod the normal drawing speed, which is constant, is about 300 ft. per min. A widely varying speed is required, however, at starting up. The machine motion at a very low motor speed is initiated by a body push bar, so that the operative can have both hands free to manipulate the drawing dogs. The motor is directly coupled to the main machine shaft.

Draw benches for up to 2·5-in. diameter bars and hexagon bars measuring 2·05 in. across the flats include one driven by a B.T.H. variable-speed AC commutator motor (124/40 HP, 720/240 RPM) which is run at its maximum speed as far as possible, so that the full power of the motor may be utilised. The motor was originally installed as a totally-enclosed unit, but it has since been modified

Rod under treatment in this straightening machine passes through flying shears

for pipe ventilation with satisfactory results.

Among the straightening machines which deal with the rod and bars after drawing is a Halden equipment in which the rod passes through two sets of adjustable staggered rolls, one vertical and one horizontal. The bar or rod under treatment passes through flying shears integral with the machine and controlled by limit arms set for the length at which the bar is to be cut. A 25-HP slip-ring motor drives this machine, with V-belt transmission of about 3 to 1 ratio from the 965-RPM motor shaft to a countershaft from which the rolls are driven. The motor runs continuously at constant speed, the shears, which move along at the same speed as the rod during cutting operations, being brought into operation by a friction clutch under the control of the limit arms.

The foregoing relates to preparatory operations common to all the four main classes of Newall products—" Hitensile " bolts and studs which are produced from carbon steel and have an ultimate tensile strength of 45/55 tons per sq. in.; " Newalloy " bolts and studs which are produced from manganese-molybdenum steel and have an ultimate tensile strength of 60/75 tons per sq. in.; " Newallastic " bolts and studs which have a similar tensile strength but greatly increased fatigue-resisting properties; and " Hi-Tem " bolts and nuts which are produced from chrome-molybdenum steel and will withstand working temperatures up to 500 deg. C.

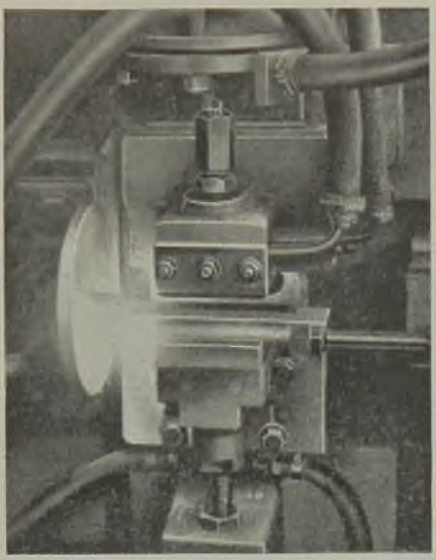
" Hitensile " and " Newalloy " bolts and nuts are produced by three entirely separate processes. The first, to which we propose to confine our attention almost entirely, employs National bolt-making machines, the second involves separate heading and screwing processes, and in the third hot forging, burnishing, grinding and screwing are all separate processes. There is a wide range of National bolt-making machines, capable of producing from 0·75-in. by 6-in. bolts at the rate of 50 per minute to 0·141-in. bolts (4BA) at the rate of 120 per minute.

The largest of the bolt-making machines is driven by a 75-HP motor which is arranged for rapid emergency stopping

The rod is fed into each machine through rollers to a point at which suitable lengths are guillotined. Thence there are five major groups of operations—extruding the wire to the body diameter, further extruding for the threads and forming the button heads,

trimming, pointing and, finally, roll threading. The largest machine is driven by a 75-HP main motor, and the smallest by a 15-HP motor. For each operation there is a micro-emergency switch which will automatically stop the motor in the event of a production fault developing and show where the fault is by means of a flag indicator.

These emergency switches operate in conjunction with a beam switch which is carried forward with the rotation of the motor and so makes a contact while the motor is running. If this contact is broken by any one of the emergency switches the motor is switched for reverse running. Immediately the motor stops the beam switch swings back into the "off" position, so that the motor does not actually reverse. These operations are effected by contactors in a nearby cabinet, and there is also for each machine a push-button station equipped for notching, forward, reverse, running and stop operations. Each of the larger bolt-making machines has an electrically controlled straightening and rod-entering device. The entering roll is clamped down on the wire hydraulically, and the forward motion is imparted by a small auxiliary motor which is reversible to enable the wire to be taken out of the machine. Apart from special requirements, such as drilling for split pins, the products of these machines are complete in every detail.



Resistance-heating upsetting machine in which electrical contact is made between the grip and plate electrodes through the blank

In the hot forging department there are three electrical upsetting machines of the resistance type. The bolt blank is placed between copper grips which are brought together by a small compressed-air cylinder. A pneumatic pusher presses the end of the blank against a copper plate. Electrical contact is thereby made between the plate and the grips and a very heavy current is passed through the blank, generating sufficient heat to render it plastic. The pusher then feeds the bar forward and the stock is gathered into a ball. When the pusher reaches a predetermined point the current is cut off and the partly formed bolt is ejected from the grips and passed on for mechanical forging.

Another type of resistance heating machine, without upsetting arrangements, has two

Intermittent swaging machine for waisting a number of portions on a 10-ft. bar

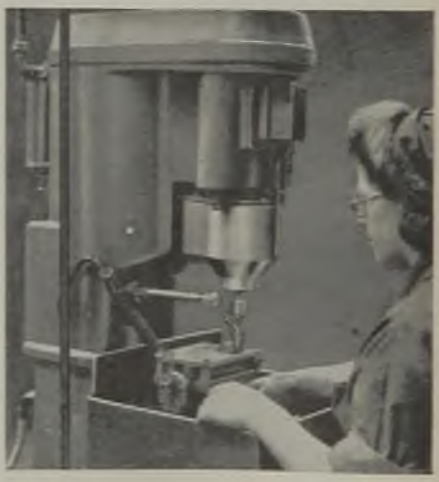
grips (electrodes) which clamp a section of the blank equal to the amount of stock required to form two bolt heads. When the forging temperature is reached, as indicated by the " colour " of the metal, the current is cut off and the grips are released automatically by the use of a photo-electric cell at the back of the machine which is lined up with the heated metal. The double blank is then cropped in the centre of the heated portion and the two similar blanks thus formed are passed on for forging.

Swaged bolts are threaded in circular roll thread generators

The " Newallastic " bolt is subjected to a waisting operation on the whole or part of the body, usually to a diameter slightly smaller than the root diameter of the thread. This has the effect of distributing the stress, which would otherwise be concentrated at the root of the thread, throughout the body of the bolt. The bolt is usually removed from the bolt-making or header machines as a blank which is first heat treated and ground before the waisting which is effected by cold swaging. This takes place in rotary swaging machines. The bolt head is gripped in a clutch and the body is fed between the swaging dies which are brought into operation by means of wedges and give the surface of the bolt 5,000 blows per minute, thus reducing it to the required diameter. After this treatment the body is in a state of compression and the waisted surface is entirely free from marks. These factors help to increase the fatigue-resisting properties.

An intermittent swaging machine waists a number of portions on a 10-ft. bar for the production of studs which, after waisting, are parted off, pointed and ground at the ends ready for thread rolling. The bar is pulled through the machine by a carriage which is operated by a lead screw. This is engaged by a clutch which is operated by a solenoid supplied through two cam-operated micro switches. The cams are governed by a timing box which regulates the lengths of the swaged and plain portions of the studs as required. The die-operating wedges are controlled hydraulically, while an electrically operated valve is incorporated in the timing circuit. The main geared driving motor is a four-speed machine—2,945, 1,470, 970 and 455 RPM.

The swaged bolts and studs pass to Steinle machines which have circular rolls on which the threads are generated. Both rolls are motor driven in the same direction, and the work is held on a rest between them. One remains in the same lateral position while the other is fed in hydraulically, and when the thread is fully formed the moving roll is returned to the open position by means of a solenoid which holds the operating lever in the " on " position up to this point. A very sensitive micro switch with vernier regulation trips the solenoid when it is actuated by the roll on this reaching



An air-electric tapping machine with top speeds up to 1,000 RPM

the full-thread position. The time for this operation varies with the type and size of the thread and the hardness of the material, but steel heat-treated to 75 tons tensile can be so threaded without any difficulty.

" Hi-Tem " bolts and studs, which are used very largely in connection with oil refining, are primarily designed for use at temperatures up to 500 deg. C. Their material is a creep-resisting chrome-molybdenum steel, but apart from this different raw material the product is practically of the same design as the " Newallastic " bolt and embraces the same manufacturing processes.

A further development in connection with the production of the " Newallastic " bolt is induction - heating hardening the swaged portion to a depth of 50 thousandths, with the result that the carrying load of the reduced portion of the bolt is equivalent to that of a bolt having the full diameter throughout the body, and still retaining the fatigue resisting properties of the waisted type of bolt.

Nut-making machines producing up to 1,440 blanks per hour

The machine shop is equipped with the latest high - speed machinery, including batteries of Warner & Swasey, Gishalts, Browne and Sharpe automatic centreless grinders, National tappers, etc. A Haskins air-controlled machine used for tapping blind holes is illustrated. It has top speeds ranging from 600 to 1,000 RPM, and is driven by a ½-HP motor.

Nuts are made from bright drawn hexagon bar 24 ft. long on Budd-Ranney nut-making machines. One photograph shows part of a battery of seven of these machines. The nut blanks, ready for tapping, are produced at the rate of from 360 to 1,440 per hour. The machines are driven by electric motors ranging from 5 HP to 15 HP.

We are indebted to Mr. A. P. Newall, managing director, for permission to visit the works and to publish this article, and to Mr. A. P. Newall, jnr., director, Mr. C. Reid, works manager, and Mr. A. Wilson, assistant works manager, for their help in gathering information and taking photographs.

Cliff Quay Power Station

PILING for the main foundations of the new power station on the River Orwell, which is being built by Ipswich Corporation to the design of Merz & McLellan, is now practically complete. Altogether 2,500 piles have been driven since June 11th; these have been cast *in situ*—a method which has been found speedier under present conditions than pre-casting and, since the station is required to be in commission within two years from now, that is a factor of great importance. Preliminary particulars of the plant to be installed were given in the *Electrical Review* of June 22nd, but the boiler steam pressure will be 635 lb. per sq. in. and not as then stated.

Further items are that the pulverised-fuel boilers will be automatically controlled, using AC motors with damper control for the two-speed forced- and induced-draught fans. Sequential operation of automatic soot blowing will be initiated from the boiler-control panels. Seaborne coal will be used, but railway sidings for emergency fuel supplies are to be provided later.

The fields of the 40,000-kW m.c.r. alternators will be excited by means of separate motor-generators. Most economical rating of the sets will be 80 per cent. of the m.c.r. Local supplies will be transmitted to Ipswich at 33 kV, but the output of the 11-kV alternators will first be stepped-up to 132 kV at which switching will take place by means of 2,500-MVA air-blast circuit breakers. All lower voltage switchgear (3,000 and 400 V) is to be of the air-break type.

Views on the News

Reflections on Current Topics

MY sympathies are with the National Executive Committee of the Electrical Power Engineers' Association. In every issue of the Association's journal appear letters from members (very largely shift engineers) complaining that little is being done to improve their conditions and salaries. But this is not all: in the November *Electrical Power Engineer* there is a letter from "Indignant Wife" emphasising "what a struggle it is to keep up appearances on electrical staff wages." She considers it high time that the Association "did something and less talking." Later in the journal I note a reference to a *silent* film entitled "Movie Memories of the E.P.E.A. and N.J.B., 1934 to 1945."

* * *

It is frequently thought (and said) that if the electricity supply business were in the hands of the Government or a public board anybody anywhere would be able to obtain a supply. At present the electricity undertakings (municipal as well as "private") seek to secure a reasonable return upon their outlay and this is often held to be very iniquitous of them. But Mr. D. S. McColl, of the North of Scotland Hydro-Electric Board, speaking in Edinburgh last week, showed that even this public board was not going to disregard economics altogether. It is true that he stated the Board's policy to be "the giving of a supply without demanding from the consumer a capital contribution towards the cost of the overhead or underground cables erected or laid to give a supply to his premises." But he added:—"Always provided he is within reasonable distance of the Board's main distributing cables." And then he further said:—"What is regarded as a reasonable distance obviously varies according to the type of consumer. A half-mile might be unreasonable in one case, whereas one mile might be reasonable in another."

* * *

Mr. C. Heathcock, managing director and general manager of the Midland Electric Corporation for Power Distribution, Ltd., was speaking to me recently on the subject of town and country planning, particularly with regard to the reclamation of waste ground. In the M.E.C. area are enormous tracts of land rendered valueless as building sites because of mine workings and the presence of water. The availability of the bulldozer has reduced to probably one-fifth the cost of levelling these sites and Mr. Heathcock suggests that local councils might well take the present opportunity of preparing them ready for future erection of factories, etc. To show what can be done Mr. Heathcock has had the offices and workshops of the company at Tipton built on just such a derelict site. Apart from erecting buildings on the front portion of the land, the rear of the 19-acre site has been laid out as a recreation ground with a cricket pitch, tennis courts, bowling green, boating and swimming lakes, flower gardens and walks.

* * *

I have just seen an effective brochure prepared by the Council of Electric Operating Companies (United States) which by text and illustration imparts an idea of the dependence of the United States war effort upon electric power, a dependence which was also manifest in this country. The various departments in which electricity played a predominant part are set out one by one with messages of appreciation from the leader of each. A striking pair of curves shows how exactly the total electricity sales have followed the gross volume of national production. It is remarkable that one kWh was sold for each dollar's worth of product. In the five years from 1939 to 1944 the sales to industrial customers increased by 225 per cent.—from 51,000 million to 115,000 million kWh.

In this country the sale of electricity for power purposes increased from 10,841 million kWh in 1938-39 to 20,951 million in 1943-44 which represented a rise of 93 per cent. The power used per head in the United States is about twice that in Great Britain.

* * *

"Vandals," a term beloved by the daily press and usually meaning small boys, have been responsible for a good deal of trouble for public lighting engineers. But would this description cover the people who have been extinguishing the lamps in a certain Sheffield thoroughfare? An alderman told the Watch Committee: "Judging from the complaints I have received, I can only assume that courting couples are responsible for turning off some of the lamps." Mr. J. F. Colquhoun, the city lighting engineer, reported that the mechanism of the clocks had been altered. In Sheffield, apparently, love laughs at clock switches.

* * *

Apropos this subject I notice in the *Electrical World* an illustrated report relating to the presentation by a local supply company of two cinema projectors to a school "as a reward for their co-operation in reducing breakage of street lamps from $14,553 in 1942 to $6,535 in 1944."—**REFLECTOR.**

Induction-Motor Capacity

Economic Utilisation for Intermittent Duties

By C. H. Pike,
Graduate I.E.E.

DUTY cycles for electric motors often comprise a series of short peak loads with relatively long intervals of running at approximately no-load. Typical examples are the drives of a wide variety of machine tools and hydraulic pumps operating presses. For such intermittent loadings, a continuous rating equal to the peak load may not be necessary.

Continuous rating implies that a motor can develop its nominal horse power continuously without exceeding the relevant temperature rises stated in B.S.S. 168–1936, even when the cooling air temperature has the maximum permissible value of 40 deg. C. If, however, the rated horse-power is used only for short periods, the active material—iron, copper and insulation—is under-utilised for the greater part of the time. This is uneconomic for two reasons: First, the initial cost incurred is excessive in proportion to the time of utilisation, implying an unprofitable use of the capital investment ; secondly, the light-running total-energy loss is high in proportion to the peak-load loss.

Iron and Friction Losses

Energy wasted in operation is equivalent to a decrease of output arising out of stator and rotor iron and copper losses and friction loss. Iron losses in the stator are approximately constant, since the flux-density is nearly so with the relatively small variations of voltage and frequency occurring normally. There is a slight diminution at large current values due to resistance voltage-drop, but it is negligible over the working range. Rotor iron losses, which are comparatively small, are also affected by change in load. As the currents increase, the main flux density in the rotor is diminished, not only due to stator resistance voltage-drop, but also by virtue of the leakage flux set up by the stator and rotor currents. At the same time, however, the increasing slip increases the frequency in the rotor so that on balance the rotor iron loss increases, but this increase is counter-balanced with increasing load by a diminishing friction loss, resulting from the reduction in speed with which it varies almost directly. Thus, the sum of iron and frictional losses is practically constant throughout the working range.

The total current that flows through the copper conductors of the motor, thereby leading to wastage of energy as heat, can be resolved into three vectorial components : Magnetising current, iron- and friction-loss current and load current. The value of the vectorial sum of the first two components is almost constant throughout the working range ; hence the energy thus dissipated can be considered as a fixed loss which is roughly proportional to the rated horse power.

Copper Loss

Now the copper loss due to the load current varies as the square of its magnitude. At full load it is usually much greater than the total fixed loss ; hence with continuous full loading it mainly determines the cost of the energy wasted. Where, however, the loading is intermittent, the light-running total loss may exceed the peak load total loss during a duty cycle. This is made clear by the formula :—

$$WH = W_f \times T_1 + W_v \times T_2 \quad \ldots\ldots\ldots (1),$$

where WH is the duty cycle total loss in watt-hours, W_f the fixed loss in watts, W_v the variable loss in watts and T_1 and T_2 are respectively the total running time and the peak loading time in hours.

The formula (1) is applicable to the simple case of one load peak during a given period, it can be extended to cover any number of load peaks of different magnitudes.

Since the fixed loss is roughly proportional to the rated horse power, it follows that, if the rating of a motor required for intermittent loading is equivalent to the peak load, then the light running energy may greatly exceed the peak-load loss with relatively long periods of light running. By using a motor of a rated horse power below that required at peak load, the light running loss can be reduced but the load loss will be greater. However investigation has shown that the total energy charges can be reduced by selecting a motor of less than peak load capacity—or in other words, by making use of overload capacity.

Overload capacity must be used with caution and with full knowledge of the factors involved. An initial factor is the ratio of peak loading time to total running time. In certain circumstances the selection of a motor rating to give particular light-running

losses may disproportionately increase the peak load loss so that the net result is to increase the running charges.

In order to appreciate the effect of overloading on mechanical performance, general reliability and life expectancy, there must be a complete understanding of the dynamic and thermal conditions consequent upon overloading. Sufficient overload torque must be ensured to deal with the maximum load without excessive temperature rise likely to damage the motor or shorten its life.

All continuously rated two- and three-phase motors complying with B.S.S. 168-1936 are capable of carrying 100 per cent. overload in torque momentarily (*i.e.*, 15 seconds) without any appreciable effect on temperature rise. This momentary overload is permissible even when a motor has been running at its continuous rating; hence with duty cycles comprising peak loads with long intervals of light running which permit the motor to cool down to nearly no-load temperature, 100 per cent. overload can be imposed infrequently for periods exceeding 15 seconds, or alternatively —as is more often required—for periods of 15 seconds or less at frequent intervals.

Temperature Rise

The thermal effect of the load cycle must, however, be determined quantitatively in order to avoid excessive temperature rise, the adverse effects of which depend largely on the rate of deterioration of both the mechanical and electrical strengths of the most heat-vulnerable insulating material incorporated. In service, mechanical strength is the most critical factor, and it decreases with both time and temperature. However, past research suggests that even if temperatures exceed, for short periods, the limits implied in B.S.S. 168 (40 deg. C. for cooling air plus permissible temperature rise) no serious damage to insulation is likely. For example, temperature ageing tests on Class A-insulated stators (Scott and Thompson, Trans. A.I.E.E. 1942, Vol. 61) have indicated that below 200 deg. C. there is no risk of abrupt failure of insulation due to temperature and that insulation could be maintained continuously at 135 deg. C. for an average period of 345 days before it was likely to fail in service. Earlier tests (Hobart, "Electric Motors," 3rd Edition, 1923, Vol. 1, p. 392) show that the life expectancy of Class A insulation at 110 deg. C. is in the region of eleven years.

Considering that a totally enclosed standard motor is designed to develop its rated horse power continuously without exceeding a winding temperature of 90 deg. C. (assuming the most severe cooling air temperature, 40 deg. C., permissible—an infrequent condition) it would appear that if the light-running period following a peak is long enough to permit adequate cooling the life of a motor will not be appreciably affected.

Rating and Overloads

To avoid uncertainties, the rating of a motor required to deal with periodical overloads should be such that the net effect of the temperature variations on the life expectancy of the insulation should not be greater than the effect of the continuous temperature for which the motor is designed. As the continuous temperature is that corresponding to a particular current value, any load cycle having the same thermal effect as the rated current during the same period is permissible. To ensure safe overloading the load cycle should, therefore, be resolved into an equivalent continuous value of current. Since it is the heating of the motor that is the important consideration, as this varies as the square of the current, it is not sufficient to take the average current as the basis of calculation. Such a method would result in the selection of a motor with a thermal capacity less than standard. An RMS equivalent value for the load cycle must be obtained thus :— RMS equivalent current =

$$\sqrt{\frac{I_1^2 \times t_1 + I_2^2 \times t_2 + \ldots . I_n^2 \times t_n}{t_1 + t_2 + \ldots . t_n}} \quad (2),$$

where I is the current value which persists for the time t.

In applying formula (2) it is essential to note that excessive temperature rises may occur, first, if the peak load is maintained for more than a certain time and, secondly, if there is insufficient time for the motor to cool down to almost light-running temperature before another peak is imposed.

The use of overload capacity in favourable circumstances by the selection of a motor of a rating capable of meeting momentary overloads instead of one rated for peak loading can lower both initial cost and running charges. A further advantage is the saving in space resulting from reduction in frame size—a factor of importance when motors have to be incorporated in machine tools.

To meet the requirements for particular duty cycles where a motor with a continuous rating equal to maximum load is uneconomical and unnecessary, a range of continuous-light-running motors has been introduced by

Crompton Parkinson, Ltd., for all horse powers and any type of enclosure or mounting with half-hour and one-hour short-time ratings. They comply with the requirements of B.S. 168 for machines of this type and are capable of 100 per cent. overload in torque for 30 sec., as against the 15 per cent. specified if continuously rated. They have a nominal horse power rating, but are capable of an RMS horse power output less than the nominal rating with peaks exceeding it.

RMS horse power is an equivalent-value obtained from ordinates of HP loading by a formula similar to (2) above. The HP ordinates are only approximately proportional to the current ordinates. They do not have a constant proportionality, owing to the influence of the lower efficiencies and power factors occurring both at overloads and light loads. The variations are, however, taken into account in establishing the rating definitions. The RMS horse power rating is such that the motor will not have a temperature-rise exceeding that which would obtain when developing nominal output continuously for the rated period.

Maximum Peak Load

The CLR half-hour motor will operate on an RMS horse power not exceeding 0·5 of its nominal rating and the one-hour motor on an RMS horse power not exceeding 0·7 of its nominal rating. It is suggested that the maximum peak load should not exceed 80 per cent. overload (*i.e.*, 180 per cent. nominal HP rating). Although CLR motors are, in general, capable of 100 per cent. overload in torque (nominal rating) with normal statutory variations of supply voltage (torque varies as the square of the voltage), the 80 per cent. value is stipulated to avoid the possibility of too great a reduction in speed at maximum load and also to allow for contingencies and maintain reasonably high efficiency and power factor. If the periods of maximum overload exceed 15 sec. each or correspondingly longer times for smaller overloads or if the light running periods are not of adequate duration, special attention must be given to the particular application to avoid excessive temperatures.

The temperature rise of these motors is in accordance with B.S. requirements for ½- and 1-hr. ratings, but when operated at the RMS horse power the temperature rise will not exceed the limits specified for standard continuously rated motors of their class. When an RMS horse-power rating exceeding 0·7 times the nominal HP rating is required, a continuously rated motor with sustained overload capacity should be used.

For many duty cycles the RMS horse power can be determined simply either by formula (2) or graphically. For example, curve (*a*) in Fig. 1 represents a typical duty cycle occurring in practice. To obtain the RMS horse power, the cycle is first resolved into a sufficiently representative number of ordinates. The magnitude of each ordinate is then squared, and the resultant values drawn to scale. This gives curve (*b*). Next, the average value of the squared HP ordinates is calculated—the resultant value is shown by the straight line (*c*) to be 179 HP^2. The RMS horse power is then $\sqrt{179} = 13{\cdot}4$ HP as shown by the straight line (*d*).

The duty represented by curve (*a*) would, therefore, be performed satisfactorily by a 13½-HP continuously rated motor providing it had sufficient overload capacity to carry the maximum peak of 40 HP, *i.e.*, 300 per cent. of full load. Such an overload capacity is abnormal for a standard motor, but it can be provided by a CLR motor having a nominal rating of 22·2 HP, in which case the overload capacity is nominal horse power × 180 per cent. = 40 HP. As the RMS horse power is approximately 0·6 of the nominal, a 22½-HP one-hour motor would be ample.

The required rating can be decided only after examination of the particular duty cycle, and the limitations of the CLR motor must also be appreciated. The half-hour type can be applied only to duties where the peak-load time is a small percentage of the total. With the one-hour motor the percentage peak-load time allowable is somewhat greater. Where circumstances permit the use of such motors, the lower efficiency and power factor on overload seldom outweigh the saving in light load losses and the reduction in magnetising current. The influence of peak-load performance becomes increasingly important as the percentage of peak-load time increases.

Danube Power Plant

A COMMITTEE set up by Bulgarian and Rumanian engineers during a recent meeting in Bucharest will plan the construction of a large power plant on the Danube at the Iron Gates, on the border between Rumania and Yugoslavia. The plant will serve Rumania and Yugoslavia, as well as North-Western Bulgaria. An agreement has also been reached for the Bucharest power plant to serve North-Eastern Bulgaria.—*Reuter.*

Sphere-Gaps

Irradiation and Impulse-voltage Measurement

THE influence of irradiation on the measurement of impulse voltages with sphere-gaps is described by DR. J. M. MEEK (Metropolitan-Vickers Electrical Co., Ltd.) in a paper read last Friday before the Measurements Section of the Institution of Electrical Engineers, which represents the continuation of investigations described by the same author in the *I.E.E. Journal* in 1942. The earlier work has been confirmed and extended by the later results, which have been obtained at voltages raised from 100 to 400 kV (peak) with 1/5 and 1/50 impulse voltage waves of positive and negative polarities and spheres of 6·25, 12·5 and 25 cm. diameter.

The investigation shows that some revision of the B.S. rules for the use of sphere-gaps is necessary and that more definite recommendations should be made concerning irradiation, the absence of which may cause large errors in the measurement of impulse voltages. The errors occur not only when short gaps are used (the need for irradiation in this case has long been realised) but also with gaps greater than 2 cm. for which irradiation has hitherto been considered unnecessary.

The most effective method of irradiation is considered to be the insertion of radium in the high voltage sphere. The 0·5 mg. of radium used in the author's experiments indicated consistent and sharply defined breakdown voltage values. It is not considered that the breakdown values of rod-gaps will be greatly affected by irradiation, but errors may be introduced if they are calibrated with the aid of non-irradiated spheres.

Discussion

MR. G. W. BOWDLER (N.P.L.) opening the discussion said that the results given in the B.S.S., which presumably represented the experience of quite a considerable number of other workers, were very much closer to the values which Dr. Meek had obtained with irradiation than those which had been obtained without irradiation. Dr. Meek seemed to have gone to extraordinary lengths to get rid of the normal sources of ionisation which might be expected in the neighbourhood of an impulse generator, but even with these precautions his results showed there was a decreasing effect of irradiation with increased size of sphere; it appeared probable that with a 500 mm. diameter sphere and over the effect of irradiation was very small.

DR. W. WILSON (G.E.C.) said the author's removal of "scatter" was very welcome and he also supported the contention that B.S. 358 should be revised to make it more definite. Was the author's use of ½ mg. of radium an economic compromise?

I.E.C. Standards

DR. S. WHITEHEAD (E.R.A.) said that as he was the chairman of the International Electrotechnical Commission sub-committee when the last I.E.C. standards were produced, he felt bound to say that for an ambitious project they had fared pretty well. Some attacks had not come to much, but a further attack on the very low voltage end might mature in the future. The present paper made a much more serious but, at the same time, more constructive criticism of positive impulse values for spheres up to 50 cm. diameter and for certain spacings. Outside those limits the author had to a large extent confirmed the I.E.C. standards and his opinions and results would also support the validity of the symmetrical or insulated gap results, since the positive polarity would be immaterial. He was convinced by the author's exposition that many of the discrepancies observed were due to variations of irradiation and that this factor must be controlled. While agreeing with the author's basic propositions he was not prepared to admit all his explanations.

MR. F. S. EDWARDS (Metrovick) thought that the author's conditions were rather artificial and it seemed that the air in London was more suited to a reliable calibration than the air in the north of England. Results varied widely from place to place, even in the same district. For that reason it seemed that, while the earlier investigators were wrong, they were not so wrong as they might have been.

MR. G. W. CARTER (B.T.H. Co.) asked the author to expand his rather vague remarks about the region of the gap in which the appearance of an ion was effective. Was the assumption that the efficiency of the impulse generator remained constant as a function of the circuit only (not of the voltage) justified?

MR. F. J. MIRANDA (Ferguson Pailin) remarked that it might well be that insufficient screening of unirradiated gaps had affected the results. In some experiments he had carried out a curtain approximately 10 ft. by 8 ft. high placed between the impulse generator set and a horizontal 6·25 cm sphere-gap proved insufficient, but the same curtain protecting the sphere-gap on three sides was effective in preventing irradiation. In one case a claim was made that the maximum error was of the order of 3 per cent., but apparently no account had been taken of personal errors. A variation of ± 3 per cent. would in many cases cancel out some of the differences recorded. In every case transition curves were drawn as straight lines for which he could not see any justification if the results were to be correctly interpreted. The diagrams seemed to indicate an insufficient number of observations. With regard to the definition of breakdown voltage, the term "minimum" was misleading and its use should therefore be discouraged.

DR. MEEK, in reply, said he had almost but not quite gone to the extreme in suppressing irradiation. He had used ½ mg of radium, which cost about £6. It was in some salt form and it could easily be installed in a normal sphere-gap. He was not at all sure that this amount was not too much. He agreed that ten impulses were not sufficient for non-irradiated measurements, but he felt that number was sufficient when measuring the breakdown of the irradiated gap.

District Heating

Prof. R. O. Kapp's Views

IN a short paper prepared for the Midland Section (Birmingham) of the Institute of Fuel, Prof. R. O. Kapp (University College, London) discusses district heating by means of hot water, or steam, distributed through pipes radiating from central boiler installations to industrial premises and dwelling houses in neighbouring districts.

After briefly mentioning such schemes in other countries, including 160 plants in Russia, the author refers to the advantages claimed for the method in respect of convenience, smoke abatement and conservation of coal. He next comments on the combination of electricity generation with district heating, but the quantity figures mentioned are suitable only to convey some idea of the right order of magnitude. They apply to one year only, gas and coke statistics are omitted, no allowance is made for any possible effect of railway electrification and, moreover, the theoretical figures pre-suppose 100 per cent. district heating with nothing but back-pressure turbines in all power stations.

What the figures do indicate is that any national saving of coal that might result from the provision of district heating might reach tens of millions of tons per year, but would not reach hundreds of millions. The maximum saving that might be expected under impossibly ideal conditions would be of the order of 10 per cent. of the nation's coal production.

Such savings are considered by the author to be large by comparison with those that could be expected from any conceivable improvement of the thermal efficiency of, say, electricity generation. Nevertheless fuel economy is in the author's opinion a less important result of district heating than the other two factors he mentions; namely, reduction of household drudgery and smoke abatement.

Certain difficulties and limitations that would be encountered in the adoption of district heating are mentioned, but the author does not regard them as obstacles; they are no more than limitations, all of which would not apply to every district. One could not hope that district heating would be advantageous in most of the large cities of this country, but it should benefit a few of them.

Architects and Engineers

AN appeal for earlier and closer collaboration between architects and electrical engineers to ensure that adequate facilities are provided in all buildings for the reception of electrical and other specialised services was made by MR. J. A. MCCONNELL in his inaugural address in Dublin as chairman of the Irish Centre of the Institution of Electrical Engineers.

When unrestricted supplies of energy again become available the Electricity Supply Board should consider reducing the number of separate rates of charge offered to commercial consumers, thereby permitting simplification of the internal wiring of buildings.

Mr. McConnell added that the general adoption of fluorescent lighting would have a considerable effect upon the design of future buildings.

CORRESPONDENCE

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

Single-Pole Fusing

BEFORE electrical installation and contracting work restarts again in earnest on a peace-time basis would it not be advisable seriously to re-consider the I.E.E. Regulation calling for single-pole fusing on two-wire circuits?

In the opinion of many highly competent installation engineers this is likely to prove a very dangerous practice—so much so that some may refuse to adopt it.

The regulation appears to be based on the assumption that the neutral conductor will always be at earth potential, but how many mains engineers are prepared to guarantee this under *fault conditions*.

In over thirty years' experience of installation work, I have never yet encountered serious trouble on any installation equipped with double-pole fuses, but have many times found that serious trouble has been saved by the blowing of a fuse on the neutral side when this has become live due to a mains fault.

I consider that d.p. fusing is much the lesser of two evils and it would be interesting to hear other readers' views. If it is finally decided that single-pole fusing is to be the order of the day, then I think that earth-leakage protection by circuit-breaker is essential and this, of course, would mean that all installations would have to be metal-clad.

Leamington Spa. H. R. MANN.

Motor Protection

FURTHER to the letter from Mr. E. F. Evenden in your issue of November 16th, while we agree in the main with the suggestion of closer limits of protection for the application mentioned, we feel that the whole question of protection by relays calls for a revision of the existing standards.

We would like to stress the need for correlation of the specifications of all the equipment concerned, *i.e.*, the relay, control gear and motor B.S. Specifications. It is impossible to divorce the subject of economic protection from the application of the equipment and there is no doubt that misunderstanding and trouble are caused by this lack of correlation of specifications.

The suppliers of different sections of electrical equipment work in more or less "watertight" compartments, manufacturing equipment which complies with their particular B.S. Specification, but which does not take into consideration the associated equipment.

The question of delta or star-wound stators is, as mentioned in the letter, one of mystery and we should like to have the considered opinion of motor makers on this. Is it "an old Spanish custom" or is there a definite advantage in manufacture or performance of the delta-wound machine, and if so is it such that it is warranted in view of the additional equipment required to protect against open-phase conditions? Further, have the motor makers any reliable statistics of the number of motor failures due to open-phase conditions?

Chester. P. J. SHIPTON & A. G. SHREEVE (Cantie Switches and Brookhirst Switchgear, Ltd.)

Protective Relays and Fuses

IN his article in your issue of November 9th Mr. Pillans compares the cost of protection with the cost of duplicating the motor. On this basis it would certainly be economical to use the relay described by Mr. D. E. Bird and myself to protect even a 1 HP 3-phase motor. Three h.r.c. fuses of the appropriate capacity should be added to deal with short circuits.

With regard to the installation of the relay under conditions of dust, humidity or vibration, I would assure Mr. Pillans that these conditions have been as far as possible catered for in the design. It has no pivots or jewelled bearings and it has been found to stand up well to severe vibration and shock. It is not necessary to provide special facilities for housing the relay which was made, to one contactor manufacturer's requirements, small enough to be incorporated in the usual high class starter.

*London, S.W.*1. L. B. S. GOLDS.

Employees and Nationalisation

IN your issue of November 9th "Borough Electrical Engineer" says he is surprised to find that some employees engaged with supply undertakings wish to see the industry nationalised. Evidently he does not know

that there are supply companies operated to-day with underpaid staff, yet paying handsome dividends to shareholders. What is more, in some cases the majority of shares in such undertakings are the property of holding companies, and these companies pay even more enhanced dividends to their fortunate shareholders.

To me it seems perfectly understandable that a professional engineer might welcome the prospect of being paid on a scale not less than that laid down in the N.J.B. Schedule, and would feel some satisfaction in knowing that any excess profits earned by the "sweat of his brow" were being returned to the State. "EMANCIPATED."

Choice of Text Books

A YOUNG electrical engineer, an Egyptian, has asked me to choose for him electrical text books to the value of £5 which should cover the following subjects: Electrical generation and transmission; industrial installations, including lighting; domestic lighting and power installations; refrigeration; automatic telephony, especially the installation and maintenance of subscribers' apparatus; elementary wireless.

The subject matter of the books should deal more with the practical than the theoretical side of the items mentioned. I wonder whether any of your readers would be so kind as to offer suggestions.

Hornsea, Yorks. J. C. CLARKE.

[Another reader asks for recommendations regarding books on domestic refrigeration, small AC motors, large and small rectifiers and Ilgner sets and Ward Leonard control for rolling mills.—Editors, *Electrical Review*.]

Iron and Steel Manufacture

FROM the author's opening remarks it would appear that the article on this subject in your issue of November 9th is descriptive of recent electrical progress in the United States. Your readers may therefore be interested to know that many of the applications have been used in this country for many years, as will be seen from the following:—

It is stated that electric furnaces for making high-duty cast-iron employ two main processes in one of which the molten metal is produced from a cold charge using a rocking arc furnace. Both rocking arc and rocking resistor furnaces have been used for this purpose, the latter having the advantage from the power supply point of view of constant load and high power factor. In the second process in which the electric furnace is used in conjunction with molten metal from a cupola, both rocking resistor furnaces and Heroult arc furnaces have been used in this country for many years, and duplexing has also been carried out using furnaces for both the melting and holding units.

The author mentions the use of an electrically-driven turntable in conjunction with the flame hardening of steel rings. It is rather surprising that no mention is made of the electrical surface hardening of steel rings by the "Tocco" process of high-frequency induction heat treatment. Plants have been supplied by us in this country for the surface hardening of wheel rims, using this process in conjunction with electrically-driven turntables. Once the ring or wheel has been placed on the turntable and a push-button pressed by the operator, the process is entirely automatic, the current being switched on for the heating operation, followed by the removal of the wheel from the inductor to the quench, after which the turntable is stopped ready for the removal of the wheel and the substitution of another.

The use of "radio frequency heating" as applied to the hardening of bearing surfaces of Diesel engine shafts is mentioned. This process has been used in this country since 1936 and was, in point of fact, the first commercial application in a British works of induction heat treatment, as distinct from induction melting.

Incidentally, we do not consider that frequencies of 12,000 cycles should be referred to under the heading "radio frequency," preferring to reserve this term for frequencies of 100,000 upwards and terming frequencies in the 500 to 100,000 band as "high frequency" or "audio frequency."

Weybridge. ELECTRIC FURNACE CO., LTD.
J. E. GAMAGE, A.M.I.E.E.

[A copy of this letter was sent to the author of the article whose reply is printed below.—Editors, *Electrical Review*.]

YOUR correspondents have wrongly assumed that the review given in my article applied solely to developments in the United States of America, as it covered Continental and British fields also. It was not intended, as they appear to believe, to establish prior claims on behalf of any one country, but I am glad they have called attention to the great advances made by British firms, though I did not intend to draw invidious comparisons.

I am quite familiar with the details outlined.

Actually, I saw the first Héroult furnace commercially used in this country at the time it was erected (1910), and I am intimately acquainted with what has been done for induction-hardening in this country by, for example, Ambrose Shardlow & Co., of Sheffield, with the "Tocco" process. I was also given many details of the flame hardening process by the late Mr. A. E. Shorter, who invented it. It was not, however, my intention to single out particular firms in an article of this type.

I am inclined to agree with your correspondents in regard to the limitation of the term "radio frequency," but as this is the term used by the firm concerned in my note, I repeated it in my article.

Your correspondents' letter should serve a useful purpose in reminding readers that far too little is said and written about British technical progress. For over five years I have been telling the story of Britain's industries overseas for both the Ministry of Information and the British Council, so that I am not by any means unfamilar with what has been done here. Propaganda was not in my mind, however, when I compiled this article.

Eyam, nr. Sheffield. L. SANDERSON.

Calling-up of Skilled Men

I HAVE to-day received the *Electrical Review* of October 19th, and deplore the misplaced criticism of the District Man-power Boards in the last paragraph of the editorial under the heading "Call-up Continues."

At a time when numerous electrical and mechanical engineers are being retained in many cases after serving in the Forces for the duration of the war, a criticism should surely not be made of an effort to supply replacements, if replacements are required, to permit the release of members of the Forces.

Criticism should be levelled at the correct quarter, the Government and heads of Services who are responsible for the present apparently chaotic condition in respect of the retention of officers, in particular electrical and mechanical officers, who were one of the first classes to be retained.

M.E.F. DEFERRED.

Electrical Film Displays—Enfield Cables, Ltd., inform us that it is arranging to show the films "T.V.A." and "Power Lines" at the Capitol Theatre, Dublin, on December 5th and at the Royal Cinema, Belfast, on December 6th. The films are also to be exhibited at the Picture House Cinema, Ipswich, on December 11th.

World Power Conference

THE meeting of the International Executive Council of the World Power Conference held at the Euston Hotel on November 20th and 21st, in order to discuss the post-war revival of the activities of the Conference was highly successful. Sir Harold Hartley, chairman of the Executive Council, presided. About twenty countries were represented, and Mr. Harold Hobson, chairman of the Central Electricity Board, led the British delegation. It was decided to hold, if possible, a Sectional Meeting in 1947 to discuss the general question of fuel economy. The place of this meeting will be decided at a meeting of the Council to be held in Paris next spring. Before the war the Conference published a Statistical Year Book containing data on all sources of energy, giving both natural resources and annual production. It was decided to resume publication of this as soon as possible. The following resolution was passed unanimously:—

"In view of the future significance of atomic energy over the whole range of power problems this Council resolves to appoint a small committee to watch developments and to make recommendations to the International Executive Council of the World Power Conference as soon as it is practicable to have an effective discussion of the utilisation of atomic energy for industrial and domestic purposes."

Steel Welding

SOME metallurgical features of welded steels are dealt with in a paper submitted by DR. H. O'NEILL (L.M.S. Railway research laboratories, Derby) to the Institute of Welding.

The author proposes a fresh definition of "welding," based upon his contention that both ancient and modern practices rely upon interatomic diffusion in the solid state to cause actual jointing, for which purpose the presence of liquid metal is said not to be necessary. Accordingly theories of friction invoking welding effects because of possible local melting are disputed and the author further differentiates between welding and adhesion.

Metallic arc welding had imparted special features to the actual fusion process; for instance there was the peculiar melting of the parent plate by "slicing" effects in austenitic welds. Also the presence of locally fused spots on a steel structure would reduce its resistance to dynamic stressing. Tests and study had shown that local fusion spots due to "stray flashes" or "arc dabs" almost doubled the hardness of the parent plate (low alloy steels) so reducing its fatigue strength.

Different methods of evaluating the weldability of steels are compared; preference is finally expressed for actual weld tests as "standardised" in the L.M.S. laboratory, the procedure being outlined in the paper.

PERSONAL and SOCIAL

News of Men and Women of the Industry

IN last week's issue (p. 735) we reported a meeting of the South-West England and South Wales Centre of the Incorporated Municipal Electrical Association. We now reproduce a photograph taken on this occasion and sent us by Mr. J. T. H. Legge, manager S.W. England and South Wales Area of the C.E.B. Alderman Sir William Walker, president of the I.M.E.A. is seen in the middle of the group, which includes

Members and visitors at the recent meeting of the S.W.England and South Wales Centre of the I.M.E.A.

Alderman W. J. Lewis (Portsmouth), chairman of the Centre, Mr. Dawson Thomas (Abertillery), vice-chairman, and Mr. T. R. Evans (Rhondda), hon. secretary and treasurer.

Mr. H. H. Longson has been released from the Inspectorate of Fighting Vehicles, and has returned to his former post as assistant manager and engineer to the Jersey Electricity Co., Ltd.

Capt. D. L. Sidney, late Hon. Artillery Coy. and 13/18 Royal Hussars (Queen Mary's Own) has now resumed his pre-war appointment with Petbow, Ltd., Watford.

Mr. W. S. Boone has been appointed publicity manager to Johnson & Phillips, Ltd.

Mr. B. Hallows Garside, A.M.I.E.E., is relinquishing as from January 1st, the position of general manager of the Chelmsford works of Crompton Parkinson, Ltd. **Mr. T. H. Windibank,** M.I.E.E. (works director), who held the position in 1942-3, will assume direct control from that date.

Mr. G. A. Marriott, manager of the Valve Department of the General Electric Co., Ltd., has been appointed to the board of the Marconi-Osram Valve Co., Ltd.

Mr. R. B. Francis, deputy borough electrical engineer of Heston and Isleworth, has been appointed engineer to the Directorate of Municipalities, Government of Iraq.

The Birmingham Electric Club is to hold a children's party on Saturday, January 5th, at the Grand Hotel. Tickets (5s.) are obtainable from Mr. W. J. Bird, hon. social secretary, 10, Beech Hill Road, Wylde Green, near Birmingham.

Major W. Robinson, B.Sc., A.M.I.E.E., has now rejoined the staff of the E.L.M.A. Lighting Service Bureau, after serving in the Royal Engineers from the outbreak of war. He has spent most of the time in India and Burma, where his work included road making in the Arakan and base construction work in Akyab. Before the war Major Robinson's main activities were in the Central England Area. He will now deal largely with industrial lighting which, despite the attention it has received during the war, still provides much scope for improvement.

Mr. L. C. Row works manager at the Chorley works of Leyland Motors, Ltd., has joined the board of Rhodes, Brydon & Youatt, Ltd., to become joint managing director with Mr. Norman Youatt.

Major H. E. Laflin, who has served with R.E.M.E. throughout the war, has resumed his position of technical sales engineer with the Electric Construction Co., Ltd.

Before their defeat of the Cardiff City team on November 17th, the "Dynamo" football team from Russia paid a visit to the works of South Wales Switchgear, Ltd., at Treforest. They were enthusiastically received by the company's employees and a group photograph was taken to commemorate the occasion.

Mr. H. L. S. Heap and **Mr. W. E. Hanson** have entered into partnership under the title of Heap & Digby, to continue the practice of consulting and inspecting engineers previously carried on under the name of Heap & Digby, Ltd., which is in voluntary liquidation, as reported in the *Electrical Review* of November 16th. The liquidation follows a decision of the Association of Consulting Engineers that members should not practise in Great Britain or Northern Ireland in the name of a limited company.

The *Electrical Engineer and Merchandiser* (Australia) reports the resignation of **Sir Harry Brown** from the position of Commonwealth Co-ordinator of General Works. From 1923 to 1940 Sir Harry was Director-General of

Posts and Telegraphs and on his retirement he became chairman and managing director of the British General Electric Co. Pty., Ltd. He is at present recovering from an illness and when he regains his health he will return to the company (the G.E.C.'s Australian associate).

Capt. S. J. M. Beale, A.M.I.E.E., upon release from the Army, where he served in the R.E. and R.E.M.E., has been appointed general manager of the Q Vehicle Co., Ltd.

Mr. G. E. Argent-Cole, late chief buyer of Dubilier Condenser Co. (1925), Ltd., has joined Copeland & Jenkins, Ltd., as production controller.

Dr. James Greig, M.Sc. (Eng.), A.M.I.E.E., head of the Engineering Department at the Northampton Polytechnic, has been appointed to the University Chair of Electrical Engineering at King's College, London. Dr. Greig received his technical education at the Heriot-Watt College, Edinburgh, and University College, London. Afterwards he gained practical experience with the Bell Telephone Co. of Canada, and at the G.E.C.'s research laboratory at Wembley. After holding an appointment at University College, London, Dr. Greig resigned in 1936 to take up a lectureship in the Department of Electrical Engineering at the University of Birmingham, going to the Northampton Polytechnic in 1939. He is the author of a number of papers on the stabilisation of high-frequency amplifiers and on the high-frequency induction furnace.

Dr. J. Greig

Mr. D. F. Grant, station superintendent at Southport, has been recommended for the position of deputy borough electrical engineer.

Obituary

Mrs. M. M. Marryat.—We learn with regret of the death, after a brief illness, of Mrs. Maude M. Marryat, widow of Mr. Howard Marryat, M.I.E.E., who died in June last year. Mrs. Marryat was in her 77th year.

Mr. P. Howard-Harrison.—We learn with regret of the death in a Siamese prisoner-of-war camp in August of Mr. Patrick Howard-Harrison, a member of the Straits Settlements Volunteer Force and of the Singapore staff of the General Electric Co., Ltd.

Dr. F. W. Aston, Sc.D., F.R.S.—The death occurred at Cambridge on November 20th of Dr. Francis William Aston, Fellow of Trinity College, Cambridge, who was responsible for notable achievements in scientific measurement. As assistant of the late Prof. Sir J. J. Thomson he worked on various problems of vacuum discharges. In 1938 he was awarded the Royal Medal of the Royal Society in recognition of his discovery of the isotopes of non-radioactive elements.

Mr. B. Chambers.—The death occurred recently of Mr. Bennett Chambers, of E. N. Bray, Ltd., three days before he was to attend an investiture at Buckingham Palace to receive the British Empire Medal awarded for administrative work in producing electrical equipment.

Mr. J. E. Aldred.—The death is reported of Mr. John Edward Aldred who retired from the Shawinigan Water & Power Co. in 1941 after having been president for twenty-four years and chairman for thirty-two. His connection with the hydro-electric power business commenced as far back as 1897. He was eighty-three years of age.

Mr. E. R. Hudson, for thirty years hon. secretary of the Midland branch of the Association of Mining Electrical and Mechanical Engineers and president last year, died recently.

Wills.—The late **Mr. G. A. C. Thynne,** a director of the West Devon Electric Supply Co. and the Bude Electric Supply Co. left £138,589 (£57,158 net personalty).

Mr. Dane Johnstone Sinclair, managing director of the St. Helen's Cable & Rubber Co., Ltd., and a director of the Automatic Telephone & Electric Co., the Midland Electric Corporation for Power Distribution and other companies, who died on September 13th, left £43,547 (£38,321 net personalty).

The Victory Club

TO gain the support of the electrical industry for the Victory Club which it is proposed to establish in London as a tribute to the part played in the war by Service men and women, Sir Harry Railing, supported by Sir George Bailey and Mr. T. H. Martin-Harvey, gave a lunch on Tuesday to a number of important representatives of the electrical industry. As already announced by the Lord Mayor of London, the Club, which will be open to all ex-Service men and women, will contain welfare and advice bureaux, reading and writing room, restaurant and sleeping accommodation. A sum of a million pounds is required, and Sir Harry suggested that an industry which had sent about 100,000 into the Forces should make a worthy contribution to this national memorial of thanksgiving. Among those who also spoke in favour of the proposal were Field Marshal Lord Chetwode, Admiral of the Fleet Lord Chatfield, Air-Vice-Marshal Sir Leonard Slatter and Sir Walter Citrine.

No separate fund is being started by the electrical industry, so that donations should be sent to: The Treasurer, The Victory (Ex-Service) Club Appeal Fund, 15, King Street, St. James's, London, S.W.1.

Kenya and Uganda Railway

High Fuel Costs Suggest Study of Electrification Possibilities

By G. H. Lepper, A.M.I.E.E.

IN a memorandum on "Post-War Problems in East Africa" issued by the Joint East African Board about two years ago the view was expressed that "the provision of further hydro-electric schemes on an economic basis to reduce importation of fuel and possibly partial electrification of the railways should be envisaged." It has now been announced that arrangements are being made by the Secretary of State for the Colonies for a team of electrical and civil engineers to visit Kenya, Tanganyika and Uganda to examine the potential demands for electricity in the three territories, the possible sources of hydro-electric and other power and the existing works, plant and equipment, and to make recommendations as to the organisation required for the future development of electricity supply in East Africa.

Coal Price Doubled

Development of water-power resources is attractive in a Colony which, as far as present knowledge goes, has been rather shabbily treated by Nature in the matter of fuel supplies. The cost of imported coal and oil was already high before the war and has risen greatly in the past six years. This is illustrated by the increase in the fuel bill of the Kenya and Uganda Railway between 1938, when it amounted to £238,000, and 1944, when it had much more than doubled to £603,000. The price of coal has mounted from 33¾s. per ton in 1940 to 66s. last year. In addition, the railways have to haul a large part of the locomotive coal and wood used for considerable distances and to expend more fuel in doing so. Nor is the wood fuel used on some sections of the system cheap or satisfactory, even when it can be obtained within a reasonable distance from the line.

Taking coal and wood together, the average cost per engine-mile run rose from 1·15s. in 1940 to 2·17s. in 1944 and per 1,000 net ton-miles from 8·18s. in 1940 to 16·64s. in 1944. Indeed fuel costs represented 24·64 per cent. of the total ordinary working expenditure of the system in the last-named year. Figures of this order would direct attention to the possibilities of electrification in any country where water power could be developed at reasonable cost, even if the traffic density, as on the Kenya and Uganda Railway, were not sufficiently great to offer any incentive in itself.

Another argument of some weight is to be found in the profiles of the main line and of some of the principal branches. Between the coast and Lake Victoria the railway climbs fairly steadily to an altitude of more than 7,800 ft. in 358 miles, with several intermediate humps. It falls 1,800 ft. in the next 100 miles, then climbs over 3,000 ft. in about 70 miles to a summit of 9,150 ft. and falls equally sharply for a similar distance. In the next 25 miles it loses another 1,000 ft. and then slopes comparatively gently towards the level of Lake Victoria. The hump between Nakuru, in the Rift Valley, and Broderick Falls, near the foot of the western descent from the Uasin Gishu plateau, is an almost symmetrical inverted V.

Similar characteristics occur on the old line from Nakuru to Kisumu although the summit is some 800 ft. lower (8,322 ft.). The Magadi Lake branch drops nearly 3,500 ft. in just over 90 miles and the soda from the lake bed, for the conveyance of which the line was built, has to be hauled up this hill. Looked at purely from the orographical point of view the main line from Konza (287 miles from Mombasa), which is the junction for the Lake Magadi branch, to Torero (400 miles further inland), together with the Kisumu and Lake Magadi branches, appear to offer the best prospects of repaying the cost of electrification, but whether this would be economical in the immediate future could only be determined by a thorough investigation of all aspects.

Water-Power Sites

Unlike the Congo basin on the other side of the continent, which is estimated to contain a very substantial proportion of the total potential water power of the earth, and Rhodesia, where one of the world's largest waterfalls is only 70 miles from the great Wankie coalfield, East Africa seems to be deficient in both mineral fuel and water-power sites, though some of the latter that do exist there have already been developed on a modest scale.

In Uganda both the Ripon and the Murchi-

son Falls on the Victoria Nile have considerable power potentialities, but the Murchison Falls are a long way from any existing demand for power and neither of these falls is well placed to assist railway electrification. Although it would be technically possible to transmit energy over the distance between the Ripon Falls and the main line summit, a very high voltage would be necessary and the small amount of energy to be conveyed would not justify its cost. If electrification of the railway should offer prospects of being remunerative, other sources of water power would have to be sought.

Promising Sections

Power sites capable of development at reasonable cost may exist on the rivers which drain the high rainfall district between the Uasin Gishu plateau and Lake Victoria. Power generated here would be within practicable transmission distance of the two humps between the Rift Valley and the other side of the escarpment between the valley and Lake Victoria. These certainly present themselves as the most promising sections to study, lending themselves very well to regenerative braking. Although this would not appreciably affect the operating costs of a hydro-electric power station it should reduce to some extent the capacity of the plant to be installed.

If it should be considered advantageous to carry electrification coastwards over the eastern wall of the Rift Valley and through Nairobi, further development of the Tana River, where the East African Power & Lighting Co. already operates hydro-electric plant, is probably the most likely prospect. Between Mombasa and the Mount Kilimanjaro region an extension to the same group's Pangani River plant might provide the necessary energy, but the route between the coast and the junction with the Magadi branch at Konza does not look so attractive as the humps on the western side of the Rift Valley and the eastern ascent from the valley floor to Limuru, because the greater part of the freight movement between Limuru and the coast goes downhill.

Precautions Against Wild Animals

Presumably the possibility of reducing operating costs by electrifying portions of the system has not so far appeared to the management to offer a solution of the problem of rising fuel costs. This may be due in part to uncertainty as to the volume of traffic on the cessation of the present abnormal conditions and partly to the hope that a considerable reduction in the cost of coal will occur within a comparatively short period. There is also the possibility of trouble owing to animals such as elephant and giraffe pushing over the traction-line supports or colliding with the conductors. Elephants might be deterred from leaning against the traction posts by guarding these with a few sharp spikes and damage from the long necks of giraffes might be prevented by raising the conductors above the normal height and increasing the length of the collecting pantographs on the electric locomotives.

Such expedients would add somewhat to the cost of the track equipment but not sufficiently to upset the economics of electrification if suitable water-power sites could be found and if the interest and sinking fund charges incurred in electrifying selected portions of the line were less than the saving in fuel costs. There need be little allowance for writing off existing rolling stock. New steam locomotives would have to be ordered to replace worn-out engines and electric locomotives could be substituted. Any other steam locomotives rendered superfluous by electrification could be transferred to the Tanganyika Railways or used on non-electrified parts of the Kenya and Uganda Railway system.

Determining Factors

Details of this kind are only mentioned here because they are among the objections which have been suggested. The determining factors must be: Suitable sources of water power that can be developed at reasonable cost, capital cost of electrification, probable volume of traffic in the period following electrification, trend of fuel prices in the future and probable saving in fuel costs in excess of capital charges of electrification.

These questions can only be answered by experts who have had considerable experience of railway electrification overseas. For two or three years it will be difficult if not impossible to begin work on any projects of this nature owing to the inability of manufacturers to deliver the equipment. This interval might well be utilised to carry out the preliminary studies which would give the answers to the questions raised above. No doubt the team of engineers to which reference is made in the first paragraph will pay some attention to this matter in the course of their studies.

Lighting Design

E.L.M.A.'s First Post-war Course

DESPITE the foggy weather there was an excellent attendance last week at the forty-first illumination design course (the first since the war) held by the Electric Lamp Manufacturers' Association at the Lighting Service Bureau. Many of the audience were men newly returned from the Forces. The course, which lasted three days, was opened by Mr. H. A. Lingard, chairman of the E.L.M.A. Council and lectures were given by Mr. W. J. Jones (director) on "The New Outlook on Lighting," Mr. E. B. Sawyer (acting manager of the Bureau) on "Lighting in Wartime" and "Post-war Lighting Possibilities," Mr. R. O. Ackerley on "Illumination Design for Interiors," Dr. B. P. Dudding on "Modern Conceptions of Quality," Mr. A. G. Penny on "The Development of the Electric Lamp," Mr. W. J. Scott on "Fluorescent Lamps," Mr. J. M. Hull on "Circuits and the Maintenance of Fluorescent Lamps," Mr. C. R. Bicknell on "Fluorescent Lamp Fittings and Methods of Installation," Mr. T. O. Freeth on "The Domestic Lighting Market," Mr. W. Robinson on "Floodlighting," and Mr. A. D. S. Atkinson on "Applications of Fluorescent Lamps."

The audience at the first post-war E.L.M.A. illumination course. At the table in the front are (left to right) Mr. E. B. Sawyer, Mr. W. J. Jones, Mr. H. A. Lingard and Mr. W. H. Williams

Building Supplies Bill

Government's Plan Debated

ON Monday last the Building Materials and Housing Bill received an unopposed second reading in the House of Commons. Particulars of the Bill were given in our last issue (p. 740). In moving the second reading the Minister of Works (Mr. Tomlinson) said that over a wide range of supplies it would be necessary to place Government orders which might take the form of either direct bulk purchase or production in Royal Ordnance Factories for re-sale through existing channels or production agreements might be entered into by which firms would undertake to produce certain quantities of goods for which the Government would undertake responsibility. It was the intention of the Government to go into business both in the manufacture and distribution of building materials and components "in a big way."

Criticism of the Bill came from Mr. Willink who said that the Bill gave unlimited powers to the Minister of Works to produce, purchase and distribute building materials of all kinds and sizes. The difficulty in meeting the demand was not lack of capacity or organisation but man-power shortage. There had been little consultation with the building materials industry or its distributive organisation. He warned the Minister against the effects of too much standardisation.

Administrative Training

"Staff College" Established

AN Administrative Staff College at which young civil servants, local government and trade union officials, business men and industrialists will work in syndicates, or teams, on typical trade and business problems, is to be established in the near future. The College has been incorporated as a company, with a Court of Governors. It is hoped that the necessary annual income of £45,000 will be contributed, mainly, by seven year covenants, in time for definite commitments to be undertaken before the end of this year.

A plan for this College was studied for nearly four years by a group of leading industrialists and public servants who consulted members of the Government, leaders in industry, commerce, the Services, local government and the universities.

The students will be nominated by the public services, trade unions and private organisations in which they are employed and will be selected from among the most promising of rising young administrators. Courses will last three months and will be attended by some sixty students, normally between the ages of twenty-eight and thirty-four.

The College aims at formulating and expounding the basic principles and technique of organisation, administration and leadership, and at giving young administrators from all walks of life an opportunity of pooling experience and of exchanging ideas. The address of the College is 40, Berkeley Square, W.1.

Forthcoming Events

Saturday, December 1st.—*Manchester.*—At Geographical Society, 16, St. Mary's Parsonage, 2.30 p.m. Junior Institution of Engineers "The Application of Electric Motors and Control Gear," by H. P. Pentelow.

Bradford.—Valley Power Station, 2.30 p.m. I.E.E. North Midlands Students' Section. "Voltage Stabilisers—Their Principle and Design," by G. N. Patchett.

Monday, December 3rd. — *Birmingham.* — James Watt Institute, 6 p.m. I.E.E. South Midland Centre. "Factors Influencing the Design of Electric Lighting Installations for Building Interiors," by R. O. Ackerley.

Liverpool.—Royal Institution, Colquitt Street, 6 p.m. I.E.E. Mersey and North Wales Centre. "Practical Aspects of Telephone Interference Arising from Power Systems," by P. B. Frost and E. F. M. Gould.

Sheffield.—University, Western Bank, 6 p.m. Illuminating Engineering Society. "Public Lighting," by N. Schofield.

Tuesday, December 4th.—*Leicester.*—Electricity Demonstration Theatre, Charles Street, 6 p.m. Illuminating Engineering Society. "Tungsten Filament Lamps," by B. Blow.

Manchester.—Central Library Theatre, 7 p.m. I.E.E. North Western Centre. Repeat of presidential address, by Dr. P. Dunsheath.

London.—Oddfellows Hall, 186, Hammersmith Road, 7.30 p.m. North-West London Branch A.S.E.E. "Control of Electric Resistance Furnaces," by J. H. Marsh.

Leeds.—Electricity Offices, 6 p.m. I.E.E. North Midland Centre. "The Place of Radiant, Dielectric and Eddy-Current Heating in the Process Heating Field," by L. J. C. Connell, G. W. Humphreys and J. L. Rycroft.

Wednesday, December 5th.—*London.*—Institution of Electrical Engineers, 5.30 p.m. Radio Section. "The Design and Use of Radio-frequency Open-wire Transmission Lines and Switchgear for Broadcasting Systems," by F. C. McLean and F. D. Bolt.

John Adam Street, W.C.2. Royal Society of Arts. 1.45 p.m. "The Defeat of the Magnetic Mine," by C. F. Goodeve.

Rotherham.—College of Technology and Arts, 6.30 p.m. I.E.E. Sheffield Students' Section. "The Metadyne," by D. E. Barber.

Liverpool.—Electricity Showrooms, Whitechapel, 6 p.m. Illuminating Engineering Society. "The Place of Science in the Art of Lighting," by R. O. Ackerley.

Manchester.—Engineers' Club, Albert Square, 12.30 for 12.45 p.m. North Western Fuel Luncheon Club. Address on "Some Post-War Problems of the Electricity Supply Industry," by Harold Hobson.

Thursday, December 6th.—*London.*—Institution of Electrical Engineers, 5.30 p.m. "The Operation of Large Turbo-Alternators to Reduce Rotor-Winding Deformation," by R. H. Coates and B. C. Pyle.

Manchester.—College of Technology. 6.30 p.m. Illuminating Engineering Society. "Bright Light Sources," by Dr. J. N. Aldington.

Cardiff.—South Wales Institute of Engineers, 3.15 p.m. Illuminating Engineering Society. "Mercury Vapour Projector Lamps," by H. K. Bourne.

Friday, December 7th.—*Bath.*—Electricity Showrooms, 7 p.m. Illuminating Engineering Society. "Maintenance and Operation of a Fluorescent Lighting Installation," by A. L. Randall.

Birmingham. — Imperial Hotel, 6 p.m. Illuminating Engineering Society, Birmingham Centre. Annual dinner.

Cardiff.—South Wales Institute of Engineers, 6.30 p.m. I.E.E. Cardiff Students' Section. "Modern Power Station Layout," by R. Lott.

Saturday, December 8th.—*London.*—Porchester Hall, Bayswater, 7 p.m. I.E.E. London Students' Section and I.Mech.E. Graduates' Section. Joint dance.

39, Victoria Street, S.W.1, 2.30 p.m. Junior Institution of Engineers. Presidential address: "Atomic Energy," by Sir George Paget Thomson.

Glasgow.—Royal Technical College. Association of Mining Electrical and Mechanical Engineers, West of Scotland Branch. "Electricity as Applied to Mining," by A. Hall.

Monday, December 10th.—*Birmingham.*—Colmore Room, Grand Hotel, 7 p.m. Midland Technical Group E.P.E.A. "A Standardised Range of AC Substations," by J. L. Ferns and L. Heaton.

Cardiff.—South Wales Institute of Engineers, 6.30 p.m. I.E.E. Western Centre. Discussion on "The Training of Electrical Craftsmen," opened by J. B. J. Higham.

Newcastle-on-Tyne.—Neville Hall, Westgate Road, 6.15 p.m. I.E.E. North-Eastern Centre. "Factors Influencing the Design of Electric Lighting Installations for Building Interiors," by R. O. Ackerley.

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 :—

South Africa.—Agencies wanted for South Africa and Northern and Southern Rhodesia for makers of switchgear, transformer equipment, electrical contractors' supplies, industrial and domestic refrigerators and radio apparatus (X.130).

Turkey.—Istanbul firm of importers, etc., wishes to get into touch with British manufacturers of industrial and domestic electrical equipment, power plants, lifts, heating and ventilating systems, refrigerators and radio apparatus. (X.131).

New Zealand.—Agencies required for fractional-HP motors and larger sizes up to 50 HP. (X.132).

United States. — Representation in Los Angeles, California, offered to British electrical manufacturers. (X.133.)

COMMERCE and INDUSTRY

Inquiry into Research. Supply Company's Munitions Production.

Survey of Industrial Research

THE F.B.I. Industrial Research Committee and Secretariat have sent out questionnaires to establish the extent of Britain's industrial research as in the opinion of the Committee, this has been greatly under-estimated, because it is largely unknown. One questionnaire is addressed to all manufacturing concerns in the country that are carrying out research and development, and the second to all firms and organisations offering facilities to industry of an analytical, testing, consultant, research or development nature. Firms and organisations which have not already received copies may obtain them from the F.B.I. Industrial Research Secretariat, 21, Tothill Street, S.W.1.

The first questionnaire seeks detailed information on the staffing and scope of a firm's research department. It asks, among other things, if the firm's laboratories cater also for other British companies; what contacts exist with universities and technical colleges; if the research department concerned wishes to be put in touch with others working in the same field, or to exchange scientific and technical information with others at home or abroad. The questionnaire embraces firms that carry out research but have no separate research laboratory. Firms are also asked to outline any plans for development or expansion of research activities during the next two years. The second questionnaire, which has been prepared on similar lines, asks the nature of the services offered, the particular field covered by the firm or organisation, and what specialist work is undertaken and equipment possessed.

Clesco's War Work

Among the exhibits being shown by the County of London Electric Supply Co., Ltd., at an exhibition of Streatham's Industries in War and Peace, is the aircraft multiple time recorder which enables one air-base to control up to 480 aircraft operating simultaneously from as many as 48 different air stations. The whole of this equipment, together with all the necessary special jigs and tools, was entirely designed, developed and manufactured for the Air Ministry by the company's engineers in its own workshops. Other exhibits include an attenuator unit used in "Air to Surface" vessel radar equipment, "Pulse" and "Heater" transformer tanks forming part of R.A.F. radar equipment, Bren gun carrier parts and musketry training equipment.

Of particular interest is a card showing a special job completed at short notice for D-Day operations. Due to the extreme urgency, no time was available to fashion special tools, and parts which normally made by complicated press tools were turned out from the solid bar. Small reinforcing springs had to be made by drilling axially phosphor bronze wire of only 0·083 in. in diameter and then turning down its outside diameter to give a "wall" thickness of 0·006 in. finally slotting the resulting tube longitudinally. This was undertaken on machines designed for work of a very much larger calibre and by staff whose normal duties involved handling apparatus weighing many tons.

The company's staff was also responsible for evolving methods for the emergency repair of the very critical co-axial receiver feeders between the aerial towers and the receivers of radar stations around the coast and redesigned the feeder system. Altogether the company's manufacturing activities meant the making of 885,423 different parts with no special labour recruited and in addition to normal and exacting duties of maintaining electricity supply. A post-war section of the exhibition demonstrates the direction of the company's effort towards saving labour in the home and more leisure for the housewife.

Training in Electric Farming

Attention to the specialised needs of the farming community in the matter of electrical instruction is a notable feature of the Norwich Electricity Department's work. Last year a special agricultural showroom was opened for the benefit of farmers. Now it is proposed to extend the Department's educational facilities by introducing a scheme for a short training of farmers and farm workers in the use of electrically-operated farm machinery. The proposed course, which will commence in January and will be held one day a week for twelve weeks, has been arranged in conjunction with the National Farmers' Union Development and Education Committee and will include both lectures and demonstrations.

Statutory rights of consumers, wayleaves and town planning are to be among subjects referred to in an opening talk by Mr. John A. Sumner, city electrical engineer. This will be followed by visits to the power station, the agricultural showroom and the repair shop, while demonstrations and lectures will be given on the use and maintenance of farm equipment, including sterilisers, grinders, incubators, welding and grain drying. Particular attention will be paid to diagnosing, rectifying and reporting faults, and to showing how farmers can help themselves and other farmers in electrical matters.

Large New Steel Mill

Dorman, Long & Co., Ltd., are to erect a new mill on a Tees-side site for the production of structural steel at a cost of about £8,000,000; it is expected to be ready for operation in about two years. It is stated that the new mill will be able to produce "H" section girders measuring up to 30 in. by 12 in. with horizontal and vertical rolls working in conjunction.

Coventry Cathedral Lighting

Special lighting of parts of the ruined Coventry Cathedral added an impressive effect to the ceremony of consecration of the Chapel of Unity. A large cross in white fluorescent light, upon a laurel wreath of green light, was mounted at the base of the spire 150 ft. above ground level. Built up from twelve 80-W white

fluorescent tubes, the cross stood 23 ft. high overall, the horizontal arm measuring 11 ft. The superimposed laurel wreath comprised thirty-six green 40-W lamps arranged in a circle 5 ft. in diameter, with five green 200-W lamps at the centre.

Within the ruined shell of the Cathedral, white floodlighting installed by the local authorities, threw into cold relief the piles of masonry and rubble, while in the chancel the high altar was bathed in amber light. Concealed in the rubble on the chancel floor were four 1,000-W amber flood-lights, four 100-W white lamps, in small reflectors, adding special brilliance to the centre of the altar. In front of the chancel was one 1,000-W red floodlight giving a touch of warmth to the scene. The illuminated cross and lighting of the altar were presented on behalf of the workers in the Coventry factories of the General Electric Co., Ltd., and the installation was voluntarily undertaken by the company's electricians.

Engineers' Conference

Mr. Ernest Bevin, Secretary of State for Foreign Affairs, is to open an engineers' conference to be held by the Institution of Professional Civil Servants at Caxton Hall, S.W.1, on December 15th and 16th. The topics to be discussed will include the historical development of engineers, the engineers' war, and the future of the engineer. Miss Caroline Haslett, director of the Electrical Association for Women, will take the chair at the first session, and among the speakers will be Dr. P. Dunsheath and Major-General E. B. Rowcroft.

"Cosmos" Calendar

Calendars

The Metrovick "Cosmos" lamp calendar for 1945-46 continues the series of attractive blondes. It is 14 in. by 18 in. with monthly sheets.

A small easel calendar with daily sheets and months on the back has been sent to us by the Albion Clay Co., Ltd.

Equipment for "Queen Elizabeth"

Referring to the article on the "Queen Elizabeth" in our issue of November 16th Britannia Batteries, Ltd., inform us that they supplied an "Alkium" steel-alkaline battery of 220-V, 350-Ah capacity, comprising 192 cells mounted in hard-wood crates.

Elliott Bros, (London), Ltd., supplied twelve sets of CO_2 indicating equipment for flue-gas analysis in the boiler rooms.

E.A.W.'s Mobile Canteens

The Electrical Association for Women's mobile welfare canteen service, formed in 1940 to cater for the needs of men and women in isolated units, has now closed down, after five years in which the sixteen canteens operated all over the country.

Now that the original need no longer exists, the canteens are being disposed of for other purposes. One was recently presented by Alderman Mrs. Gregory, on behalf of the E.A.W. to the Board of Trade, who handed it over to the Cambridgeshire Local Education Authority for work in connection with the Make Do and Mend Campaign. Another has been given to the East Suffolk Federation of Women's Institutes for educational and demonstration purposes in country districts. A third, lent to the Central Electricity Board, for use by men engaged on line work, has now been presented outright.

Electric Vehicle Production

Aero Engines, Ltd., Bristol (incorporating Douglas (Kingswood) Ltd.), have acquired from A. C. Morrison (Engineers), Ltd., Leicester, a sole manufacturing and selling licence for "A.C.M." electric vehicles, and the chairman, Sir Maurice Bonham-Carter, and the managing director, Mr. John R. Phillipson, M.I.Mech.E., are to join the board of A. C. Morrison (Engineers), Ltd. Mr. A. C. Morrison will continue as managing director of that company, but his services will be at the disposal of Aero Engines, Ltd., for all matters connected with "A.C.M." vehicles, production of which is to begin immediately at Kingswood, Bristol.

Oil Engines for India

British Oil Engines (Export), Ltd., has arranged for Parry & Co., Ltd., of India, to become the managing agents throughout that country for a range of British oil engines in sizes up to 1,500 HP. Many sizes are actually available for immediate delivery, but, to meet the urgent and increasing demand, the arrangement has been extended to cover the manufacture in India by Kirloskar Bros., of Bombay, of a number of the types and sizes, which include Petter, Mirrlees, McLaren, Coventry Cub and Fielding units.

Talk on Radar

Mr. H. de A. Donisthorpe, General Electric Co., Ltd., gave a talk on "Modern Radio Development with special reference to Radar" at a meeting of the Northampton & District Electrical Association at the College of Technology, Northampton, on November 14th.

The development of the present form of radiolocation from the form used in the last war—namely directional aerials for reception of enemy transmitted signals was admirably described and demonstrated. Mr. Donisthorpe mentioned that the earliest practical experiments in ultra-short-wave reflection were conducted by Marconi in 1922 and Appleton in 1924 and that a far-seeing committee authorised research in 1934 to develop a practical system which was actually in operation in 1938.

"Ploughshares into Swords"

This is the title of a brochure produced by the United Steel Companies, Ltd., containing an account of the important work carried out by its constituent concerns during the war. Apart from the direct operation of its own works, the organisation managed thirteen agency factories on behalf of the Government.

One of these was the Distington electric steel plant at Workington, estimates and plans for which were prepared by the United Steel Companies for the Ministry of Supply in 1940. This project involved the installation of seven 20-ton furnaces with the necessary buildings and ancillary plant. Instructions to proceed were given in 1941 and the plant was in operation within eighteen months in spite of labour and material shortages. The works became the largest producer of electric steel in the country, giving work to 7,700 employees. After the country's peak electric steel requirements had been met the plant was closed by the Ministry in 1944. It has since been purchased by the company for the production of ingot moulds and castings on a mechanised basis and for the manufacture of large mine cars and general engineering products.

Cosmic Ray Experiments

Sir Ernest Simon, chairman of the Council of Manchester University, states that Professor P. M. S. Blackett, head of the Department of Physics, and Professor Willis Jackson, head of the Electrical Engineering Department, are undertaking experiments for the location of "showers" of cosmic rays. Radar equipment given to the University by the Army is to be used in an attempt to secure reflection of waves from the cosmic ray showers to locate their position.

Electric Clock for Romford Church

An electric clock has now replaced the former mechanical timekeeper in the tower of St. Edward's Church, Romford, Essex. The new clock, which was constructed by Gillett & Johnston, Ltd., of Croydon, is of the synchronous type and the timekeeping mechanism drives the hands of the original dial, which has been fitted with electric floodlighting lamps. Both the chiming and striking mechanisms are electrical, consisting of motor driven reduction gearing controlled by special count-wheel switching and released from the timepiece through low-voltage links. Unit construction has been adopted for the various sections of the mechanism, which can accordingly be placed at the most convenient positions in the tower.

All-electric Kitchens

The Mayor of Wallasey on Saturday opened an exhibition of model electric kitchens planned on lines suggested by the British Electrical Development Association. An all-electric kitchen was also featured in the exhibit of the Macclesfield Corporation Electricity Department at an exhibition held last week in connection with Thanksgiving Savings Week.

Lighting Lecture at Newport

Over 200 people attended a meeting at Newport on November 16th of the Cardiff Centre of the Illuminating Engineering Society to hear a lecture on "Applied Colour Lighting" by Mr. R. Gillespie Williams, F.I.E.S. The principal guest, the Mayor of Newport, Mrs. Sarah J. Hayward, who was introduced by the chairman, Professor T. David Jones, M.Sc., F.I.E.S., welcomed the Society to the town. Mr. Gillespie Williams dealt with the fundamentals of light and the technical aspects of the science of seeing colour, and finally, he gave a very comprehensive explanation and demonstration how lighting effects are used on the stage to accentuate such expressions as horror, joy, etc.

The Newport borough electrical engineer and manager, Mr. T. H. Wood, thanked the lecturer, who had been previously introduced by Mr. K. D. Weguelin, sales and consumers' engineer, and Mr. S. G. Turner, hon. secretary, expressed the Centre's thanks to the Newport Town Council and Mr. Wood.

Cleanliness on the Farm

In the home and industry the vacuum cleaner has proved a potent instrument for the promotion of cleanliness and health and with the demand of the farming community for access to the facilities enjoyed by the urban dweller it has now extended its sphere of usefulness. At many points on the farm it finds application. It is used in the grooming of animals, in improving the atmosphere of barns, granaries and mills, and for removing fluff and feathers from the eggs in course of incubation so that the circulation of the warm air, which is an essential part of the process, is not impeded. The illustration shows equipment supplied by the British Vacuum Cleaner & Engineering Co., Ltd., in use for the last-named purpose.

Vacuum cleaner equipment in use at a hatchery

New "Unit" Power Station

The new Riverside power station at Baltimore contains one B. & W. pulverised-fuel-fired boiler rated at 550,000 lb. of steam per hr. for each of the two 60,000-kW 3,600-RPM turbo-alternators at present installed. According to the *Electrical World*, steam conditions at the superheater outlet are 900 lb. per sq. in. gauge and 915 deg. F. The two generating sets are

run as a group by means of a valved cross-connection between the two high-pressure boiler-to-turbine steam pipes. This entails a valved cross-connection between the feed-water circuits on the discharge side of the sixth heating stage. Design ratios per net kWh are: 11,702 BThU; 9·7 lb. of steam to throttle; 6·7 lb. of steam to condenser; 0 85 lb. of coal; 13·3 lb. of gas to stack.

Coal Consumption

Provisional figures published in the *Board of Trade Journal* show that the total consumption and shipments of coal in the third quarter of this year was 41 million tons as compared with 45·5 million and 43·3 million in the corresponding periods of 1944 and 1943. Of this electricity undertakings (including railway and transport authorities) took 4·8 million tons, against 5·3 million and 5·1 million. Gasworks took 4·6 million tons, against 4·9 and 4·5 million. Domestic consumers were responsible for the consumption of 6·6 million tons as compared with 7·9 million tons and 8·2 million tons.

Total output during the quarter was 41·7 million tons as compared with 45·9 million in the September quarter of 1944 and 46·9 million tons in the corresponding period of the preceding year.

Electricians' Wages

With reference to the recent grant of a temporary increase of 2d. in the hourly cost-of-living (war) addition, the National Joint Industrial Council for the Electrical Contracting Industry states that this addition (as from the first pay-day in December) will be as follows:—Labour over 21, 8¼d.; between 18 and 21, 5½d.; and under 18, 2¾d.

The Blind in Industry

For many years the National Institute for the Blind has been examining the possibilities of the blind working in open industry. Its annual report details the great and rapid advance made since the outbreak of the war. Among more than three hundred different operations found suitable for sightless persons are numerous machine shop duties, electrical and radio assembly, precision instrument manufacture, telecommunications, physiotherapy, etc. On certain machine operations output has often been found substantially greater than that of seeing operators.

C.E.B. Valuation

The Joint Committee of the Central Valuation Committee and the four associations of local authorities has recommended that Mr. H. P. Buckingham shall be appointed to make further valuations of the Central Electricity Board's undertaking based upon the 1943 and 1944 accounts for fees of £2,500 and £1,000 respectively. The cost of these further valuations would be shared on the basis of the values apportioned to the respective areas of the county valuation committees.

Trade Publications

Pye, Ltd., Radio Works, Cambridge.—Service sheet for model 15A broadcast radio receiver with circuit diagram, list of components' circuit analysis and timing procedure.

Dynamo & Motor Repairs, Ltd., Wembley Park Works, North End Road, Wembley, Middlesex.—Illustrated brochure dealing with the reconditioning, testing, hire, sale and buying of used plant.

Speed Tools, Ltd., 35, Percy Street, London, W.1.—Illustrated folder describing Speetol-Gordon illuminated magnifiers and lenses for close inspection.

James Gordon & Co. Ltd., Dalston Gardens, Stanmore, Middlesex.—Illustrated leaflet (H.28) descriptive of Hagan regulators of fuel, draught and air for Lancashire and "Economic" steam boilers.

"Yarworth" Electric Panel Co., Glencoe, Queens Road, Kingston-on-Thames.—A leaflet describing the "Yarworth" electric bed warmer, panel and mat heaters.

Applicants should write on their firms' business notepaper.

Future Neon Lighting

Speaking to the Nottingham Illuminating Engineering Society, Mr. K. G. Oldham, of Leeds, predicted new forms for neon lighting to include new colours and signs constructed to harmonise with buildings, instead of just being built on afterwards.

TRADE MARKS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered within a month from November 21st :—

DIACAM. No. 635,894, Class 9. Electric cam switches.—Craig & Derricott, Ltd., Teddesley Works, Teddesley Street, Walsall.

CLEM. No. 635,916, Class 9. Electric flat iron. Also No. 635,917, Class 11. Electric fires.—Clayton Lewis & Miller, Ltd., 5, Bridge Street, Staines.

NITROGOL. No. 635,799, Class 17. Electric insulating compounds composed of waxes, mineral jellies, and synthetic resinous or bituminous substances; electric insulating liquids.—Dubilier Condenser Co. (1925), Ltd., Ducon Works, Victoria Road, North Acton, London, W.3.

INFORMATION DEPARTMENT

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

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

Makers of "TALON" self-locking cable suspenders for use in mines.

Makers of electric iron marked "JM."

Multiple Service Points

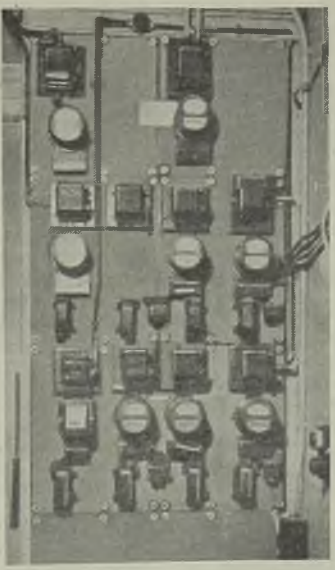
Arrangements for "Multi-Occupier" Premises

By P. Ridler

SUPPLYING a number of separate consumers in one premises often entails the provision of a neat service lay-out that can readily be expanded. The problem is more complex when old installations are being divided up for more consumers than were originally anticipated.

Probably most undertakings have premises connected to their mains with load demands and installation conditions quite different from those of, say, thirty years ago. Large houses have been divided into flats, each with its own meter; other buildings have been let off in small suites of offices, or possibly an indoor market-place has developed in an out-of-the-way corner. When the undertaking has been approached to give supply to some prospective consumer, possibly remote from the incoming service point, it has had to resort to a variety of expedients in order to meet the request.

One favoured method was to install a sub-meter for the circuit under consideration. This was frequently troublesome, because the sub-meter advance had to be deducted from that of the main meter and specially recorded for future reference. Sometimes part of the wiring would be separated from the remainder of the installation and meter connections would be brought from the distribution board fuseways. Alternatively, and more commonly, one portion of the installation would be separated electrically from the rest of the wiring and a new main run to the service point, where some means for connecting it to the service cut-outs had to be devised. The results may be seen in obscure corners and basements in the shape of an extremely unsightly agglomeration of meters, cables and controls. The writer has attempted to improve such supply points and provide a simple lay-out that would include a separate service fuse-way and allocate sufficient space for two meters for each consumer.



Central control board for large premises

Plywood boards of a size determined by the number of fuseways or "consumer spaces" are prepared in the workshop and taken to the site ready for erection. On these the apparatus is arranged to meet the conditions in each case. The consumers' controls are placed immediately above the spaces, where the consumer would expect to find them. In large premises a similar outfit is installed in a central accessible position on each upper floor, with a rising main to bring supply from the incoming service, as illustrated. The unoccupied spaces are available for heating-rate meters when required.

The method advocated has enabled such local and unsightly arrangements to be eliminated

The advantages of centralising the meters and points of supply in multi-occupier premises are many, although often overlooked because the service point is so commonplace. The consumer likes to know which are his meters and which are his main controls. It gives him confidence if he can examine and

operate these, and he is less likely to suspect that someone else's load is on his meter. If the meter has a cyclometer register, so much the better, for he can read it more easily.

The owner, too, likes to know that there is a supply of electricity available to meet the needs of each occupier in any part of his premises at a minimum of cost and disturbance. He is probably prepared to go to some trouble to get a supply for lighting purposes, but it should also be made easy for his tenants to have supply to circuits for heating and power as well. This centralising also greatly facilitates meter reading and expedites service calls.

It is not always easy to persuade an owner to go to any expense to improve conditions in premises that already have supply, no matter how untidy from an electrical point of view and the undertaking may not feel justified in incurring expenditure beyond that of providing the service apparatus. It may therefore be necessary to adopt a long-term policy, taking advantage of changes of occupier, when parts of the premises become disconnected, to reshape the scheme of distribution along previously planned lines. Circuits which do not fit in with a rational scheme can be left disconnected and supply resumed only from a suitable distribution point. The process may take years but bad spots will be eliminated eventually.

Acknowledgment is made to Mr. W. A. Royle, general manager, Sunderland Corporation electricity undertaking, for permission to use the illustrations.

News from South Africa

By our Cape Town Correspondent

Street Lighting in Cape Town.—The Electricity and Waterworks Committee of the Cape Town City Council has reported that "improvements in the street lighting of the city generally are long overdue, and the present appears to be an opportune time to begin that work." As a first instalment, the Committee recommends that the existing fittings on the Sea Point and suburban main roads shall be equipped with mercury-vapour lamps.

Rural Electrification.—Although rural electrification has not been specially studied by the Social and Economic Planning Council, it has suggested that this subject should be given the early attention of the authorities. So far rural supplies in South Africa have been confined to areas close to populous centres or near the electric railways, such as in certain parts of Natal.

Industrial Scholarships.—The Brush Electrical Engineering Co., Ltd., has awarded two industrial travelling scholarships, one to a student from the University of Cape Town and the other to a student of the Witwatersrand University. It will be possible for such engineering graduates to spend two years in the English workshops and factories of the company, during which time they will each receive an allowance of £260 a year. If this initial bursary offer proves successful it is likely that the scheme will be continued indefinitely.

Plant from Sweden.—Much of the heavy electrical plant and equipment needed by the Union is to come from British workshops, but the South African Electricity Supply Commission and the large municipalities have in some cases considered other sources of supply. Two of four steam turbines being built for the Commission at Ljungström, in Sweden, for a power station near Viljoensdrift, Orange Free State, were recently delivered at Durban by the Swedish steamer *Klipparen*. The ultimate capacity of the station is expected to exceed 100,000 kW.

New Rhodesian Station.—The Southern Rhodesia Electricity Supply Commission is building its biggest power station at Umniati, in the midlands of that Dominion. It is designed to have an ultimate installed capacity of 120,000 kW, and 88,000-V transmission lines, which are new to Rhodesia, will be erected. The first generating unit of 10,000 kW, should be installed towards the end of 1946.

Electrical Equipment Manufacture.—During the war a company known as the Alpha-Harris Corporation was formed to produce electric motors and other essential equipment that could not be imported. It is now intended to continue with this form of production, and the wartime company has been converted into the First Electric Corporation of South Africa, Ltd. A new factory is to be laid out at Witwatersrand Deep, covering an area of about three acres and bringing under one roof departments that are now scattered over the Rand. Twenty acres has been acquired to allow for expansion. During the war electrical equipment worth over £1,500,000 was produced.

Telegraph and Telephone Orders.—The Minister of Posts and Telegraphs, on his return from a visit to England, said that orders had been placed in Britain for £1,250,000 of new equipment for modernising the automatic telephone and telegraph systems in South Africa. A vigorous policy of automatic exchange development is to be undertaken in the Union. The Minister said that he had impressed upon British manufacturers the urgency of South Africa's needs and they were doing all they could to help.

ELECTRICITY SUPPLY

Plant for Belfast. Mountain Ash Bonus.

Belfast.—POWER PLANT INQUIRY.—The city electrical engineer (Mr. W. J. McC. Girvan) has been authorised by the Electricity Committee to visit factories in Britain to make investigations regarding the best type of plant for the proposed extensions at the Harbour power station.

Croydon.—POWER STATION EXTENSIONS.—The Central Electricity Board has now issued a formal direction to the Council to construct the further section of the new power station, to be ready for commercial operation in September, 1949.

LOANS SANCTIONED. — The Electricity Committee has obtained sanction to borrow £4,107 for a substation at Ashburton Park and £6,480 for housing estate mains.

SODIUM LIGHTING. — Sodium street lamps are to be provided on the Ashburton estate at a cost of £1,400.

SERVICES FOR ADDINGTON ESTATE.—The Housing Committee has decided that on the Addington estate 75 per cent. of the houses shall be provided with gas cookers, gas fires, electric lighting and power plugs and 25 per cent. with electric cookers, electric fires, electric lighting and power plugs.

Mountain Ash.—VICTORY "CHRISTMAS BOX.'—Electricity consumers at Mountain Ash will this year receive a victory "Christmas Box" worth £5,000. At the monthly meeting of the Urban District Council, Councillor Tom Morgan (chairman, Municipal Undertakings Committee) said this was the third successive year they had been able to come down to a farthing per kWh. It would be the thirteenth "Christmas Box." He added that the accounts for the year were not quite completed but there was sufficient information available to show that last year was the most successful for the consumers of electricity in the district over a period of thirty-three years. Last year they gave a bigger "Christmas Box" than ever before, followed in the March quarter by a bonus in anticipation of victory in Europe. The two bonus discounts were paid out of surplus revenue for the year. He complimented Mr. E. W. Jones (general manager) and his Department on the results obtained.

The charges recommended for December, subject to payment within the prescribed period, are as follows:—Lighting only: First, 100 kWh at ¼d. per kWh net, with additional supplies at 1d. per kWh, no meter rents being charged. Two-part tariff: First 100 kWh at ¼d. per kWh net and thereafter at ¾d. per kWh.

Middlesex.—PUBLIC UTILITY ASSESSMENTS.—At a meeting of the Valuation Committee of the Enfield U.D.C. the clerk reported upon a conference with representatives of the Southall Corporation and the Middlesex County Council with reference to public utility assessments It was understood that the view of the County Valuation Committee, agreeing with representations made by the Southall and Enfield authorities, was that the assessment of such undertakings should be determined by reference to the year of account ending immediately prior to the date of the rate and that, unless the Committee saw some reason to alter this view, it would contest the views of the various public utility undertakings in the county that regard could be had to the accounts up to the date of the proposal. With regard to the basis of apportionment of the cumulo value of the Northmet Power Co. the county valuer had advised that facilities would be given to discuss this question with the panel valuer for the County Council.

Rothesay.—DIESEL GENERATING PLANT INAUGURATED.—A 450-kW Diesel generating plant built and installed by Mirrlees, Bickerton & Day, Ltd., was set in motion last week at Rothesay power station by Provost C. S. Muir. About sixty guests attended and were shown over the plant by Mr. E. A. Earls, the burgh electrical engineer. Mr. William Robertson, electricity convener, said that the electricity undertaking would shortly pass into the control of the North of Scotland Hydro-Electric Board, and though they had some regrets concerning the transfer, it would ultimately result in a reduction in charges and extension of the service. The Board takes over the undertaking next May, and the new plant was supplied by it. The station will be operated in conjunction with the Board's proposed hydro-electric station near the head of Loch Striven, and it will serve Dunoon, South Cowal, Rothesay, Millport, and the islands of Bute and Cumbrae.

Sedgley.—PUBLIC LIGHTING.—The U.D.C. Housing Committee has decided in favour of electricity for public lighting on new housing estates.

Stirlingshire.—ALL-ELECTRIC HOUSES. — The County Council has instructed the county architect to consider the possibility of providing all-electric houses in the Lennoxtown, Torrance and Milton of Campsie areas.

Watford.—METERS. — The Electricity Committee has obtained sanction to borrow £2,000 for meters.

Overseas

Australia.—HOSPITAL HEATING.—A feature of the new Perth Hospital will be a steam-heating system with the steam supplied from the East Perth power house, nearly 6,500 ft. away. It is believed that this will be the longest run of steam piping in the Commonwealth.

Brazil.—HYDRO-ELECTRIC PROJECT.—President Getulio Vargas has issued a decree authorising a hydro-electric company to exploit the San Francisco river and to develop a region within a radius of 280 miles comprising the states of Bahia, Alagoas, Sergipe and Pernambuco. The Brazilian Federal Treasury will put up 51 per cent. of the capital which will be about £2,500,000.—*Reuter.*

Canada.—BRITISH COLUMBIA COMMISSION'S PLANS.—The British Columbia Power Commission proposes to take over eight more utility companies, to rehabilitate the plants and extend the services, according to a statement by the Premier. He said that the Commission had

already taken over eighteen power plants and distribution systems and had embarked on its first big power development scheme.

United States.—DOMESTIC CONSUMPTION.—Electricity consumed in American homes now averages 1,200 kWh annually per customer, compared with 547 kWh in 1930.

Municipal Reports

Blackburn

IN his report for 1944-45 Mr. R. H. Harral, engineer and manager of the Blackburn Electricity Department, says there is little doubt that electricity from the public supply will play an important part in the re-industrialisation of the area. Last year the undertaking sold 97·4 million kWh (against 95·9 million), including 16·7 million kWh supplied in bulk to Darwen. Revenue from the sale of electricity amounted to £417,074 (£399,469), equal to 1·028d. (0·998d.) per kWh sold. The net profit, after the appropriation of £3,149 capital expenditure out of revenue, was £28,682. The maximum demand (on January 26th, 1945) was 33,561 kW (against 28,535 kW). At the undertaking's power station 194·3 million kWh was generated (172·9 million in 1943-44).

Bolton

The accounts of the Bolton Electricity Department (borough electrical engineer, Mr. H. E. Annett) show that revenue from the sale of electricity increased from £538,799 to £555,067, but total income, at £557,558, was less than in the previous year when £16,225 was included from the C.E.B. second area pool. Working expenses after meeting loan charges, etc., together with £8,773 (£34,483) income tax were £477,233 (£450,625). There was a net profit on the year of £38,250 (£39,030). Capital account expenditure amounts to £1,519 (£1,231), £6,000 (same) is transferred to reserve and the rate fund receives £10,000 (nil), the balance carried forward being raised from £185,168 to £205,899.

A total of 132·4 million kWh was sold compared with 133·5 million in 1943-44. Power supplies decreased from 87·0 million to 80·3 million kWh, against which there was a large increase in domestic sales. The average price received per kWh sold rose from 0·97d. to 1·01d. while the cost remained at 0·931d.

Glasgow

For the first time the gross revenue of the Glasgow Electricity Department (general manager, Mr. G. Morgan) exceeded two million pounds in the year ended May 31st last, the actual amount being £2,137,019 (against £1,989,860 in 1943-44). Working expenditure was £1,684,678 (£1,513,057), loan charges £383,760 (£424,632) and income tax £6,423 (£50,368), leaving a net surplus on the year's working of £62,158 (£1,803). Of this £11 540 was appropriated for capital and special expenditure.

Sales of electricity totalled 668·4 million kWh against 666·1 million in the previous year. Per kWh sold, the total revenue averaged 0·7673d. (0·7169) and expenditure 0·7450d. (0·7163d.) the cost of electricity purchased being 0·5439d. (0·4782d.). The output of the Department's power plant was 636·7 million kWh (against 720·9 million), after allowing for 35·9 million kWh (39·4 million) used on works.

Stoke-on-Trent

An increase in the efficiency of distribution from 92·4 to 93·1 per cent. is recorded in the 1944-45 report of Mr. T. Lockett, general manager of the Stoke-on-Trent Electricity Department. The total quantity of electricity purchased (186·5 million kWh) was nearly a million kWh less than in the previous year while sales (173·6 million) were slightly up. Another interesting point is that the maximum load of 44,660 kW—the highest in the history of the undertaking—occurred at 11.30 a.m. on Saturday, January 27th. This was the first time that the peak load had occurred on a Saturday and Mr. Lockett attributes it to the artificial conditions at the time, normal peaks being "lopped off."

Excluding bulk supplies to other authorities, 162·6 million kWh was sold, an increase of 7·7 million kWh, mostly in lighting, cooking and heating supplies although power sales were also up. The reduction in bulk supplies was largely the result of the loss of the supply to Stone.

Revenue from the sale of electricity (excluding bulk supplies) amounted to £667,278 (against £628,804), equal to 0·98d. (0·97d.) per kWh. Total revenue was £717,656 (£686,862) and there was a net profit of £200 (£24,116), this being the lowest figure since 1927. Income tax increased by £13,300 to £37,741.

Sunderland

The latest report of the Sunderland Electricity Department (engineer and general manager, Mr. W. A. Royle) covers the fiftieth year of operation of the undertaking, during which extensions of the Hylton Road generating station were inaugurated (*Electrical Review*, March 16th, 1945). Electricity sales in the aggregate showed little change from the preceding year, amounting to 93·5 (against 93·7) million kWh, an increase in domestic supplies of over 3 million kWh almost offsetting the reduction in power supplies.

Revenue from the sale of electricity amounted to £385,126, equivalent to 0·988d. per kWh, compared with £365,059 and 0·937d. in the previous year. Total income was £422,787 (£397,263) and working costs £320,156 (£308,773), there being a net trading surplus of £40,887 (£42,276). After allowing for an amount brought forward £22,347 (£9,241) has been appropriated for renewals and special expenditure and £20,631 (£33,035) has been transferred to the development reserve and renewal fund. The average cost per kWh sold was 0·907d. (0·848d.).

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Fluorescent Lamp Fittings

A TROUGH fitting for 5 ft. fluorescent lamps placed on the market by METROPOLITAN-VICKERS ELECTRICAL CO., LTD., Kingsway, London, W.C.2, is constructed of "Perspex," so forming a rigid translucent body for situations where top light is desirable. It has metal ends with hinged cover plates for access to the lamp holders and starter switch, but the choke and condenser have to be mounted separately.

Another model is made of sheet steel with all the control gear completely concealed within the end-sections, which have hinged cover plates. This reflector is slotted to provide an upward component of light and it is obtainable in either one or two lamp types.

Tubular Copper Fire

Solid copper tube, polished and lacquered, has been used to good effect in a new electric fire which the COOPER MANUFACTURING CO., Hanway Street Works, Hanway Street, London, W.1, has produced to meet modern furnishing requirements.

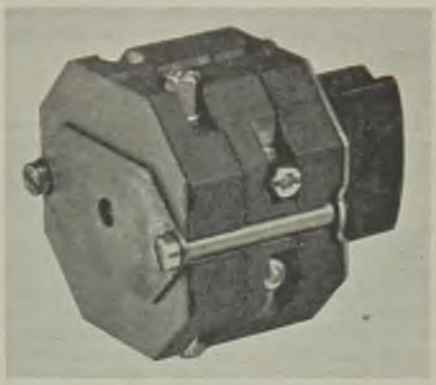
Both 1- and 2-kW models are available, the latter having a switch incorporated in the reflector cowl at the back, which is also of solid copper. The centre of gravity has been carefully selected to prevent risk of the fire's being knocked over, while the loop at the top facilitates carrying. The usual wire guards for the fire-bar type elements are provided.

Cooper tubular copper fire

Rotary Cam Switches

A switch that offers the advantages of the rotary principle and gang assembly, yet permits the renewal of worn parts with ease, has been introduced under the trade name of "Diacam," by CRAIG & DERRICOTT, LTD., Royal Works, Sutton Coldfield, Warwickshire. It is suitable for domestic and industrial uses and the plain shaft extension and one-piece body are housed in water-tight and flame-proof enclosures.

Many circuit combinations are possible; for instance, series speed selection for motors, while one of the switch poles can be advanced to function in the no-volt coil circuit for ensuring that the starter will close or open before the main line contacts engage. The dimensions are unusually small relative to capacity; for example, the double pole AC model with double break for 30 A at 500 V has a body size of 2 by 2 by $1\frac{5}{8}$ in. deep.



Multi-position rotary cam switch of small dimensions

The actuating shaft carries bakelite cams, engaging the main contacts through the medium of an additional roller moving freely in the section chamber, which accommodates the star wheel and positioning rollers made of hardened steel. The additional roller reduces friction and forms the single-point suspension of the moving contacts, for alignment. The cam contours ensure that the break is quick and short, with wide isolation space and double break at each pole. Springs, which do not carry current, back up the moving contacts and the fixed terminals will accommodate connecting cables up to 7/·036 section. Contacts are silver faced, all metal parts plated and working parts are totally enclosed in dust-tight housings. Single, double and triple pole models are available for 15 and 30 A in four, six, eight, or ten rotor-position assemblies.

Rectifier Cut-out

A thermal cut-out for the protection of metal rectifiers against overheating, which may be caused in a number of ways additional to overloading, employed by F. C. HEAYBERD & CO., LTD., 28, Russell Square, London, W.C.1, during

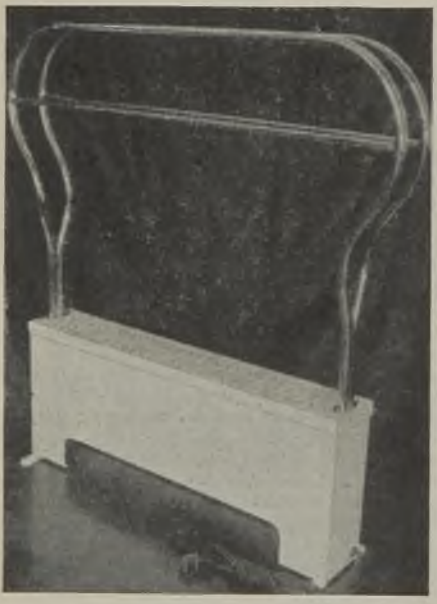
the war is now to be incorporated in the company's industrial range of rectifiers and battery chargers.

The device consists of a bi-metallic disc uniformly dished and secured at one point of its perimeter diametrically opposite a contact piece on the disc, which is normally in engagement with another contact, thereby keeping the circuit closed. In the event of the temperature rising dangerously the disc will become unstable and snap over, thereby breaking the electrical circuit. When the rectifier cools down the disc will revert to its original shape, so re-closing the circuit.

Electric Clothes-horse

The "Lectros" electric clothes-horse produced by JOHN A. GREY & PARTNERS, LTD., Piccadilly House, Piccadilly Circus, London, consists of a totally enclosed heating and warm-air-flow unit to which is attached a chromium-plated drying-rail structure.

The heater element, which operates at black heat, is totally sheathed in copper tubes to which are attached specially designed radiating fins. The drying rail never becomes actually hot even when the apparatus is in use for extended periods and there is thus no risk of fire or scorching. It is claimed that even woollen garments can be aired or dried without shrinkage or matting of the wool. Apart from its primary purpose, the unit is also useful for space heating. Its loading is less than 1 kW. The base portion of the grill is finished in porcelain enamel, in white, pink, rose, or other pastel shades. Plastic or chromium hooks are provided for attaching small articles of clothing, such as children's woolly socks, to the drying rails.



The "Lectross" clothes-horse

Convection Radiator

The "Rosyglow" convection radiator produced by A. E. W., LTD., Imperial Works, High Street, Edgware, is designed so that the air is heated at low temperature and kept in constant circulation. The elements are enclosed in an air duct shaped in such a way as to direct hot air all over the room, it being claimed that by this means an even temperature is maintained in the room with the use of only half the normal consumption of electricity. The enclosure of the elements (which, incidentally, the makers say will not burn out) eliminates risk of burning persons, clothes, etc. The "floodlighting" of the front gives the apparatus an attractive appearance. Both 1- and 2-kW models are available.

The "Rosyglow" convection radiator

Certificates of Origin

SINCE 1939 all goods imported into the United Kingdom from certain neutral countries have had to be accompanied by certificates signed by a British consular officer to the effect that no enemy had any interest in such goods, and that not more than 5 per cent. of their cost was due to the employment of enemy labour or raw material.

The object of this provision was to prevent any substantial benefit from accruing to the enemy *via* neutral countries. This is now considered no longer necessary, and the Board of Trade has therefore issued the Import (Certificates of Origin and Interest) (Revocation) Order, 1945 (S.R. & O. 1945 No. 1316) (Stationery Office, 1d.) which revokes the Import (Certificates of Origin and Interest) Order (S.R. & O. 1939 No. 1505) and amending orders. The revocation means that importers need no longer produce Certificates of Origin and Interest in respect of goods imported from Liberia, Liechtenstein, Portugal, Spain, Sweden and Switzerland.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Ferranti, Ltd., report a net profit for 1944-45 (after providing for taxation) of £95,678, as compared with £96,237 for the preceding year. Reserve receives £72,817 (against nil) and contingency reserve account £5,000 (against £60,000). The ordinary dividend is maintained at 6 per cent. and £58,832 (against £76,471) is carried forward.

In his statement to be presented at next Thursday's meeting Mr. V. Z. de Ferranti (chairman and managing director) says that the Canadian and American subsidiaries are now in a sound financial position and are earning a steady and satisfactory revenue from their own efforts. It is therefore considered proper to write back part of the provision for initial losses and restore the book values of the investments to their original cost. In addition the Canadian company has made a substantial bonus issue of shares from reserves for which credit has also been taken. Reserves and surplus now stand at £508,832.

The value of the company's wartime output was £30,000,000 divided into six principal categories—fuses (nearly £9,000,000), radar and radio, fire-control apparatus, navigational instruments, electrical instruments and transformers. Both factory space and the number of employees were about doubled, employment reaching a peak of about 12,000. The company has to face a difficult period of reorganisation for only 10 per cent. of the wartime products were normal products. The reorganisation, and, to a certain extent, the reconcentration of the factories will have to be undertaken, as well as the rebuilding of the company's normal business. They are tackling the position with energy and have already secured some hundreds of thousands of pounds worth of export business.

Crabtree Electrical Industries, Ltd.—Dr. H. Schofield, chairman, stated at the annual meeting on November 21st that the operating company had been very fortunate in finding itself among the few firms whose standard productions were in demand equally in war and peace and in consequence it had not been called upon to undergo drastic reorganisation. It had, of course, not restricted itself to its standard productions during the war—about 75,000,000 completely finished articles were made—and the slight drop in trading profit this year was due to the cessation of special contracts and the switching over again to a larger output of normal products. Now that the war was over they looked forward to expanding their activities on the lines originally envisaged on the formation of the company (Crabtree Electrical Industries) in 1936.

Aeronautical & General Instruments, Ltd.—In a statement circulated with the report and accounts the chairman (Mr. W. McClelland, C.B., O.B.E.) says that the company is now engaged in the completion of certain essential and specialised Government work and in the gradual resumption of its pre-war activities together with the development of new commercial products. The war has greatly increased the size of the company's buildings and plant and consequently the scope of its activities. He points out that the company's general policy is to provide specialised articles possibly in limited quantities, rather than articles of universal demand manufactured on mass production lines, and says it is the board's considered opinion that future products should represent a continuance and extension of this policy. The break-up of mid-European scientific instrument production gives additional reasons for the necessity to provide such products for the home and export markets. Secondly, and as a corollary to its primary policy, the company has built up an organisation that is substantially self-contained as a manufacturing unit and so dependent only on the so-called " raw " materials.

Falk, Stadelmann & Co., Ltd., in their accounts for the year ended March 31st last, show a profit of £121,063, compared with £112,981 in the previous year. After allowing £7,315 (£6,958) for pensions, £26,468 (£29,074) for income tax and N.D.C. and £2,945 (nil) written off goodwill, the net profit is £84,334 (£76,950). The ordinary dividend is raised from 7½ to 10 per cent. and £47,531 (£50,594) is carried forward. Last year £5,000 was allocated to the staff fund. The report states that in addition to war activities the output of reasonable quantities of normal products was maintained.

British Electric Resistance Co., Ltd.—Many price queries being outstanding the directors are not able to submit the annual report and accounts for the year ended July 31st last at the annual meeting to be held to-day (Friday). Sufficient is known, however, regarding the result to permit the payment of the usual dividend of 20 per cent. The turnover of the business was satisfactory, while the subsidiary company, the British Power Transformer Co., Ltd., again had a profitable year.

Heenan & Froude, Ltd., propose to pay a final ordinary dividend of 5 per cent., and a cash bonus of 5 per cent., maintaining the total distribution for the year at 15 per cent. The net profit to August 31st was £53,823, compared with £47,368 in the previous year.

The Associated Equipment Co., Ltd., reports net profits for the year to September 30th last (subject to final audit) of £218,500, compared with £227,500 in the previous year. The final dividend on the ordinary stock is 5 per cent. free of tax, making 7½ per cent. tax free for the year (same).

Max Stone, Ltd., report a trading profit for the year ended June 30th last of £69,706 (against £54,233). As already reported the ordinary dividend for the year is being raised from 10 to 15 per cent.

The East African Power & Lighting Co., Ltd., announces interim dividends of 3 per cent. on the ordinary shares (same) and 1½ per cent. on the new ordinary shares.

Bullers, Ltd., announce a final dividend of 5 per cent., again making 7½ per cent. for the year.

Dictograph Telephones, Ltd.—A final dividend of 7 per cent. is recommended, making 11 per cent. for the year ended August 31st last (same). The net profit was £36,629 (£36,318).

The Chloride Electrical Storage Co., Ltd., is again paying interim dividends of 5 per cent. on the "A" and "B" shares.

The Telephone Manufacturing Co., Ltd., is again paying an interim dividend of 2½ per cent.

New Companies

Hogan & Wardrop, Ltd.—Private company. Registered November 16th. Capital, £1,000. Objects: To carry on the business of agents and merchants, electrical, mechanical or consulting engineers, etc. Directors: J. R. E. Hogan, 54, Lake Rise, Romford; and J. L. Hill and F. Wardrop, both of 45, Mashiters Walk, Romford. Secretary: A. W. Jobson. Registered office: City House, 158, City Road, E.C.1.

Electrical Development Co., Ltd.—Private company. Registered in Belfast November 13th. Capital, £500. Objects: To carry on the business of electrical, wireless, mechanical and general engineers, manufacturers and merchants of, and dealers in, and agents for, electrical and wireless apparatus, etc. First directors: J. McEwen, 63, Dunlambert Drive, Belfast and R. McEwen, 57, Mount Merrion Park, Belfast. Registered office: 63, Dunlambert Drive, Belfast.

Electric Vehicle Service (Birmingham), Ltd.—Private company. Registered November 20th. Capital, £2,000. Objects: To carry on the business of repairing, servicing and maintaining battery electric vehicles, trucks and conveyances of all kinds, etc. Directors: J. W. Treece (director of Treece (Birmingham), Ltd.) and L. A. Treece, engineer, both of 8, Ascot Road, Moseley, Birmingham, 13. Secretary: E. B. Westwood. Registered office: Lombard House, Great Charles Street, Birmingham, 3.

Craft Electrical Industries, Ltd.—Private company. Registered November 16th. Capital, £1,000. Objects: To carry on the business of manufacturers of, and dealers in, electrical and other plant and accessories, etc. First directors: R. Nuttall and Mrs. E. Nuttall, both of 22, King Street South, Rochdale. Registered office: Tonge Lane Works, Whitworth, nr. Rochdale.

Burgess Armature Winding, Ltd.—Private company. Registered November 20th. Capital, £1,000. Objects: To carry on the business of armature winders, manufacturers of, and dealers in, armatures, dynamos, motors, magnetos and batteries, electrical engineers, etc. Subscribers: M. Gordon, 113, High Holborn, W.C.1, and T. W. Weyler, 217, Beehive Lane, Ilford, electrical engineer. Secretary: M. Gordon. Registered office: 113, High Holborn, W.C.1.

Blaenau Electrical Supplies, Ltd.—Private company. Registered November 13th. Capital, £100. Objects: To carry on the business of electrical engineers, electricians, contractors for the supply and maintenance of electric light and power installations, etc. Directors: H. D. Hands, "Nairobi," Clarence Road, King's Heath, Birmingham, director of London Aluminium Co., Ltd.; R. W. Heams, "Beechcroft," Guildford Road, Ottershaw Park, Guildford, director of Ridgefield Trust, Ltd.; and I. P. Jones, "Gogarph," Manod Road, Blaenau Festiniog, and general manager, Yale Electric Power Co., Ltd. Registered office: 9, Clarges Street, W.1.

L. Bunce (Electrical), Ltd.—Private company. Registered November 13th. Capital, £15,000. Objects: To acquire the business of an electrical wholesaler now carried on by Leonard Bunce at 182, High Street, Dudley. Permanent directors: Leonard Bunce, 50, Cranbourne Road, Dudley Wood, Cradley Heath, and four others. Registered office: 87/8, King Street, Dudley.

J. Robertshaw (Manchester), Ltd.—Private company. Registered November 2nd. Capital, £100. Objects: To carry on the business of designers and manufacturers of, and dealers in, electrical, radio, sound recording and television apparatus, etc. Directors: P. Fox, 78, Cavendish Road, Eccles, and J. Darlington, 4, Atherstone Avenue, Crumpsall. Registered office: 16, Blackfriars Street, Manchester.

Electrical Units, Ltd.—Private company. Registered November 14th. Capital, £1,000. Objects: To carry on the business of traders in electrical units, fittings and equipment, etc. Directors: J. T. Cooper, 22, Richmond Road, New Barnet; and Eileen M. Wilder, 49, Eaton Rise, Ealing, W.5. Secretary: J. T. Cooper. Registered office: 22, Richmond Road, New Barnet.

Essay Electrical Co., Ltd.—Private company. Registered November 17th. Capital, £1,200. Objects: To carry on the business of electrical engineers and contractors, etc. Directors: S. Moody, 179, Park Avenue, Southall, and two others. Registered office: 30, Bath Road, Hounslow.

Increases of Capital

Reynolds & Bradwell, Ltd.—The nominal capital has been increased by the addition of £5,000 in £1 ordinary shares beyond the registered capital of £10,000.

Mortgages and Charges

Electrical and Industrial Investment Co., Ltd.—Particulars filed of debentures for £200,000 and premium of 2 per cent., authorised June 18th, and covered by trust deed dated October 30th, 1945, charged on the company's undertaking and property, present and future, including uncalled capital. Trustees: Alliance Assurance Co., Ltd.

Grant Switchgear, Ltd.—Charge on moneys under contracts dated October 22nd, 1945, securing all moneys due or to become due from the company to Midland Bank, Ltd.

Mitchell Electric, Ltd.—Satisfaction in full on October 22nd, of mortgage dated April 2nd and registered April 15th, 1942, securing all moneys due or to become due from the company to the Westminster Bank, Ltd.

Liquidations

Robert Beresford (Newcastle, Staffs), Ltd.—Meeting December 31st at 17, Albion Street, Hanley, to receive an account of the winding-up by the liquidator, Mr. A. B. Snow.

STOCKS AND SHARES

THE sweeping nationalisation programme of the Government has had an unfavourable effect upon prices of home electricity supply shares. Coal, transport, iron and steel, electricity and gas, are comprised in the Government plan, the details of which are awaited with a feeling akin to anxiety on the part of shareholders in companies which have flourished, in the main, through the exercise of private enterprise. Ordinary shares in the various electricity supply groups, London, Provincial and Scottish, have felt the chilling influence of the Government's announced intentions. For the time being, the market in home electricity supply issues for years past one of the firmest round the House, is unsettled and fidgety.

Electricity Supply

Falls in the list of home electricity ordinary shares range from 6d. to a florin. The investor can now obtain an average yield of 4 per cent. on money spread over ordinary shares in a number of the best-class companies. Electric Supply Corporation ordinary at 47s. 6d. are 1s. higher and Newcastle Electric at 49s. 3d. have gained 6d. Metropolitan dropped to 40s., to rally to 41s. 6d., leaving the price 1s. up on the month. Preference shares in the group are mostly lower. No changes have occurred amongst the debenture stocks.

The Indian electricity shares have declined. Calcutta Electrics fell 5s. to 60s. 6d., Cawnpore 2s. to 62s. 6d. and Madras Electrics 4s. 6d., to 40s. 6d. Tokyo sixes are 9½ down on the month at 42½. In spite of the crisis, Palestine Electric " A " at 37s. 6d. show a rise of half-a-crown, but Jerusalem Electrics at 25s. 6d. have lost 1s.

A Month's Fluctuations

Thanks to the Government's attitude to home transport, Thomas Tillings have gone back 4s. 6d. to 2½, and British Electric Traction deferred, after a rise of 130 points to 1,135, lost 90 of them, reacting to 1,045, leaving a gain of 40 on the month. West Ridings are 5s. higher at 45s. and Lancashire Transport 2s. 3d. at 43s. 6d. Amongst Overseas companies, Calcutta Trams gained 12s. 6d, rising to 90s. before going back to 82s. 6d.

Radio concerns' shares have gone ahead since a month ago. A.C. Cossor rose 2s. 6d. to 45s.. and E.M.I. at 34s. 3d. are 1s. 3d. up. Philco eased off to 11s. At 36s. 3d. Pye deferred are 3s. 9d. to the good.

Equipment and Manufacturing

Most of the month's changes in this section are upward; some of the rises are substantial. International Combustion at 8½ are 10s. better, Christy Bros. at 81s. 3d. have gained 6s. 3d., Consolidated Signal at £7 are 7s. 6d. to the good. Mather & Platt, Revo, Reyrolle,Lancashire Dynamo, Chloride Electrical Storage, are well up as compared with a month ago. Thorn Electrics at 32s. 3d. are 3s. 6d. better. Vactrics, Veritys and Allen Wests show rises. General Cables at 19s. have advanced 2s., and Arons $\frac{1}{10}$ to 63s. 9d. Reference to the price lists shows how considerably the gains have predominated in the month under review.

Cable & Wireless

The recent excitement in Cable & Wireless stocks, caused by the Government's declaration that it intends to take over the communication part of the combine, has subsided, and the market is in a quieter condition. On the month, prices show comparatively little change, but the ordinary stock, 91 in the middle of October, has been up to 112, since then reacting to the present price of 105½, which leaves a gain on balance of 14½ points. Vague optimism canvasses the possible price which the ordinary stock would be worth if the combine went into liquidation. Present counsels, however, take the view that liquidation is unlikely, and that matters will go on as before, save that the Government, in acquiring the active part of the system, may give by way of compensation a British security with the status of a trustee investment. However, the matter is still in the dark, and, pending further light on the situation, the market in both stocks, ordinary and preference, is distinctly quieter.

Home Rails

The Home Railway market has taken a slight turn for the better. It cannot be said that there is any considerable volume of trade doing in the stocks, but what little there is serves to demonstrate that buyers are not wholly indifferent to the attraction of high yield on their money, and are content to ignore nationalisation chances. Transport " C " shows a fall of 2 points on the month. Stock is on offer at 64½, at which the yield on the money is £4 14s. per cent. This compares with £6 15s. per cent. obtainable from Southern Railway 5 per cent. preferred stock at 74½. Prior-charge stocks in this group are dull, in sympathy with the weakness of Consols and British Government funds. Transport 4½ per cent. " A " stock is, exceptionally, 2 points up on the month at 121½. On the other hand, Southern Railway 5 per cent. preference, a full trustee stock, is 2½ down at 105.

Stock Exchange Statistics

The Stock Exchange Council has now published its annual report, covering many sides of Stock Exchange life for the year ended March 24th last. Incidentally, it may be of interest to notice that there were at that time 3,563 members of the Stock Exchange. These, with non-members, made a total on the floor of the House of 5,137, which included 2,137 members and clerks serving in the Forces at the end of March. Statistics are provided of the

(*Continued on page* 803)

ELECTRICAL INVESTMENTS

Past Month's Price Changes

Company	Dividend Previous	Dividend Last	Middle Price Nov. 23	Month's Rise or Fall	Yield p.c.
Home Electricity Ordinary					£ s. d.
Bournemouth and Poole	12½	12½	60/6	−2/−	4 2 8
British Power and Light	7	7	29/−	..	4 16 7
City of London	5½	6	28/6	−1/−	4 4 3
Clyde Valley	8	8	40/6	−6d.	4 0 0
County of London	8	8	40/−	−1/−	4 0 0
Edmundsons	6	6	28/−	−2/−	4 5 9
Elec. Dis. Yorkshire	9	9	41/−	..	4 7 10
Elec. Fin. and Securities	12½	13½	58/3	−6d.	4 12 9
Elec. Supply Corporation	10	10	47/6	+1/−	4 4 3
Lancs. Light and Power	7½	7½	34/−	−6d.	4 5 9
Llanelly Elec.	6	6	25/6	−6d.	4 14 0
Lond. Assoc. Electric	3	4	27/−	+6d.	2 19 2
London Electric	6	6	28/6	−6d.	4 4 3
Metropolitan E.S.	8	8	41/6	+1/−	3 17 2
Midland Counties	8	8	40/−	−6d.	4 0 0
Mid. Elec. Power	9	9	41/6	−6d.	4 6 9
Newcastle Elec.	7	7	29/3	+6d.	4 15 9
North Eastern Elec.	7	7	32/−	−6d.	4 7 6
Northampton	10	10	47/3	..	4 4 6
Northmet Power	7	7	38/−	−1/−	3 13 8
Richmond Elec.	6	6	26/6	..	4 10 7
Scottish Power	8	8	36/−	−2/−	4 9 0
Southern Areas	5	5	23/6	..	4 5 0
South London	7	7	29/−	..	4 16 7
West Devon	5	5	25/−	..	4 0 0
West Glos.	4½	3½	25/−	−6d.	2 16 0
Yorkshire Elec.	8	8	40/−	−6d.	4 0 0
Public Boards					
Central Electricity :					
1955–75	5	5	114	..	4 7 9
1951–73	4½	4½	107	+1	4 4 0
1963–93	3½	3½	105	..	3 6 8
1974–94	3¼	3¼	102	+1	3 3 9
London Elec. Trans.	2½	2½	98	..	2 11 0
London & Home Counties 1955–75	4½	4½	112	..	4 0 4
Lond. Pass. Trans. Bd.					
A	4½	4½	121½	+2	3 14 1
B	5	5	120½	+1	4 3 0
C	3½	3	63	−2	4 15 3
West Midlands J.E.A. 1948–68	5	5	105½	..	4 14 9
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	9/6	+1/6	—
Calcutta Elec.	6*	6*	60/6	−5/−	1 19 7
Cawnpore Elec.	7	13	62/6	−2/−	4 3 3
East African Power	7	7	39/−	+2/−	3 11 9
Jerusalem Elec.	7	5	25/6	−1/−	3 18 5
Kalgoorlie (10/−)	5	5	12/−	+6d.	4 3 1
Madras Elec.	4	6	40/6	−4/6	2 19 6
Montreal Power	1½	1½	24½	−½	—
Nigerian Elec.	10	10	40/−	..	5 0 0
Palestine Elec. "A"	5*	5*	37/6	+2/6	2 13 3
Perak Hydro-elec.	6	7	17/−	−1/−	—
Tokyo Elec. 6%	6	6	42½	−9½	—
Victoria Falls Power	15	15	98/9	+2/6	3 0 9
Whitehall Inv. Pref.	—	6	25/−	..	4 16 1

Company	Dividend Previous	Dividend Last	Middle Price Nov 23	Month's Rise or Fall	Yield p.c.
Equipment and Manufacturing					
Aron Elec. Ord.	10	15	63/9	+1/16	4 14 1
Assoc. Brit. Eng.	6	7	51/3	−1/16	2 14 4
Assoc. Elec. :					
Ord.	10	10	58/3	−3d.	3 8 9
Pref.	8	8	40/−	−1/16	4 0 0
Automatic Tel. & El.	12½	12½	70/−	..	3 11 5
Babcock & Wilcox	11	12	58/6	+6d.	4 2 1
British Aluminium	10	—	40/−	+1/9	—
British Insulated & Callender's	..	..	47/6	+6d.	—
British Thermostat (5/−)	18½	18½	23/−	+1/−	4 0 5
British Vac. Cleaner (5/−)	30	30	38/−	+1/−	3 19 0
Brush Ord. (5/−)	9	10	10/6	..	4 15 4
Burco (5/−)	15	20	19/6	+2/3	5 5 3
Chloride El. Storage	15	15	87/6	+1/16	3 8 6
Christy Bros.	12½	17½	81/3	+6/3	4 6 1
Cole, E. K. (5/−)	15	20	37/6	..	2 13 4
Consolidated Sig.	24	27½	7	+⅛	3 18 7
Cossor, A. C. (5/−)	10*	12½*	45/−	+⅛	1 7 6
Crabtree (10/−)	17½	17½	46/−	+2/3	3 16 1
Crompton Parkinson Ord. (5/−)	22½	22½	32/6	..	3 9 2
De La Rue	40	40	11	−¼	3 12 0
E.M.I. (10/−)	8	8	34/3	+1/3	2 5 1
Elec. Construction	10	12½	59/6	..	4 4 6
Enfield Cable Ord.	12½	12½	63/−	−1/−	3 17 0
English Electric	10	10	57/−	+1/6	3 10 2
Ericsson Tel. (5/−)	22*	20*	53/9	+1/16	1 15 0
Ever Ready (5/−)	40	40	44/6	+6d.	4 10 0
Falk Stadelmann	7½	10	38/9	+2/9	5 3 3
Ferranti Pref.	7	7	33/6	..	4 3 7
G.E.C. :					
Pref.	6½	6½	35/−	+6d.	3 14 4
Ord.	17½	17½	97/3	+9d.	3 13 5
General Cable (5/−)	15	15	19/−	+2/−	3 19 0
Greenwood & Batley	15	15	42/6	..	7 1 2
H.T.A. (10/−)	12½	12½	28/−	+1/−	4 9 3
Henley's (5/−)	20	20	27/9	−6d.	3 12 0
4½% Pref.	4½	4½	24/6	..	3 13 6
Hopkinsons	17½	20	87/6	+3/9	4 11 4
India Rubber Pref.	5½	5½	24/−	..	4 11 9
Intl. Combustion	30	32½	8½	+½	3 16 6
Johnson & Phillips	15	15	81/6	+1/6	3 13 6
Lancashire Dynamo	22½	22½	5½	+1/16	4 1 10
Laurence, Scott (5/-)	12½	12½	14/6	+1/−	4 6 2
London Elec. Wire	7½	7½	42/−	+2/−	3 11 5
Mather & Platt	10	10	55/−	+4/3	3 12 9
Metal Industries (B)	8½	9	50/−	..	3 12 0
Met. Elec. Cable Pref.	5½	5½	21/3	..	5 3 6
Mid. Elec. Mfg.	25	25	7½	..	3 4 5
Murex	20	20	33/9	−½	4 5 1
Newman Ind. (2/−)	20	20	8/6	+1/−	4 14 2
Philco (2/−)	25	10	11/−	−9d.	1 16 4
Power Securities	6	6	28/−	+1/−	4 5 9
Pye Deferred (5/−)	25	25	36/3	+3/16	3 9 0
Ransome & Marles	20	20	95/−	+1/3	4 4 2
Revo (10/−)	17½	17½	50/6	+3/6	3 9 6
Reyrolle	12½	12½	76/−	+2/9	3 5 9

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend Previous	Dividend Last	Middle Price Nov. 23	Month's Rise or Fall	Yield p.c. £ s. d.
Equipment and Manufacturing *(Continued)*					
Siemens Ord. ..	7½	7½	38/6	—6d.	3 18 0
Strand Elec. (5/–)	10	12½	11/6	+1/3	5 8 8
Switchgear & Cowans (5/–) ..	20	20	21/–	..	4 15 2
T.C.C. (10/–) ..	7½	10	24/–	..	4 3 4
T.C. & M. ..	10	10	62/–	+3/–	3 4 6
Telephone Mfg.(5/–)	9	9	14/–	+1/3	3 4 3
Thorn Elec. (5/–)	20	20	32/3	+3/6	3 2 2
Tube Investments	20	22½	5¾	+⅛	3 15 0
Vactric (5/–) ..	Nil	22½	22/6	+6d.	5 0 0
Veritys (5/–) ..	7½	7½	8/–	+3d.	4 13 9
Walsall Conduits(4/–)	55	55	57/–	..	3 17 3
Ward & Goldstone (5/–)	20	25	33/–	+1/–	3 15 9
Westinghouse Brake	14	14	80/–	+1/3	3 10 0
West, Allen (5/–)	7½	7½	9/–	+9d.	4 3 4
Traction and Transport					
Anglo-Arg. Trans :					
First Pref. (£5)	Nil	Nil	2/6	..	—
4% Inc. ..	Nil	Nil	1¼	..	—
Brit. Elec. Traction :					
Def. Ord. ..	45	45	1045	+10	4 6 2
Pref. Ord. ..	8	8	180	..	4 9 0
Bristol Trams ..	10	10	52/–	—1/3	3 17 0
Brazil Traction	2	2	29½	+¼	6 16 9
Calcutta Trams	6½	7½	82/6	+5/–	1 16 6
Cape Elec. Trams	5	6	28/–	..	4 5 9
Lancs. Transport	10	10	43/6	+2/3	4 12 0
Southern Rly. :					
5% Prefd. ..	5	5	73⅛	+½	6 16 0
5% Pref. ..	5	5	105	—2½	4 15 3
T. Tilling ..	10	10	50/–	—1/6	4 0 0
West Riding ..	10	10	45/–	+5/–	4 9 0
Telegraph and Telephone					
Anglo-Am. Tel. :					
Pref. ..	6	6	127½	—½	4 14 1
Def.	1½	1½	31½	..	4 15 4
Anglo-Portuguese	8	8	29/–	—1/–	5 10 4
Cable & Wireless :					
5½ Pref. ..	5½	5½	112	—½	4 18 3
Ord. ..	4	4	105½	+14½	3 15 10
Canadian Marconi	$1	Nil	4 cts.	20/–	+1/9 —
Globe Tel. & Tel. :					
Ord. ..	8¼*	5*	44/–	+6d.	2 5 6
Pref.	6	6	32/–	+1/6	3 15 0
Great Northern Tel. (£10) ..	Nil	Nil	37	+2¾	—
Inter. Tel. & Tel.	Nil	Nil	35½	+2½	—
Marconi-Marine	7½	7½	33/9	—3/3	4 9 0
Oriental Tel. Ord.	4	4	58/9	—1/3	—
Telephone Props.	Nil	6	22/–	..	5 9 1
Tele. Rentals (5/–)	10	10	13/–	—9d.	3 17 0

* Dividends are paid free of Income Tax.

Stocks and Shares

(*Continued from page* 801)

securities quoted in the daily Stock Exchange Official List, and, under the heading of "Electric Light and Power," it is stated that on April 3rd this year the nominal amount of outstanding capital was £221,000,000, with a market valuation of over £332,000,000. By comparison with a year ago, the market valuation is up £19,000,000. The former figure has shrunk heavily since last March, the decline being due, it is hardly necessary to add, to the result of the General Election and its *sequelæ*.

American Interest

One of the present-day developments in Stock Exchange markets is a return of American interest to ordinary shares in British industrial companies. The demand for such shares is due wholly to exchange. American industrial stocks and shares give a higher rate of yield, as a whole, than the returns which the British investor is content to accept, but it would appear as if American balances over here are being utilised in the purchase of front-rank ordinary shares, particularly, of course, in those companies with which the American investor is more or less familiar. It will not be forgotten that some years ago the Americans made a bid for control of various British companies operating on this side, General Electric being an outstanding example. This met with no favour here. Steps were taken to remove the possibility of the control of British concerns passing into American hands. The present movement on the part of American investment is inspired by quite different reasons, that of exchange being, as already mentioned, the principal.

Eire's Imports Increase

EVIDENCE of a noteworthy improvement in conditions in the electrical trades in Eire is afforded by the official import returns for the nine months ended September last. As compared with the corresponding period of 1944, imports have more than doubled in value, as shown in the accompanying table.

	January–September 1944 £	1945 £
Electric motors	8,263	18,611
,, measuring instruments and apparatus	10,054	12,544
Other electrical machinery ..	24,869	64,905
Vacuum cleaners	—	1,764
Dry batteries and parts ..	4,983	13,247
Electric lamp bulbs	3,237	32,043
,, fires, kettles, irons, etc.	4,187	10,484
,, cooking apparatus and parts	2,333	3,455
,, lighting accessories and fittings ..	11,404	28,971
,, wires and cables, insulated	8,324	42,629
Telegraph and telephone apparatus	6,423	42,674
Wireless receiving sets and cognate material	18,350	48,388
Other electrical goods and apparatus	77,100	115,957
Totals	£179,527	£435,672

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 (1*s. each*) *may be obtained from the Patent Office*, 25, *Southampton Buildings, London, W.C.*2.

A. M. ARMOUR, J. W. Walley and Metropolitan-Vickers Electrical Co., Ltd.—"Detection of faults in non-magnetic materials." 8146. May 21st, 1943. (573152.)

W. Blackman, Cinema-Television, Ltd., and G. A. R. Tomes.—"Photo-electric cells." 17637. December 13th, 1940. (573173.)

British Thomson-Houston Co., Ltd.—"Driving mechanism employing planetary gearing." 19993/43. December 5th, 1942. (573122.) "Washing machines." 9548/43. June 17th, 1942. (573155.) "Thermal electric switches." 10752/43. July 3rd, 1942. (573156.) "Electric switching mechanism suitable for load ratio control." 11521/43. July 15th, 1942. (573158.)

British Thomson-Houston Co., Ltd., and K. J. R. Cocke. — "Domestic washing machines." 14247. September 1st, 1943. (573192.)

Cable & Wireless, Ltd., and F. Warburton.—"Telegraph apparatus." 19910. November 29th, 1943. (573121.)

J. B. Cataldo and W. E. Stilwell, Jnr.—"Electric overload protective devices." 20590/43. December 5th, 1942. (573135.)

Compagnie pour la Fabrication des Compteurs et Materiel d'Usines a Gaz.—"Arrangements of differential electric protection." 9977/40. June 13th, 1939. (573172.)

Ferranti, Ltd., and F. L. Humber.—"Release devices for cable wound on reels." 20291. December 4th, 1943. (573128.)

Ferranti, Ltd., and M. K. Taylor. —"Apparatus for the reproduction of signals limited in frequency band width before and/or on reception." 20138. December 2nd, 1943. (573168.)

General Electric Co., Ltd., and F. C. Archer.—"Dynamo electric machines." 7404. April 21st, 1944. (573197.)

General Electric Co., Ltd., and C. E. Ransley.—"Metallising of ceramics." 1949. February 13th, 1942. (573142.)

General Electric Co., Ltd., H. C. Turner and G. W. V. Buckle.—"Mercury electric switches." 4362. April 1st, 1942. (573143.)

H. M. Harmer.—"Regulating arrangements for electrical circuits." 10994. July 7th, 1943. (573185.)

J. H. O. Harries.—"Electron discharge tubes." 13885. September 5th, 1940. (573205.) "Cathodes for electron discharge tubes." 13886. September 5th, 1940. (573206.) "Electron discharge tubes." Cognate applications 13887/40 and 13888/40. September 5th, 1940. (573207.) "Electron discharge tubes and their circuits." 13889. September 5th, 1940. (573208.) "Construction and assembly of electron discharge tubes." 14467. September 23rd, 1940. (573209.)

A. J. King and Metropolitan-Vickers Electrical Co., Ltd.—"Detection of faults in articles of non-magnetic material." 8147. May 21st, 1943. (573182.)

H. A. Malpas. — "Electron discharge apparatus and circuits therefor." 18570. November 9th, 1943. (570397.)

Patelhold Patentverwertungs & Elektro-Holding Akt.-Ges.—"Generator for the production of micro-waves." 14295/43. September 1st, 1942. (573193.)

Philco Radio & Television Corporation.—"High-frequency transformer." 18769/43. January 29th, 1943. (573099.)

Pritchett & Gold & E.P.S. Co., Ltd., and E. S. Chapman.—"Electric storage batteries having insulating covers for the terminals thereof." 20038. December 1st, 1943. (573123.)

Siemens Electric Lamps & Supplies, Ltd., J. N. Aldington and A. J. Meadowcroft.—"Electric discharge lamps." 16371. November 12th, 1940. (573141.)

A. Soloman.—"Cathode ray tube apparatus for large screen television purposes." 17099. October 18th, 1943. (573226.)

Standard Telephones & Cables, Ltd., and W. T. Gibson.—"Electric vacuum tubes and the like." 4045. March 3rd, 1944. (573170.)

Standard Telephones & Cables, Ltd. (trading as Stanelco Products), and J. Handley.—"Electric soldering irons." 19885. November 29th, 1943. (573108.)

Standard Telephones & Cables, Ltd., and D. C. Rogers.—"Impedance matching transformers." 20113. December 1st, 1943. (573124.)

Standard Telephones & Cables, Ltd., S. H. Towner and P. A. Childs.—"Electro-magnetic relays." 20507. December 8th, 1943. (573133.)

Sulzer Frères Soc. Anon.—"Combustion product power plants." 8970/43. July 4th, 1942. (573153.)

Traylor Vibrator Co.—"Automatic control system for electrical vibrating apparatus." 4669/43. March 28th, 1942. (573177.)

Vickers, Inc., R. S. Miller and K. Seidel.—"Electromagnetic solenoids." 835. January 16th, 1943. (573174.) "Electromagnetic solenoids." 13105/45. January 16th, 1943. (Divided out of 573174.) (573203.)

Warner Electric Brake Manufacturing Co.—"Electrical coupling plug." 10877/43. December 21st, 1942. (573157.)

A. E. Watkins.—"Automatic electric circuit-breakers." 12289. July 28th, 1943. (573159.)

Western Electric Co., Inc.—"Electron discharge devices." 20312/43. June 5th, 1942. (573232.)

The J. Y. Fletcher Memorial Fund

IN response to the request that contributions should be made to the funds of the Electrical Industries Benevolent Association, in lieu of floral tributes at the funeral of the late Mr. J. Y. Fletcher, a sum of over £500 has been received. For many years Mr. Fletcher was the Association's honorary treasurer, one of its wardens, and a member of its Council, Court, and Finance Committee, and a generous personal contributor. He was responsible for the E.I.B.A. "penny collection" plates.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

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

Australia.—Sydney County Council.—March 7th, 1946. Coal-handling plant for Pyrmont "B" (Spec. 72).—*Tenders* (Melbourne).

Batley.—December 4th. Electricity Department. 11-kV cable. (November 23rd.)

Inverness.—December 12th. Electricity Department. Switchgear kiosk; 6·6 kV switchgear; 250-kVA kiosk substation, and 500-kVA distribution transformer. (See this issue.)

Oldham. — December 14th. Electricity Department. E.h.v. cable, cast-iron frames and covers. (See this issue.)

Orders Placed

Birkenhead.—Electricity Committee. Accepted. L.v. AC switchboards.—W. Lucy & Co.

Stockport.—Electricity Committee. Accepted. Eight ring main units (£2,966).—Ferguson, Pailin. Two 750-kVA transformers (£470).—Electric Construction Co.

Watford. — Electricity Committee. Accepted. Cables for twelve months.—Telegraph Construction & Maintenance Co.

West Hartlepool.—Corporation. Accepted. Cables.—Scottish Cables and Henley's.

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.

Belfast.—Houses (215), Cregagh, for Northern Ireland Housing Trust; Ministry of Finance, Room 103, May Street.

Blaydon (Co. Durham).—Houses (150), Winlaton and Rowlands Gill; U.D.C. surveyor.

Bridgwater.—Houses (42), for R.D.C.; Gallanaugh & Nicholls, architects, 30, High Street.

Bromsgrove.—Houses (123), shops (13), etc., Gannow Green Estate; Gerald Trust, Ltd.

Houses, Catshill estate for U.D.C. (£108,637); J. & A. Brazier, Ltd., builders, Worcester Road.

Bury.—Cinema, Fox Street, Manor Street and Walmersley Road; Bury Cinematograph Co., Ltd., Knowlsey Street.

Houses (20), Parr Fold estate; Bainbridge Bros., builders, 25, Uplands Road, Flixton.

Bushey.—All-electric houses (50), Mead Way estate; U.D.C. surveyor.

Cardiff.—Houses (42), and two blocks of flats, Whitchurch, near Cardiff, for R.D.C.; M. Warren, clerk, Council Offices, Park House, Park Place.

Clackmannan.—Extensions, Dollar Academy (£250,000).

Croydon.—Extensions, Addington school (£8,600); borough engineer.

Houses, Ashburton estate (180), Long Heath (42), and The Glade (32); E. Taberner, town clerk, Town Hall.

Darlington.—Electrical work for 28 houses, Coleridge Gardens; borough engineer, Town Hall.

Durham.—Police houses, Chester-le-Street, Durham City, Coxhoe, Jarrow, and Monkton; county surveyor, 43, Old Elvet.

Enfield.—Works additions, Stockingswater Lane, for Ruberoid Co.; F. S. Snow & Partners.

Three temporary schools; U.D.C. surveyor.

Houses (39), Ashton Road; C. Carter (Romford), Ltd.

Gateshead-on-Tyne.—Houses (66) for T.C.; J. Clark & Son, Ltd., Gregson Terrace, New Seaham, Co. Durham.

Factory for Hugh Woods Mining Machinery Co., Ltd., Team Valley Trading Estate; L. J. Couves & Partners, Carliol House, Newcastle-on-Tyne.

Extensions, Tyneside Safety Glass Co.'s factory, Team Valley Trading Estate; J. H. Napper, 52, Eldon Place, Newcastle-on-Tyne.

Winch-making shop for Clarke, Chapman & Co., Ltd..

Works extensions for British Ropes, Ltd; J. Milne & Sons, Coatsworth Road.

Golborne.—Houses (£28,420), King's Avenue, Lowton, for U.D.C.; A. E. Prescott, Ltd., builders, Holden Road, Leigh, Lancs.

Hampshire.—Hospital extensions, Gosport (£16,000); county architect, Winchester.

Hitchin.—Houses (24), Codicote and Shephall, for R.D.C.; C. E. Bowyer, builder, Codicote Road, Welwyn.

Holmfirth.—Houses (44), Bradshaw Avenue, Honley, for U.D.C.; P. N. Brown, architect, 23, Victoria Street.

Houghton-le-Spring.—Houses (68); U.D.C. surveyor.

Kent.—Laboratory, County Hall, Maidstone (£2,950); extensions, County Hospital, Farnborough (£8,878); conversion, Sherwood Park premises, Tunbridge Wells, to hospital (£16,350); and maternity block, County Hospital, Dover (£13,500); county architect, Maidstone.

Kidderminster.—Houses (38), for R.D.C.; A. S. Northover, building surveyor, Land Oak House.

Longbenton.—Houses (226); U.D.C. offices, Forest Hall, near Newcastle-on-Tyne.

Market Drayton.—Houses (£37,408), Christ Church, Little Drayton, for U.D.C.; J. A. Harvey, builder.

Milngavie.—Houses (26), with electrical work, Balvie Road; F. A. B. Preston, burgh surveyor, 6, Buchanan Street.

Middlesex.—Additions, X-ray department, Central Hospital (£6,500); county architect.

Newcastle-on-Tyne.—Houses (36) ; H. Wiles, 11, Bude Gardens, Low Fell, Gateshead.
Houses (29), Cliftonville Avenue, etc.; J. McEwan, builder, 20, Croftsway.

Normanton.—Houses (40), Dalefield Road, for U.D.C.; W. Martin Jackson, architect, The Mount, Syndale Road.

Norton.—Houses (58), for U.D.C.; G. D. Channon, architect, Market Street, Malton, Yorks.

Port Talbot.—Houses (84); Llewellyn J. Thomas, architect, Municipal Buildings, Aberavon.

Redditch.—Houses (74), Salters Lane, Batchley estate, for U.D.C.; Loveday, Smith & Perrins, architects, 10, Unicorn Hill.

Rochdale.—Houses (64), Greave estate, for Town Council (£65,561); Moston Brick & Building Co., Ltd., Kenyon Lane, Moston, Manchester.

Rowley Regis.—Branch library and community centre, Throne estate; borough surveyor, Municipal Buildings, Old Hill, Staffs.

Ryton (Durham).—Houses (110), Parkfield site; U.D.C. surveyor.

Seaton Valley (Northumberland).—Houses (60) for U.D.C.; J. E. Gardner, builder, Gateshead.

South Molton.—Houses (£24,577), Witheridge, for R.D.C.; C. P. Unwin & Sons, Ltd., builders, Bournemouth.

South Shields.—Houses (306); borough surveyor, Town Hall.
Secondary school, girls' high school and technical college.

Stockton-on-Tees.—Electric lighting, Wynard Hall; Dixon & Barker, Ltd., Darlington.

Sunderland.—Houses (16) Sidecliff Estate ; G. T. Brown & Son, architects, 51, Fawcett Street.
Factory, Strand Street North for Wards Paints, Ltd.; J. Potts & Son, architects, 57, John Street.

Walton & Weybridge.—Houses (£39,971), Felix Road, Walton, for U.D.C.; Percey, Maslin & Co., builders, Station Road, Addlestone, Surrey.

Warwickshire.—Extensions, Weston Mental Colony (£194,900), and school kitchens (£11,000); county architect, Warwick.

Electricity in Scotland

ON November 22nd in the House of Lords, Lord Kinnaird called attention to the operation of the Hydro-Electric Development (Scotland) Act, 1943. He asked whether the Government was satisfied that the provisions of Section 9 (3) were being complied with. He also moved for papers. He pointed out that a Government inquiry was held in Edinburgh which raised the question of the powers conferred on the Electricity Commissioners by the Act, but the inquiry left the question undecided and he asked the Government to define the position. If the Commissioners' power of veto was going to be abused any scheme that the Hydro-Electric Board put forward could be turned down and the Commissioners could make it quite impossible for the Board to carry out the duties laid on it by Parliament. Moreover the recommendations of the Amenities Committee would not be made public until it was too late to make objections. The whole country had a right to know what those recommendations were.

The Earl of Haddington expressed grave perturbation at the activities of the Board. He said that qualified engineers had told him that smaller and more moderate schemes could supply the rural areas of Scotland with all the electricity that was needed. If the Board was to balance its budget at the expense of glorious Scottish scenery that was too high a price to pay. The falls of Tummel were considered of such beauty that they had been acquired by the National Trust of Scotland. There were six other properties of that Trust which might be affected by the Board's operations as they came within the area of future development schemes, and the Trust had a right to know where it stood and felt it had to make a very vigorous protest. There seemed to be nothing to stop the Board from exploiting the whole country and altering the whole face of the landscape.

The Earl of Rosebery said that the feeling was that the Hydro-Electric Board, which had managed to throw dissension and discord into the whole of Scotland was too much under the thumb of London. He asked whether there was any chance of atomic energy being used for getting electricity. If so, the Board should be very careful in what it did.

The Earl of Airlie said there was no question of the Central Electricity Board or the Electricity Commissioners putting pressure on the Hydro-Electric Board. The Commissioners did not dictate policy to the Board, which formulated its own policy. Twenty-two distribution schemes had already been prepared by the Board and the Tummel-Garry scheme would be able to meet the losses of about a third of them. The Board had very carefully considered alternative schemes, great and small. The country was losing its time and money in no small measure owing to the Board's inability to get on with the schemes through lack of labour.

The debate was adjourned.

Tummel-Garry Project

In our report last week on the House of Commons proceedings relating to the Tummel-Garry hydro-electric scheme, remarks made by Mr. A. Anderson were intended to refer to the North of Scotland Hydro-Electricity Board and not to the Central Electricity Board.

come rain come shine

THE spring cap of a Pinnacle is unaffected by the weather. It doesn't matter if it rains bucketsful or snows. It doesn't matter if it freezes — or if the thermometer goes up into the hundreds. When you see a Pinnacle on a bolt you know it's locked. The spring metal cap is holding the threads clamped tight. No shaking, no vibration will loosen that nut—nothing, in fact, except a spanner. When we call the Pinnacle a stop nut we mean that it stays put.

Before the spring metal diaphragm comes into contact with the bolt.

When the bolt has passed through the diaphragm the nut is locked.

PINNACLE STOP NUTS

SIMMONDS AEROCESSORIES LIMITED

GREAT WEST ROAD · LONDON · A COMPANY OF THE SIMMONDS GROUP

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, minimum 2 lines 4/-, or for display advertisements 30/- per inch, with a minimum of one 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.

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

Original testimonials should not be sent with applications for employment.

OFFICIAL NOTICES, TENDERS, ETC.

ELECTRICITY SUPPLY BOARD, DUBLIN

Erne Power Development

THE Electricity Supply Board invites tenders for the supply, delivery and erection of TRANSFORMERS AND SWITCHGEAR AT THE CATHALEEN'S FALL AND CLIFF STATIONS ON THE RIVER ERNE.

Conditions of Tendering, Form of Tender, Conditions of Contract and Specification may be obtained by contractors from the Chief Design Engineer, Electricity Supply Board, 26, Lower Fitzwilliam Street, Dublin, C.18, by application and on payment of a fee of five guineas, which will be refunded on receipt of a bona-fide tender. Additional copies may be purchased at a cost of one guinea per copy (non-returnable).

Tenders, with all the relevant documents enclosed in a sealed cover, endorsed "ERNE POWER DEVELOPMENT: TENDER FOR TRANSFORMERS AND SWITCHGEAR," must be delivered to the undersigned not later than 12 o'clock noon on Thursday, the 28th February, 1946.

The Board does not bind itself to accept the lowest or any tender.

PATRICK J. DEMPSEY,
Secretary.
Electricity Supply Board,
60-62, Upper Mount Street,
Dublin, C.18.
28th November, 1945. 3512

COUNTY BOROUGH OF OLDHAM

Electricity Department

TENDERS are invited for the supply of:—

E.H.T. CABLE
CAST IRON FRAMES AND COVERS.

Specifications and conditions may be obtained on application to the Chief Engineer and Manager, Corporation Electricity Department, Greenhill Offices, Oldham.

No tender will be received except in a plain sealed envelope endorsed "Tender——" followed by the subject to which it relates, but not bearing any name or mark indicating the sender, and addressed to the Chairman of the Electricity Committee, c/o the Chief Engineer and Manager, Corporation Electricity Department, Greenhill Offices, Oldham, and received not later than the first post of Friday, the 14th December, 1945.

The Corporation do not bind themselves to accept the lowest or any tender.

The Contracts will be subject to the Standing Orders of the Corporation with respect to Contracts which include a requirement (in certain cases) for the provision of sureties.

THOMAS ALKER,
Town Clerk.
Town Hall, Oldham.
29th November, 1945. 3537

ROYAL BURGH OF INVERNESS

TENDERS are invited for the following contracts:

(1) 6.6-kV Switchgear Kiosk complete with switchgear; 6.6-kV switchgear.
(2) One 250-kVA Kiosk Substation.
(3) One 500-kVA Distribution Transformer.

Copies of Specifications and Forms of Tender may be obtained from Mr. N. B. Macarthur, Burgh Electrical Engineer, Electricity Offices, Waterloo Place, Inverness, on payment of a fee of one guinea for each specification, which amount will be refunded on receipt of a bona-fide tender.

Tenders, duly endorsed and addressed to the undersigned, to be delivered by first post on Wednesday, 12th December, 1945.

The Council does not bind itself to accept the lowest or any tender.

JAMES CAMERON,
Town Clerk.
Town House, Inverness.
16th November, 1945. 3504

SITUATIONS VACANT

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

BOROUGH OF FINCHLEY

Electricity Department

Appointment of Senior Lady Demonstrators

APPLICATIONS are invited for appointment on the permanent establishment of four Senior Demonstrators in the Intermediate (Female) Grade 2 of the Council's Salaries Scale of £180 minimum rising by £15 per annum to a maximum of £240, plus the present cost of living bonus of £48 2s. per annum.

Salaries in the grade will be determined according to experience and qualifications.

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

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

Applications from women who are serving in H.M. Forces are invited.

Forms of application will not be issued, and applications to the undersigned, containing full details of the candidate's experience, should be received not later than first post on 7th January, 1946, endorsed "Senior Demonstrator."

C. R. WESTLAKE, M.I.E.E.,
General Manager and Engineer.
Electricity Offices,
Squires Lane,
Finchley, N.3. 3502

BOROUGH OF HESTON AND ISLEWORTH

Electricity Department

Appointment of Deputy Borough Electrical Engineer and Manager

THE Corporation of Heston and Isleworth invite applications for the position of Deputy Borough Electrical Engineer and Manager, at a commencing salary of £600 per annum, rising by £25 per annum to a maximum of £700 per annum, plus cost of living bonus (at present £59 16s. per annum) and a motor car allowance of £100 per annum (at the discretion of the Council). Candidates should preferably not be more than 40 years of age. They must have held executive positions of considerable responsibility and be possessed of sound administrative ability, and must be a Member or Associate Member of the Institution of Electrical Engineers.

The person appointed will be required to carry out such duties as may be assigned to him, to devote his whole time to the duties of his office, and to reside within the Borough. He must have had sound experience in generation and distribution of electricity, both A.C. and D.C.

The appointment is subject to the Local Government Superannuation Act, 1937, and the selected candidate will be required to pass a medical examination. The position may be terminated by two months' notice on either side.

Applications for the position must be made on a form to be obtained from the Borough Electrical Engineer and Manager, 11, Staines Road, Hounslow, and addressed to the undersigned, endorsed "Deputy Borough Electrical Engineer and Manager," accompanied by not more than three recent testimonials, to be received not later than Saturday, 8th December, 1945.

Canvassing, directly or indirectly, will be deemed a disqualification.

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

HAROLD SWANN, Town Clerk.
3410

BOSTON & DISTRICT ELECTRIC SUPPLY CO. LTD.

Assistant District Engineer

APPLICATIONS are invited for the above position. Applicants should have experience in the operation of a high tension system in a Rural Area and be conversant with the maintenance of overhead lines and associated equipment.

Preference will be given to applicants who have also had some knowledge of dealing with consumers' requirements in the matter of installations and the equipment of farms, as the successful applicant will be required to take charge of a section of a Rural District and deal with most matters arising therein, other than new construction work.

Applications, giving age, education, details of training and experience, together with commencing salary required, and accompanied by copies of recent testimonials, should be sent to the above Company at the address given below not later than the 8th December, 1945.

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

Besco House, Market Place,
Boston, Lincs. 3431

COUNTY BOROUGH OF WALLASEY

Appointment of Testing Assistant

APPLICATIONS are invited by the 7th January, 1946, for the appointment at a salary in accordance with Class F, Grade 9, of the National Joint Board Schedule, at present £320-£333 p.a. Applicants must be Graduate Members of the Institution of Electrical Engineers and/or in possession of the Higher National Certificate in Electrical Engineering, and be competent to undertake the testing of protective relays and other apparatus in the distribution system.

Permission of the Ministry of Labour to publish this advertisement has been obtained. A form of application will be supplied by the Electrical Engineer and Manager, Wallasey Road, Wallasey, on receipt of a stamped and addressed foolscap envelope.

EMRYS EVANS, Town Clerk.
November, 1945. 3544

AN Electricity Supply Authority in the Home Counties invites applications for the following vacancies:—

(a) 6 Electricians for the maintenance and repair of domestic electrical apparatus on consumers' premises.
(b) 1 Assistant Electrician for Works Maintenance—D.C. and overhead experience essential.
(c) 4 Wiremen.
(d) 2 Overhead Linesmen for H.T. line construction and maintenance.
(e) 1 Plumber Jointer for 11-kV jointing.
(f) 1 Electrician for Cooker Repair Shops and Factory maintenance.
(g) 1 Tracer or Junior Draughtsman for Mains Records, etc.
(h) 2 Meter Testers and Repairers.

District rates will be paid. Applicants to indicate clearly the particular vacancy for which they are applying, and include the following information in their reply:—

Age.
Whether married or single.
Training and experience.
Last civilian employment and nature of work.

At present the Control of Engagement Order limits the age of male applicants to men under 18 years or over 51 years of age. Applicants who are thereby prevented from changing their employer may make an application, which will be retained for consideration when the restriction is removed.

Class A men on leave, just discharged from the Forces, may apply, irrespective of age, provided their period of leave has not expired.

Women under 18 years or over 41 years of age may apply for vacancies (a), (g) and (h).

This advertisement is published by permission of the Ministry of Labour and National Service.

Replies to—Box 3524, c/o The Electrical Review.

CITY OF COVENTRY

Electricity Department

Appointment of Consumers' Engineer

APPLICATIONS are invited for the position of Consumers' Engineer from persons qualified to carry out the duties of controlling and co-ordinating the Sales Department, Installation and Hired Domestic Appliance Department and Meter Department.

The conditions of employment will be in accordance with the National Joint Board Agreement, at the salary equal to Class J, Grade 3 (at present £724, rising to £759 per annum). The appointment will be subject to the provisions of the Local Government and Other Officers Superannuation Act, 1937, and the successful candidate will be required to contribute to the Staff Widows' and Orphans' Pensions Scheme, and pass a medical examination.

Applications, stating age, details of training and experience, and accompanied by copies of not more than three testimonials, must be delivered to the undersigned not later than Monday, 10th December, 1945.

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

F. W. GODDEN, A.M.I.E.E.,
Council House, Electrical Engineer and Manager.
Coventry. 3522

SKIPTON URBAN DISTRICT COUNCIL

Plumber Jointer

THIS advertisement is published with the permission of the Ministry of Labour and National Service.

Applications are invited for a Plumber Jointer. The applicant must have had experience in jointing both H.T. and L.T. cables. Rates of pay in accordance with the Joint Industrial Council Scale, B Zone, plus war bonus, and the successful applicant will be subject to the provisions of the Local Government Superannuation Act.

Applications, stating age and experience, to be received not later than the 14th December, 1945.

W. V. SMYTHE,
Electricity Offices, Engineer and Manager.
79, Caroline Square, Skipton. 3538

STRETFORD AND DISTRICT ELECTRICITY BOARD

Appointment of Deputy Chief Engineer

APPLICATIONS are invited for the above-mentioned position from Engineers having first-class technical education and administrative and commercial experience, capable of taking responsibility under the Chief Engineer for all the activities of the Undertaking.

Applicants must be incorporated members of the Institution of Electrical Engineers, and possession of an engineering degree will be an advantage.

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

The salary will be £800 per annum, rising, subject to satisfactory service, by annual increments of £50 per annum to a maximum of £950 per annum, plus a war bonus (at present £49 16s. per annum).

Applications, stating details of education, training and experience, together wtih copies of three testimonials, should be forwarded to the undersigned, endorsed "Deputy Chief Engineer," and must be received not later than the 10th December, 1945.

Canvassing will disqualify.

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

C. TREWAVAS,
Clerk to the Board.

Town Hall,
Stretford, Lancs.
30th November, 1945. 3534

CORPORATION OF BRISTOL

Electricity Department

Appointment of Junior Charge Engineer (Temporary)

THE Electrical Committee of the City of Bristol have a vacancy for a JUNIOR CHARGE ENGINEER for Rotary Substation work.

The salary will be in accordance with the National Joint Board Schedule for the Electricity Supply Industry, Class H, Grade 9a, which is at present £326/341 per annum.

This is a permanent position, but the successful applicant will be engaged on a temporary basis to conform with the proviso the Bristol City Council has placed on appointments made during the war.

The appointment will be subject to the provisions of the Local Government and Other Officers Superannuation Act, 1937, and the successful candidate must pass a medical examination by the Bristol Medical Officer of Health.

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

Applications, accompanied by copies of at least three testimonials, must reach the undersigned not later than Monday, 10th December, 1945, endorsed "Junior Charge Engineer."

E. C. WILLIS,
General Manager.

Dorset House,
Clifton Down, Bristol, 8. 3503

WEST MIDLANDS JOINT ELECTRICITY AUTHORITY

Appointment of Temporary Mechanical Draughtsmen

THE above-named Authority desire to appoint two Temporary Mechanical Draughtsmen in connection with the design and layout of important generating station extensions.

Applicants must have had wide experience in work of this class, and must be Corporate Members of the Institution of Mechanical Engineers or possess equivalent qualification.

The salary will be £10 per week.

Applications must be made on the prescribed form, which may be obtained from the address below.

The Ministry of Labour and National Service, Technical and Scientific Register, have given permission under the Control of Engagement Order, 1945, for the advertising of these vacancies.

H. F. CARPENTER,
Clerk and Manager.

Phœnix Buildings,
Dudley Road, Wolverhampton.
16th November, 1945. 3507

COUNTY BOROUGH OF OLDHAM

Electricity Department

Appointment of Mains Superintendent

APPLICATIONS are invited for the above position. Applicants must have had sound practical experience in superintending the installation and maintenance of high and low voltage underground and overhead mains, substation plant and distribution equipment. Salary in accordance with the National Joint Board Schedule, Grade 3, Class H.

The possession of Engineering Degrees and/or Corporate Membership of the Institution of Electrical Engineers is desirable.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful applicant will be required to pass a medical examination. Subject to the place of residence not interfering with the due performance of the duties, he will be at liberty to reside within ten miles of the Town Hall, Oldham. Canvassing will be a disqualification.

Applications, endorsed "Mains Superintendent," stating age, full details of education, training and experience, with copies of not more than three testimonials, to be forwarded to the Chief Engineer and Manager, Corporation Electricity Department, Greenhill Offices, Oldham, not later than Wednesday, the 12th December, 1945.

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

THOMAS ALKER,
Town Clerk.

Town Hall, Oldham.
21st November, 1945. 3521

BOROUGH OF ILFORD

Electricity Undertaking

APPLICATIONS are invited for the post of Assistant Installations Engineer. Applicants must have had a sound theoretical and technical training, and some experience in estimating for, design and construction of, lighting, power and heating installations.

The successful applicant will be required to assist generally in the administration of the Installations and Consumers' Service Department.

The salary will be in accordance with the N.J.B. Schedule, Class G, Grade 9, commencing at £357 per annum, and 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, accompanied by not more than three testimonials, should be addressed to the Borough Electrical Engineer and Manager, 320/6, High Road, Ilford, Essex, and must be received by him on or before the 10th December, 1945.

This advertisement does not apply to persons covered by the Control of Engagement Order, 1945.

CHARLES N. ROBERTS,
Town Clerk.

Town Hall, Ilford.
22nd November, 1945. 3539

CITY OF SALFORD

Appointment of Draughtsman

APPLICATIONS are invited for the position of Electrical Draughtsman to act as a Section Leader at a salary in accordance with Grade 9, Class H, of the N.J.B. Schedule, the present value being £361 per annum rising to £375 per annum in four years.

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

Candidates should have had experience of high voltage and low voltage switchgear construction, substation layouts and the associated equipment.

All applications should be addressed to the City Electrical Engineer, Electricity Department, Frederick Road, Salford, 6, Lancs., and be received by Monday, 17th December, 1945.

The attention of applicants is drawn to the requirements of the Control of Engagement Order, 1945.

H. H. TOMSON, Town Clerk.
3514

BOROUGH OF LEYTON

Electricity Department

Appointment of Electrical Fitter

APPLICATIONS are invited for the position of Electrical Fitter. The rate of pay will be in accordance with the Schedule of the District Council (No. 10), London Area, Electricity Supply Industry, which at the present time is 2s. per hour plus war bonus of 6d. per hour. Forty-seven hours will constitute a normal week of work.

Applicants should have had experience in the manufacture, erection and maintenance of E.H.T. switchgear.

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

Applications, in candidate's own handwriting, stating age, experience, position with regard to National Service, and when able to take up duties, accompanied by copies of two recent testimonials, to be sent to the Borough Electrical Engineer and Manager, Electricity Offices, Cathall Road, Leytonstone, E.11, not later than first post Monday, 24th December, 1945.

Canvassing in any form will be a disqualification. The Ministry of Labour and National Service have given permission under the Control of Engagement Order, 1945, for the advertising of this vacancy. (E.D.629a.)

D. J. OSBORNE,
Town Clerk.

Town Hall, Leyton, E.10.
23rd November, 1945. 3551

MID-LINCOLNSHIRE ELECTRIC SUPPLY CO. LTD.

Meter Mechanician

APPLICATIONS are invited for the appointment of a Meter Mechanician at the rate of 2s. 2½d. per hour for a 47-hour week, for Class A Polyphase Testing Station. Applicants must have had experience in repairing all types of quarterly and prepayment meters, time switches, maximum demand attachments, etc.

The successful candidate will be required to participate in the Company's Superannuation Scheme.

Applications in writing, giving details of training and experience, accompanied by copies of recent testimonials, endorsed "Meter Mechanician," should be addressed to the Meter Superintendent, Mid-Lincolnshire Electric Supply Company Limited, North House, Grantham, Lincolnshire, not later than the 7th December, 1945.

The Ministry of Labour and National Service have given permission under the Control of Engagement Oder, 1945, for the advertisement of this vacancy. 3420

BOSTON & DISTRICT ELECTRIC SUPPLY CO. LTD.

APPLICATIONS are invited for the following vacancies:

PLUMBER JOINTER used to work up to 11,000 volts. Rate 2s. 3½d. per hour.

METER TESTER/MECHANIC, CLASS 1, for Type A non-polyphase testing station. Rate 2s. 2½d. per hour.

The Ministry of Labour and National Service have given permission under the Control of Engagement Order, 1945, for the advertising of these vacancies.

Applications to the above Company at Besco House, Boston, Lincolnshire. 3430

ELECTRICAL POWER ENGINEERS' ASSOCIATION

NOTICE

HESTON AND ISLEWORTH CORPORATION

Appointment of Deputy Borough Electrical Engineer

THE National Executive Council of the above Association desires to point out to all intending applicants for the above position that, under the National Joint Board Agreement, the minimum commencing salary should be £810 per annum.

ALL ENGINEERS, WHETHER ENGAGED IN THE ELECTRICITY SUPPLY INDUSTRY OR NOT, ARE URGENTLY REQUESTED TO INCLUDE THE ABOVE CONDITION IN ANY APPLICATION MADE FOR THE APPOINTMENT REFERRED TO.

W. ARTHUR JONES, A.M.I.E.E.,
General Secretary,
Electrical Power Engineers' Assn.
3411

A Competent Man is required by an expanding manuf'g co. in N.-West to take charge of dept. producing small and medium accessories. Applicants must have knowledge of compression moulding, planning, costing, time and motion study. Excellent prospects for suitable man. When replying give full details of experience, salary req'd, etc.—Box 3526, c/o The Electrical Review.

AN old-established company in the London area, manufacturing telephone cables, requires an engineer with experience of works and production organisation, and control of personnel, in the capacity of Assistant Works Manager. Experience of the industry, while valuable, is not considered the first requisite, as the company will arrange facilities for a period of special training. The prospects are excellent and a salary commensurate with the experience and qualifications of the selected applicant will be paid. The appointment is permanent and pensionable.—Box 3349, c/o The Electrical Review.

APPLICATIONS are invited for the appointment of Area Manager in the Lighting Division of E. K. Cole Ltd. Applicants must have had previous experience in control of representatives and be prepared to take control of all sales activities of the area. Knowledge of illuminating engineering is desirable. The salary offered is commensurate with the importance of the appointment, which is also pensionable. Applications, giving full particulars of previous experience, which will be treated in strictest confidence, should be addressed to—E. K. Cole Ltd., Lighting Division, Southend-on-Sea, Essex. 3493

ARMATURE Winder, 5 to 50 h.p., A.C., D.C. Class A ex-Serviceman. Good employment conditions. Also Woman or Girl for similar but lighter work, and Boy to train.—Industrial Electrical Co. Ltd., Offord Street Works, London, N.1. 3423

ASSISTANT (Inside) to the London Sales Manager of an important electrical manufacturing concern. Applications only from men exempt from M.O.L. control. State experience, age, and salary required to—Box 3554, c/o The Electrical Review.

ASSISTANT Works Engineer required for industrial undertaking Outer London area. Experience essential in mechanical and electrical engineering. Builders' experience an asset. Applications from Class A ex-Servicemen and others exempt from M.O.L. control only. Write full details in confidence, stating qualifications, age, experience and salary required, to—Box 7904, A.K. Advg., 212a, Shaftesbury Avenue, W.C.2. 3368

BUYER required with previous experience in the radio or associated light electrical industries by established and progressive company of small transformer manufacturers, London area.—Box 3448, c/o The Electrical Review.

CLERICAL Assistant, Class A ex-Serviceman, for Stores Office. Must have thorough knowledge of all electrical material. Apply—London Electrical Company, 92, Blackfriars Road, S.E.1. 24

COST and Record Clerk (Female) required with knowledge of electrical contracting. Permanent position. Write, giving full details of experience, age and salary required, to—Giles (Electrical Engineers) Ltd., 9 and 11, Victoria Colonnade, Southampton Row, W.C.1. 8001

COUNTER Assistant, essential good knowledge of the trade, Class A ex-Serviceman. State experience, age, salary, etc., to—General Manager Sloan Electrical Co. Ltd., 41, Kingsway, W.C.2. 3466

DEAF Aids. Experienced men required for final assembling and testing, also for repairs. Permanent positions for suitable applicants. Under 18, over 51, or Class A ex-Servicemen only. Apply—Fortiphone Ltd., 33, Copeland Road, Rye Lane, Peckham (3rd floor, Block A). 3377

DESIGNER required for A.C. and D.C. machines by well-known firm in Eastern Counties. F.H.P. experience desirable. Applications from men over 51 or Class A ex-Servicemen only. State age, experience and salary.—Box 3357, c/o The Electrical Review.

DRAUGHTSMAN, assistant, preferably having some experience with electronic equipment, London, progressive opportunity. Applications invited from Class A ex-Servicemen and others exempt from M.O.L. control. Write stating age, experience and salary required.—Box 3533, c/o The Electrical Review.

DRAUGHTSMEN, Electrical and Mechanical, required by large electrical engineering firm in Midlands. Men becoming available for civil employment under Class A demobilisation are invited to send particulars stating age, technical qualifications and industrial experience to—Box No. 231, 8, Serle Street, London, W.C.2. 3444

ELECTRIC motor manufacturer has vacancy for Assistant Designer immediately the present employment restriction is removed. Applications will now be considered. State age and experience.—Higgs Motors Limited, Witton, Birmingham, 6. 3531

DRAUGHTSMEN (3) required immediately by leading radio manufacturers in South-East London area for design department working on radio and television equipment, previous experience essential. Applications from Class A ex-Servicemen and others exempt from M.O.L. control only. Write, stating age, experience and salary required, to—Box 7901, A.K. Advg., 212a, Shaftesbury Avenue, W.C.2. 3367

ELECTRICAL Fitter. Experienced assembly and repair motors, 1 to 50 h.p. Good employment conditions. Class A ex-Serviceman, or otherwise exempt.—Industrial Electrical Co. Ltd., Offord Street Works, London, N.1. 3424

ELECTRICAL Fitter experienced dismantling, overhaul and assembling of all types electric motors. East London area. Class A ex-Servicemen or otherwise exempt M.O.L. control.—Box 3390, c/o The Electrical Review.

ELECTRICAL Research Engineer required by firm manufacturing small electric motors and electro-mechanical appliances. Please write giving full details of experience, education and salary required. Over 51 or from Class A ex-Servicemen only.—Box 3527, c/o The Electrical Review.

ELECTRICIAN-Wiremen for installation and maintenance work. Class A ex-Servicemen or otherwise exempt from Ministry of Labour control.—C. F. Parkinson, 114, West Street, Boston, Lincs. 7993

ELECTRICIAN-Wiremen. Three capable and energetic men required for Essex factory. A.C. and D.C. installation, rearrangement and maintenance. Fault location ability and experience of A.C.-driven machine tools an advantage. Permanency to suitable men. Week-end overtime and occasional night work. District rates. Class A ex-Servicemen or over 51.—Box 3421, c/o The Electrical Review.

ELECTRICIANS and Assistants for installing and maintaining wiring installations. Suitable applicants can be placed in London or Provincial areas. Under 18, over 51 or from Class A ex-Servicemen only.—Box 3556, c/o The Electrical Review.

ELECTRICIANS and Assistants for work in London and Provinces. Class A ex-Servicemen or otherwise exempt from Ministry control. Write or apply to—F. H. Wheeler & Co. Ltd., 39, Victoria Street, S.W.1. 3397

ELECTRICIANS and Assistants required for good-class installations, London and Provinces, Class A ex-Servicemen, otherwise exempt from Ministry of Labour control. Permanent position.—Giles (Electrical Engineers) Ltd., 9 and 11, Victoria Colonnade, Southampton Row, W.C.1. Holborn 5726. 7999

ELECTRICIANS and Electricians' Mates. Men exempt from Ministry of Labour control, or Class A ex-Servicemen, are invited to communicate with—Powerlite Electrical Installations Ltd., Windsor House, Victoria Street, S.W.1. Telephone, Abbey 1319 3394

ELECTRICIANS required by small established contractors for good class installation and maintenance work. Screwed: L.C.; T.R.S. Good conditions. Permanent employment. Class A ex-Servicemen or otherwise free.—Winfield & Co., 32, High Street, Boston, Lincs. 7895

ENGINEERS and Draughtsmen, becoming available for civil employment under Class A demobilisation, are invited to apply for positions in the heavy electrical plant departments (comprising electrical machines and transformers of all kinds) of a large electrical engineering manufacturer in the Midlands. Applications, stating age, appropriate technical qualifications and industrial experience, and order of salary required, to—Box 71, c/o The Electrical Review.

ENGINEERS. Junior Assistants for design work, electrical and mechanical, preferably with drawing office experience, required by large electrical engineering firm in Midlands. Young men becoming available for civil employment under Class A demobilisation, who have obtained technical training equivalent to university degree standard, are invited to send particulars stating age, technical qualifications and industrial experience to—Box No. 230, 8, Serle Street, London, W.C.2. 3445

ESTIMATING Engineer required by a firm of manufacturing electrical engineers in the South of England to deal with enquiries and technical correspondence for house service meters and indicating instruments. Applicants who have specialised in either product may apply, but preference will be given to those with a knowledge of both. Salary £450/£525 according to qualifications. The Ministry of Labour and National Service have given permission under the Control of Engagement Order, 1945, for the advertisement of this vacancy. Applications, which must be in writing, stating date of birth, full details of previous experience (including a list in chronological order of posts held), should be addressed to—Box 3439, c/o The Electrical Review.

ENGINEERS and Draughtsmen, becoming available for civil employment, under Class A demobilisation, are invited to apply for positions in the Switchgear Department of a large electrical engineering manufacturer in the Midlands. Applications stating age, appropriate technical qualifications and industrial experience, and salary required, to—Box 69, c/o The Electrical Review.

ENGINEERS & Draughtsmen becoming available for civil employment under Class A demobilisation are invited to apply for positions in Steam, Gas and Water Turbine and Diesel Engine Departments of a large engineering manufacturer in the Midlands. Applications stating age, approximate technical qualifications and industrial experience and order of salary required to—Box 3405, c/o The Electrical Review.

ESTIMATOR wanted, capable of preparing own schemes in addition to standard quoting on consultants' work. Keen costing necessary and sound knowledge of electrical contracting business essential. Very comfortable post and permanency to right man. Class A ex-Servicemen or men otherwise free. State salary required and experience to—Box 7951, c/o The Electrical Review.

EXPERIENCED Female Tracers required by switchgear manufacturers. Association rates offered; 40-hour week. Reply, stating full particulars of experience, etc., to—Switchgear & Cowans Ltd., Elsinore Road, Old Trafford, Manchester, 16. 3454

FIRM developing servo-mechanisms for aircraft purposes require a Senior Designer-Draughtsman, also several Development Engineers with some experience with A.C. servo motors. London area. Class A ex-Servicemen or otherwise exempt M.O.L. control only. Apply—Box 3489, c/o The Electrical Review.

FOREMAN, experienced radio assembly and coil winding, offered permanent post, good salary and prospects. Class A ex-Servicemen or men over 51 years of age. Write—Box 3520, c/o The Electrical Review.

FULLY experienced Foreman required for transformer shops, must be conversant with all manufacturing processes, including winding, assembly and impregnating, able to control personnel (150). Knowledge of rate-fixing and piece-work. Permanent progressive position. Factory in North-West London. Applicants must be free from restrictions of the Control of Engagement Order. Write, stating age, experience and salary required, to—Box 3495, c/o The Electrical Review.

GOVERNMENT of Burma. Applications are invited for post of Chief Engineer and Manager to take charge of operations of Electricity Supply Division of Department of Industries and Labour, Government of Burma, which will include the restoration of electricity supply in Burma. Applicants should be corporate members of the Institute of Electrical Engineers and should have experience in commercial and general management of an electricity supply undertaking, as well as first-hand knowledge of generation of electricity, transmission and overhead distribution systems. Age limit 50 years. The appointment will be on contract for five years. Salary according to qualifications and experience up to Rs. 3000 per month (approximately £2,700 per annum). Free passage to and from India. Write, quoting D.1555A, to Ministry of Labour and National Service, Appointments Department, Technical and Scientific Register, Room 670, York House, Kingsway, London, W.C.2, for application form, which must be returned completed by 10th December, 1945. 3487

HEAD Foreman required for winding shop specialising in new and repair work. Must have good general experience in A.C. and D.C. motor winding. Theoretical and practical knowledge essential. State age, salary expected and references. Apply to—Box 3441, c/o The Electrical Review.

INSULATION Engineer with experience in all modern types of insulation material required for development laboratory of manufacturers of light current electrical equipment. Class A ex-Servicemen or otherwise exempt M.O.L. control only. Apply—Box 3492, c/o The Electrical Review.

INTERNAL Sales Engineer required for London office, age 22/25 years, and having knowledge of preparing estimates for motors and control gear. Applications only from Class A ex-Servicemen to—Veritys Ltd., Brettenham House, Lancaster Place, London, W.C.2. 3518

LABORATORY Assistant required in S.W. London area with knowledge of electrolytic condenser manufacture, able to assist in development and process control. Permanency with good prospects for keen person. Applications from Class A ex-Servicemen only. Write giving all essential details.—Box 3548, c/o The Electrical Review.

LABORATORY Assistant with some knowledge of physics and electrical training required in S.W. London area. Applications from Class A ex-Servicemen only. Write giving details of age, experience, etc.—Box 3549, c/o The Electrical Review.

LADY Book-keeper required, also Invoice Clerk for Export Firm. Both with knowledge of typing. No Saturdays. Apply—Box 3477, c/o The Electrical Review.

LEADING cable manufacturers (members of C.M.A.) seek the services of a first-class Mains Cable Sales Engineer for the Midlands. An established connection with electricity supply authorities is essential. Post offered is permanent and progressive. Full details of experience, age and salary required should be submitted by letter in confidence to—Box 3417, c/o The Electrical Review.

MANAGER, keen competent man required for servicing, estimating and supervising electrical wiring and installation work. London area.—Box 3555, c/o The Electrical Review.

MANAGER required at once for London W.9 district. Electrical and mechanical experience desired, knowledge plastics an advantage. Write, stating age and salary required.—Box 3519, c/o The Electrical Review.

MANAGER required, technical and commercial, for small progressive manufacturing company in North London area. Experience in design of electrical control gear essential. Permanency and excellent prospects for capable man. Replies treated in strictest confidence. State experience, age and commencing salary. Write—Box 3440, c/o The Electrical Review.

OLD-established and well-known firm (medium size), manufacturing fractional horse-power motors, requires an experienced Sales Manager. Applicants must have a thorough technical knowledge, be conversant with the markets and have organising abilities. Good opportunity for a keen and enthusiastic man. Write in confidence, giving full details of experience and salary required, to—Box 3511, c/o The Electrical Review.

ONE or Two Electronics Engineers are required by a firm developing highly specialised electronic equipment for aircraft. London area. Class A ex-Servicemen or otherwise exempt M.O.L. control only. Apply—Box 3490, c/o The Electrical Review.

OVERHEAD Linesman required by electricity undertaking serving Teignmouth, Dawlish and rural area south-west of Exeter, for erection of 11-kV and M.V./L.V. overhead lines and maintenance. J.I.C. wages and conditions. This advertisement is published by permission of the Ministry of Labour and National Service under the Control of Engagement Order, 1945. Apply—Teignmouth Electric Lighting Co. Ltd., Teignmouth, Devon. 3505

OVERSEAS Employment: India. The following technical personnel are urgently required for electricity supply purposes in India in the service of the Central Government and Provincial Governments. One Project Officer, hydro-electric power station work with civil engineering experience (Central Government) (E.3039A). One Special Co-ordinating Officer experienced in development schemes (Bengal) (D.1559A). One Chief Engineer, hydro-electric power development (United Provinces) (D.1560A). One Chief Engineer and General Manager (Central Provinces) (D.1561A). One Chief Electrical Engineer (Bihar Electric Grid Scheme) (D.1567A). Three Transmission and Distribution Engineers (Central Government, Bengal and Bombay) (D.1562A). Three Thermal Power Station Engineers with mechanical and electrical qualifications (2 Central Government, 1 Bengal) (D.1563A). One Steam and Diesel Station Engineer with mechanical and electrical qualifications (Bombay) (C.2932A). Two Commercial Engineers with tariffs experience (Central Government and United Provinces) (D.1564A). One Hydro-Electric Station Engineer with civil engineering qualifications (Bengal) (E.3038A). One Hydro-Electric Engineer to supervise design of transmission network and transformer stations, etc. (United Provinces) (D.1566A). One Electrical Engineer (Bombay) (D.1565A). One Water Turbine Engineer (United Provinces) (C.2933A). Maximum age limits 45 to 55 years. Contract three to five years. Pay ranges from Rs. 1750 a month (approx. £1,575 a year) to Rs. 3500 a month (approx. £3,150 a year), plus, in some cases, sterling overseas pay £13 6s. 8d. a month, except Water Turbine Engineer, Rs. 600 to Rs. 1000 a month (approx. £540 to £900 a year). Contributory provident fund. In most cases a diploma or degree in electrical, mechanical or civil engineering, as the case may be, or equivalent qualifications, is essential. Write, quoting appropriate reference number, to Ministry of Labour and National Service, Appointments Department, Technical and Scientific Register, Room 670, York House, Kingsway, London, W.C.2, for application form, which must be returned completed by 12th December, 1945. 3486

PERMANENT position offered to capable Electrician (London district). Over 51 or Class A ex-Servicemen only. Apply—Box 3482, c/o The Electrical Review.

PROGRESS Manager required by medium-sized company of light electrical manufacturers, north London area.—Box 3553, c/o The Electrical Review.

OUTSIDE Representative, capable and energetic, required by old-established manufacturing electrical engineers, to cover Yorkshire, Lincolnshire, Nottinghamshire. Resident in Leeds or Sheffield. Must have wide technical knowledge of electric power and distribution, and have connections amongst supply authorities and industrial organisations. Car owner preferred. Particulars of experience, with age and salary required, to—Box 3428, c/o The Electrical Review.

QUALIFIED Electrical Engineer, knowledge domestic appliances and R.F. and H.F. heating, London. Applications from those exempt from M.O.L. control only. Box 8003, c/o The Electrical Review.

REALLY good man required to build up and operate Armature Rewinding section of established electrical engineering concern on Sussex coast. One prepared to work and also train others. Sound position with excellent future prospects. Applications from those over 51 and Class A ex-Servicemen only. State salary required. References.—Box 3413, c/o The Electrical Review.

REQUIRED, an experienced Attendant for static sub-station. Wages and conditions in accordance with D.J.I.C. scale No. 10 area. Present inclusive wage £5 15s. 2d. for 48-hour week. The Ministry of Labour and National Service have given permission under the Control of Engagement Order, 1945, for the advertisement of this vacancy. Applications to be made immediately, in writing, giving age, particulars of experience and copies of testimonials, to—Chief Engineer and Manager, Electricity House, Durnsford Road, Wimbledon, S.W.19. 3552

SALES Engineer, preferably with connections, required by electrical contractors in London. State technical qualifications, age and salary required.—Box 3494, c/o The Electrical Review.

SENIOR Draughtsmen required by switchgear manufacturers. Preference will be given to applicants experienced in E.H.T. switchgear and mining gear design and/or detail. Association rates offered; 40-hour week. Applications are invited from Class A ex-Servicemen and others exempt from M.O.L. control only. Reply, giving full particulars of experience, etc., to—Switchgear & Cowans Ltd., Elsinore Road, Old Trafford, Manchester, 16. 3453

SEVERAL Senior Designer-Draughtsmen required by a firm in the London area manufacturing aircraft electrical equipment. Only first-class men need apply. Good prospects for the right men. Class A ex-Servicemen or otherwise exempt M.O.L. control only. Apply—Box 3491, c/o The Electrical Review.

SHIFT Engineer for 30,000-kW Steam Turbine Power Station in the Argentine. Candidate must have been employed in similar capacity previously. Age not exceeding 30 years; 5 years contract. Apply—"Y.R.," c/o Streets, 110, Old Broad Street, E.C.2. 3508

SHOWROOM Assistants required for industrial, commercial and domestic showrooms, with radio servicing facilities. Class A ex-Servicemen, otherwise exempt from Ministry of Labour control. Apply in writing in first instance, stating age, experience, salary required, to—Giles (Electrical Engineers) Ltd., 9 and 11, Victoria Colonnade, Southampton Row, W.C.1. 8000

SIMPSON Brothers (of Hapton) Ltd. are desirous of manufacturing a range of domestic appliances and wish to appoint a versatile Designer with sound technical knowledge, capable of supervising production from his designs. Applications invited from Class A ex-Servicemen or those not subject to Control of Engagement Order, 1945, with full details of experience (in confidence) and salary required, to—Smith & Smith, Solicitors, 2 Elizabeth Street, Burnley. 3513

SWITCHGEAR manufacturers in the Manchester area have vacancies for Draughtsmen experienced in layouts, detailing and diagram work. Applications are invited from men who are free from restriction and particularly men under Class A release. Full details should be quoted, in the first place, to—Box 3496, c/o The Electrical Review.

TELEVISION and Radio Draughtsmen required for progressive growing firm, with good prospects. Applicants should be exempt from the provisions of the Control of Engagement Order, 1945. Class A release men with experience welcomed. Write fully, in confidence, giving age, experience and salary required, to—O-Personnel Officer, R.F. Equipment Limited, Amersham, Bucks. 3452

VACANCIES are available for men released in Class A who have had experience on Instrument Work. Preference will be given to those who possess some theoretical knowledge. Apply, stating experience, training, age and wages required, to—Cambridge Instrument Company Ltd., Sydney Road, Muswell Hill, N.10. 46

WAREHOUSEMAN, essential good knowledge of the trade, Class A ex-Serviceman. State experience, age, salary, etc., to—General Manager, Sloan Electrical Co. Ltd., 41, Kingsway, W.C.2. 3465

WANTED Assistant Electrical Engineer to take charge of electrical work connected with production of machine tools, factory maintenance, and installation work. Commencing salary £400-£500 per annum, according to experience and qualifications. Over 51 or from Class A ex-Servicemen only. Write, giving age, qualifications and experience details to—The Newall Engineering Co. Ltd., Old Fletton, Peterborough. 3545

WAREHOUSEMAN-Packer required. Permanent position. Past experienced preferred. Applications only from Class A ex-Servicemen. Write, stating wages, etc., to—Box 3437, c/o The Electrical Review.

WORKS Manager required for radio valve and cathode ray tube factory employing approximately 1,200 people in London area. Salary in region of £1,000 per annum. Applicants must have sound mechanical and electrical qualifications and be fully experienced in modern methods of works organisation, mass production methods and labour management. Write, stating age and full experience, to—Box 3499, c/o The Electrical Review.

X-Ray and Electro-Medical Engineer required immediately for Egypt. Take charge sales and technical supervision this department of important firm. Two years' contract, with extension if mutually satisfied. Good salary and commission paid, board and lodging provided. Write—L. L. Vincent and Partners, 59, Shaftesbury Avenue, London, W.1. 3536

APPOINTMENTS FILLED

Dissatisfaction having been so often expressed that unsuccessful applicants are left in ignorance of the fact that the position applied for has been filled, may we suggest that Advertisers notify us to that effect when they have arrived at a decision? We will then insert a notice free of charge under this heading.

SITUATIONS WANTED

COMMERCIAL AND/OR SALES MANAGER

ADVERTISER, aged 43, of proved ability to handle a wide range of products, desires change to progressive manufacturer. Fourteen years' all-round managerical experience, organizing and controlling sales, publicity, estimating, costing, buying, labour and staff. Good technical background, some works experience and d.o. training. Reasonable salary. Midlands preferred but not essential.—Box 8012, c/o The Electrical Review.

TO PRINCIPALS OR MANAGING DIRECTORS

MAJOR, Royal Engineers (T.A.), Class A release, with 23 years' experience in design and production of electrical apparatus, desires executive position.

Experience of works management, good administrator and organiser.

Intimate knowledge of domestic appliances, telephone and signalling apparatus & systems, and electrical instruments.

Energetic and ambitous with plenty of initiative.

Replies treated in confidence.—Box 7972, c/o The Electrical Review.

A Technical Engineer, A.I.E.E., M.I.E.I. (39), extensive experience design, purchasing, inspection, production (modern tooling methods) in domestic apparatus, small electric motors, switchgear. Executive position with responsibility and scope required, West London or Surrey. Excellent references. Present position 10 years. Write—Box 7949, c/o The Electrical Review.

A Technical Engineer, age 27, requires progressive position demanding drive, initiative and organizing ability. 4½ years' experience in design, manufacture, and test of Automatic Control Gear and Industrial Switchgear. Particulary interested in contactors and the acceleration of motors, and keen on traction and lift work. Fluent German and Italian. Release obtainable. London preferred. Reply—Box 8005, c/o The Electrical Review.

ABOUT to be de-mobbed, young man, 32, keen and conscientious. Comprehensive experience, 10 years with three leading electro-mechanical instrument firms. Including 5 year apprenticeship in all shops and latterly in test room, experimental and inspection departments, desires permanent post offering good prospects.—Box 7984, c/o The Electrical Review.

ADVERTISING Manager, in twelfth successful year with leading company, invites offers from manufacturers of industrial and domestic electrical products.—Box 8023, c/o The Electrical Review.

ADVERTISER (age 36), married, 12 years' experience, practical, ex-Serviceman, Class A, seeks permanent progressive position with good prospects, accustomed responsibility, keen, energetic, Assistant/Buyer/Manager, Electrical/Wholesale Contractor, comprehensive knowledge accessories, exemplary character, first-class army testimonial, references; interview desired. London area.—Box 8038, c/o The Electrical Review.

ADVERTISER, anticipating early release from a Govt. Dept., desires a post as Representative of an electrical manufacturer in Norway or Denmark; 20 years' experience planning, costing and installing, all classes electrical installations, including hydro-electric stations.—Box 8009, c/o The Electrical Review.

ADVERTISER desires change, seeks post as Sales Manager with progressive firm. Excellent connection with electric motor mfrs., telephone and radio mfrs., also electrical wholesalers in London and district. Owns car. Box 7987, c/o The Electrical Review.

ADVERTISER (35), for many years in well-known contractors office, desires change. Thoroughly experienced in preparation of tenders and administration of large contracts in all stages, including final accounts. Responsible position with prospects required by man with initiative. London area preferred.—Box 7973, c/o The Electrical Review.

ALL Chief Engineers. A supply undertaking has the opportunity to secure service of Development Engineer, A.I.E.E., M.E.M.E., qualified take charge development of area any size, load building, sales, installations. Prefer Scotland, but consider any district. Commencing salary £550. Apply first instance—Box 7998, c/o The Electrical Review.

A.M.I.E.E. (40), Power Station O.H. and U.G. district. Practical, technical and commercial exp. supply work. Overseas preferred.—Box 7974, c/o The Electrical Review.

A M.I.E.E. (51), desires appointment as Sales Engineer, London and South, with Electric Heating Manufacturers. Technically qualified. Good connections. Car. Telephone. Available December.—Box 8058, c/o The Electrical Review.

AN Electrical Contractor's Supervising Engineer. Electrical, Mechanical, etc. Long experience, connections, London centre radius.—Box 8019, c/o The Electrical Review.

AREA or Branch Manager, desires permanency commencing January. Qualified Business Executive, Sales, Export, Accounts. Twenty years' experience electrical, radio, garage equipment. Sound Midlands connections, own car. Sole agencies or distribution also considered.—Box 8060, c/o The Electrical Review.

AVAILABLE shortly. Chief Electrical Engineer, Specialist for design, development and production, highly qualified (University degree, 20 years in electric motor industry resulting in many patents), requires similar position carrying four figure salary.—Box 8062, c/o The Electrical Review.

BUYER, fully experienced purchase raw materials, all sub-contracted components and other supplies, including plant and machine tools for electrical and mechanical products. Full member P.O.A. Write—Box 8029, c/o The Electrical Review.

BUYER offers services. Experienced 6 and 7-figure purchases, electrical equipment and access. Knowledge of markets, keen buyer, home and foreign. Free soon.—Box 3426, c/o The Electrical Review.

CHARTERED Electrical Engineer, age 37, would like to get in touch with a radio or electrical firm requiring a Representative in the West Midlands area.—Box 8044, c/o The Electrical Review.

CHIEF Electrical Engineer, now free, desires post in factory or consultants in London area; 20 years' experience, practical, technical and administrative capacity.—Box 8047, c/o The Electrical Review.

EL. and Mech. Engineer seeks position where new design, development, extraordinary ability and experience are required. Salary £1,000 p.a.—Box 8048, c/o The Electrical Review.

ELECTRICAL and Refrigeration Engineer, A.M.I.E.E. (38), seeks responsible appointment with manufacturers, or distributors, where general electrical and refrigeration experience, coupled with six years' army experience on technical staff and administrative control of R.E.M.E. workshops, are suitable qualifications. London area preferred. References.—Box 7954, c/o The Electrical Review.

ELECTRICAL Engineer/Administrator (41), A.I.E.E., sales and works experience domestic apparatus and switchgear, desiring change, seeks progressive post, sales management preferred; residence Manchester.—Box 7995, c/o The Electrical Review.

ELECTRICAL Designer. News of senior openings wanted.—Box 8059, c/o The Electrical Review.

ELECTRICAL Engineer, B.Sc.Eng., age 32, ex-major R.E.M.E., released Class A, requires progressive executive or technical sales position. Specialist in factory and general industrial electrification problems.—Box 8030, c/o The Electrical Review.

ELECTRICAL Engineer, free at end year, desires administrative post. Age 43. 20 years' experience, installation and alteration of E.H.T. systems and hydro-electric stations. Building and workshop installations. Some experience heating and ventilating.—Box 8010, c/o The Electrical Review.

ELECTRICAL Engineer, pre-war Contracting, Subs., Management, or Manufacturers' Service Agent, capable in all maintenance, installation & auto electrical work, car, res. Herts (46).—Box 8026, c/o The Electrical Review.

ELECTRICAL Engineer, 22 years' business experience, just completed contract for U.S. Government on the Continent, seeks re-engagement as Representative or Negotiator, willing to travel, own car available, residing London area. Free to commence at once. Minimum salary £1,000 per annum.—Box No. 210, c/o Crossley & Co. Ltd., 5, Racquet Court, Fleet Street, E.C.4. 3351

ELECTRICAL Engineer (29). Free mid-December. Desires permanent and progressive position. Experience, generation E.H.T. and L.T., conversion and distribution, installation testing, tariffs and wiring. South preferred.—Box 8056, c/o The Electrical Review.

ELECTRICAL Engineer, 37, seeks executive position with progressive firm, 10 years' experience in factory, associated with R.F. furnaces and electronic apparatus, excellent organiser, present salary £650.—Box 8061, c/o The Electrical Review.

ELECTRICAL Engineer (41) desires change, 20 years' experience, factory installation or maintenance, minimum salary £500; Berkshire area preferred.—Box 8035, c/o The Electrical Review.

ELECTRICAL Measuring Instruments. Progressive engineer (36). Ten years' works experience with leading instrument company as foreman various departments. Familiar manufacturing processes, modern assembly and test methods all types miniature instruments. Experience on laboratory standards, sub-standards and station instruments. Appreciation of works organisation and production planning, control of female and male personnel. Experience on time and motion study as applied to instruments. Advertiser has drive and will consider a position with scope preferably on the works side but would be willing to undergo sales training.—Box 8063, c/o The Electrical Review.

ENGINEER (31) desires position in a factory organisation; 9 years' practical experience electrical manufacture; 3 years production planning, estimating and rate-fixing; 2 years investigator for M.A.P., Adm., M.O.S., etc., into methods and costs of production.—Box 8049, c/o The Electrical Review.

EXPERT on design and manufacture of F.H.P. electric motors, seeks post in the Eastern Counties. Qualifications B.Sc., A.M.I.E.E. Experienced in scientific control of labour.—Box 8011, c/o The Electrical Review.

FOREMAN Jointer, used to mains up to 33,000 volts, married man.—Box 8034, c/o The Electrical Review.

GRADUATE I.E.E. (21) seeks Drawing Office or Technical post in Cardiff or district.—Box 8031, c/o The Electrical Review.

KEEN Engineer, seeks progressive position, 26 years' practical experience, instrument and tool making, machine shop, general engineering, jig and tool drawing and designing, planning, age 40, tactful. London area.—Box 8053, c/o The Electrical Review.

MAJOR, aged 35, Class A release, trained electrician with 12 years' experience in commercial and domestic installations, requires responsible post, at home or abroad, as manager or sales manager, where hard work, initiative and organising ability are necessary.—Box 8051, c/o The Electrical Review.

MANUFACTURERS' Traveller, over 20 years with present employers, seeks change. Unrivalled connection with wholesalers, Corporations, and large users in London and South. Own car. Or would consider agency arrangements. Reply in confidence.—Box 7983, c/o The Electrical Review.

RELEASED Class A, Electrical, Lieut. R.N.V.R., age 30, desires situation in supervisory capacity. Sound experience of installations, repairs, maintenance, A.C. and D.C. motors, generators, alternators, power and lighting circuits and associated equipment.—Box 8057, c/o The Electrical Review.

R.A.F. Officer, Class A release, age 34, seeks perm. position, tech. or non-tech. Two years' engineering course, three years' R.A.F. apprenticeship elect. and wireless, 15 years' service experience, four of which in executive position.—Box 8046, c/o The Electrical Review.

SECRETARY-S. Typist, accustomed minuting meetings, conf. correspondence, knowledge graphs statistics, desires perm. post-war position—Shipley, Bradford.—Box 8045, c/o The Electrical Review.

TO Sales Managers planning expansion: Advertiser, successful record, wishes renew sales career as London Representative. Selling experience covers wholesale and retail, industrial users and large stores.—Box 7994, c/o The Electrical Review.

YORKSHIRE, experienced Representative (44), connection electrical, motor, cycle trades, own car, desires first-class representation. Fullest references.—Box 8032, c/o The Electrical Review.

FOR SALE

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

PLANT FOR SALE

1 6kV, 2-phase, 50-cy. Metropolitan-Vickers 1,000-kVA Transformer Control Cubicle, independent mounting, complete with cable sealing box, 3 400-amp. type F s.p. isolating switches, 1 400-amp. B.B.H.5, 2-pole automatic hand-operated oil circuit breaker, 2 current transformers, 2 voltage transformers, 2 ammeters, 2 kilowatt hour meters, type N.E., 1 voltmeter, mounted in non-interlock sheet steel cubicle with doors inter-connections, wiring, fuses, labels and earth bar. **Absolutely new and unused.**

1 5-kV, 3-phase, 50-cy. Metropolitan-Vickers 1,000-kVA Transformer Control Unit, Drawout Truck Cubicle Type, including 1 set 3 main busbars, neutral busbars, neutral link, 1 400-amp. B.B.H.5, 3-pole automatic hand-operated oil circuit breaker, fitted with 3 over-current releases, current transformers, voltage transformers, 1 ammeter, 1 voltmeter, 1 power factor meter, 1 kilowatt hour meter, 1 set of synchronising receptacles mounted on drawout truck cubicle, with main meter inter-connections, small wiring, fuses, labels and earth wire. **Absolutely new and unused.**

6 125-kVA, 5,000/230-volt, 3-phase, 50-cy. Transformers, Metropolitan-Vickers; also 2 Flat Back Slate Panel Switchboards, 4 panels per board fitted with M.V. hand-operated 300-amp. oil switches, ammeters, voltmeters, current transformers, busbars, isolating links and wiring.

OFFERS INVITED.

METROPOLITAN-CAMMELL CARRIAGE & WAGON CO. LTD., OLD PARK WORKS, WEDNESBURY.
Telephone, Wednesbury 0571.
3506

WATER TUBE BOILERS IN STOCK

Two	55,000 lbs.	evaporation,	270 lbs. W.P.
Two	25,000 lbs.	,,	250 lbs. ,,
Two	25,000 lbs.	,,	175 lbs. ,,
Three	20,000 lbs.	,,	175 lbs. ,,
Two	16,000 lbs.	,,	190 lbs. ,,
One	12,000 lbs.	,,	200 lbs. ,,
One	9/10,000 lbs.	,,	200 lbs. ,,

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

MOTOR GENERATOR SETS

1 G.E.C., input 460 volts D.C., output 12 kW, 400 volts, 3-phase, 50 cycles (four wires).
1 Crompton Parkinson, input 400 volts, 3-phase, 50 cycles, output 9.6 kW, 80 volts D.C., with Control Gear.
1 Newton, input 220 volts D.C., output 90 volts, 190 amperes D.C.
1 L.S.E., input 400 volts, 3-phase, 50 cycles, output 4.8 kW, 80 volts, 60 amperes D.C., with Control Gear.
1 Mawdsley, input 460 volts D.C., output 338 volts, 1-phase, 50 cycles, 36 amperes, with Control Gear.

OLDFIELD ENGINEERING CO. LTD.,
96, EAST ORDSALL LANE,
SALFORD, 5.
70

LOW VOLTAGE MOTOR-GENERATOR SETS

ONE SET— INPUT 400 volts, 3-phase, 50 cycles; OUTPUT 1,000 amps., 12 volts, 1,450 r.p.m.; with exciter; on combination base with switchgear.
ONE SET—INPUT 400 volts, 3-phase, 50 cycles; OUTPUT 950 amps., 0/35 volts, 960 r.p.m.; with exciter; on combination base with switchgear.
ONE SET—INPUT 400 volts, 3-phase, 50 cycles; OUTPUT 750 amps., 0/20 volts, 710 r.p.m.; with exciter; on combination base with switchgear.
ONE SET—INPUT 400 volts, 3-phase, 50 cycles; OUTPUT 300 amps., 0/60 volts, 580 r.p.m.; with exciter; on combination base with switchgear.

NEWMAN INDUSTRIES LIMITED, YATE, BRISTOL
3458

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 Phœnix Works, Belgrave Terrace, Soho Road, Handsworth, Birmingham.
Telephone: Northern 0898.
26

ALTERNATORS

Suitable for 400-3-50, in perfect condition.

65 kVA	1,000 r.p.m.	with exciter
160 kVA	300 r.p.m.	for coupling
170 kVA	1,000 r.p.m.	with exciter
235 kVA	300 r.p.m.	for coupling
600 kVA	300 r.p.m.	for coupling

THE ELECTROPLANT CO.
Wembley, Middx. 3515

BURDETTE & CO. LTD.

Stock
Reconditioned A.C. and D.C. Motors and Starters Equal to New.

STONHOUSE STREET, CLAPHAM, S.W.4.

Day and night service. MACaulay 4555.
17

COX & DANKS LTD.
for
MOTORS AND DYNAMOS, A.C. AND D.C. DISTRIBUTION BOXES, SWITCHGEAR.

Large Stocks—Prompt Delivery.
Visitors always welcome.

FAGGS ROAD, FELTHAM, MIDDX.
Tel. Feltham 3471/3.
72

Stocks of
B.A. & WHIT. BRASS & STEEL SCREWS (All Heads).
BRASS AND STEEL NUTS.
SCREWED STUDDING. BRASS DOMED NUTS.
BRASS AND STEEL WING NUTS.
STEEL SPRING WASHERS.
Immediate Deliveries.

CLERKENWELL SCREWS, 109 Clerkenwell Rd., E.C.1
Telephone, HOLborn 6504 and 1215.
8036

A number of D.C. Generators, 100 kW, 500 volt, 250 r.p.m., Crompton, for coupling. First class. Low prices. The Electroplant Co., Wembley, Middx. 3516

A number of portable Alternating Lighting Sets, fully guaranteed, for quick delivery. 1½-3 kVA, 230/1/50.—The Electroplant Co., Wembley, Middlesex. 3517

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 4422). 8066

A.C. Motors, 1/10 h.p. to 50 h.p., for Export. Early delivery.—John Terry (Exporters) Ltd., 21, Maddox Street, Regent Street, London, W.1. 8054

A.C. Motors, 1/50th h.p. to 10 h.p., from stock. Also D.C.—The Johnson Engineering Co., 86, Great Portland Street, London, W.1. Tel.: Museum 6373. 57

AERIAL Cables, all sizes quoted for, good deliveries.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 01

ALL types of Transformers up to 15 kVA, including neon and fluorescent lighting chokes.—Woden Transformer Co. (Phone, Bilston 41959), Moxley Rd., Bilston, Staffs. 12

BATTERIES, B-class only, all types available; contracts accepted for high tension, grid bias, cycle, 4½-v. flat, bijou, baby batteries and unit cells (wholesalers and retailers supplied). Also large range of other electrical appliances.—Brooks & Bohm Ltd., 90, Victoria Street, S.W.1. Victoria 9550. 61

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

BEST English Cables, 1/.044 up to 127/.103 deliveries.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 02

B.T.H. 30-h.p. A.C. Motor, 3-phase, 50 cycles, revs. 1,465, complete with star delta starter, as new, used for one month only; also 3-h.p. variable speed D.C. Motor and starter, good condition.—Abergavenny Steam Laundry, Merthyr Road, Abergavenny. 3528

CARBONS, large stocks assorted sizes, solid and cored.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 03

CHEAP to clear, 12½ and 12-h.p. D.C. Motors with slide rails, starters and switches; also 1-h.p. D.C. with starter.—Sadd, 5, Coleridge Ave., Manor Park, E.12. 8050

D.C. Motors, 110 v., 2 h.p., £8; 1 h.p., £5.—Cook, Acme Works, Caterham. 3488

ELEVEN 1/6th-h.p. Capacitor Motors wound for 200/210 volts single-phase 50 cycles with resilient mountings and designed to run at 1,425 r.p.m.—Box 3535, c/o The Electrical Review.

HALL Lanterns, finished in various attractive colours, also oxidized.—Central London Engineering (Fabrications) Ltd., 120, Old Street, E.C.1. Telephone, Clerkenwell 2586. 7918

"HEATRAE" Electric Water Heater. Capacity 100 gallons, type R.T.F. piece No. 121899, volts 250/440, 3-phase 4 wire kilowatts 24. Never used, price £60.—Benton & Stone Ltd., Aston Brook Street, Birmingham. 8008

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

INSU-Glass covered Plain or Enamelled Instrument Wires, No. 18 s.w.g., No. 40 s.w.g., stock deliveries.—Saxonia, Roan Works, Greenwich, S.E.10. 29

LEAD-covered and Armoured Cables, P.I. and V.I.R., various special lines at low prices.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 04

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

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

MOTORISED ¾" Bench Drilling Machine, 13 speeds, £12 2s. 6d.—John E. R. Steel, Clyde Mills, Bingley. Phone 1066. 51

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

OFFERS wanted for one 10-cwt. belt-driven Friction Hoist, 80/90 ft. per min., complete with D.C. motor and auto-starter, "stop," "start" push button and hand rope control; and one 15-h.p. 400-volts D.C. enc. ventilated English Electric Shunt Motor, ball bearing 600 r.p.m. with starter, switch and vee pulley, first-class condition.—Box 3532, c/o The Electrical Review.

ONE FF Model 500-gallons per minute, and one FSM Model 120/220-gallons per minute, Coventry Godiva Trailer Fire Pumps complete with trailer suction wrenches, tools, drag ropes and accessories, together with two 15' lengths of 4" and 10' lengths of 3" armoured suction hose and copper strainer. Offers should be submitted to the Town Clerk, City Chambers, Dundee. Any further particulars required can be obtained on application to the Electricity Department, Dudhope Crescent Road, Dundee. 3540

ONE 350-kW, 500-r.p.m. 400-volts, 3-phase, 50-cycles, 4-wire Alternator by British Westinghouse, 3 bearing machine with d/c exciter on fabricated baseplate arranged for belt drive.—Newman Industries Limited, Yate, Bristol. 3459

PORCELAIN Cleats, 2 and 3 groove, various sizes ex stock, price list.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 05

PORCELAIN Insulators, various sizes in stock, galv. spindles.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 06

PACKING Cases, all sizes and descriptions, for home and export trade; also S/h Cardboard Cartons, all sizes.—L. Goldser & Sons, 14a, Rectory Sq., London, E.1. Phone, Stepney Green 2550. 73

PRIVATE Plant Users. 110-v. 125-amp. hour D.P. sealed top Battery in splendid condition. Dynamo and Switchboard also available immediately.—Giffens Ltd., 30, Chequer Street, St. Albans. 8025

READY for immediate delivery, Tower Ladder, extending 18 feet to platform; Tower Ladder mobile trailer type extending 22 feet to platform. Full details from—Shaftesbury Ladders Ltd., 453, Katherine Road, Forest Gate, E.7. Phone, Grangewood 3363. 3546

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

SELF-Priming Electric Pumps, 300 g.p.h., £12.—John E. R. Steel, Clyde Mills, Bingley. Phone 1066. 53

SEVERAL Telescopic Tower Ladders ready for essential work Extensions, Trestles and Steps to order.—Shaftesbury Ladders Ltd., 453, Katherine Road, E.7. Grangewood 3363. 15

SPECIAL line Bell and Telephone Wires, also screened wires, large quantity, clean.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 07

SPIRAL Elements for electric fires, boiling rings, and other appliances, supplied to order.—Electrothermal Engineering Ltd., 270, Neville Road, London, E.7. 54

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

SWITCH and Fuse Units, Conduits and fittings, works requirements stocked.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 08

SWITCHBOARDS suitable for dynamos and alternators, all sizes from 100 amp. up to 1,500 amp.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 25

TORCH Battery Making Plant, including all materials for making No. 8 batteries, £100.—Cook, Acme Works, Caterham. 3370

TRANSFORMER Lead-in Wire, 7/38 and 14/38 s.w.g., Insu-Glass finished, various colours, stock.—Saxonia, Greenwich, S.E.10. 34

T.R.S. Cables and Flexibles, Welding Cables supplied.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 09

VACUUM Cleaner Spares and Accessories, Belts, Bags, Fans, Brushes, Hoses, Bearings, etc. Trade price lists on application.—Reliance Vacuum Cleaner Service, 152-154, Broadway, Bexley Heath. 58

"VIBRO-ARC" Electric Pens for engraving any metal, 4-6 v. A.C. or D.C 10s. each, less trade discount, delivered.—J. Holborow, 48, Yew Tree Lane, Harrogate. 8006

2 Plating Sets, makers Bruce Peebles, 220 volt D.C., input 1,600 amp., 10 volt D.C. output. Complete with starting gear, £375.—Stewart Thomson & Sons (L'pool) Ltd., Fort Road, Seaforth, Liverpool, 21. 3484

2 ring main B.T.H. Oil Circuit Breakers, 6,600 volt, 3-phase, 50 cycle, type J.B.721, class Q.A. 51, form C.J. 4, 300 amp. Apply to—Salvage Dept., D. Napier & Son Ltd., London, W.3. 3470

75 and 30-h.p. National Diesels; 35-kW Browett Steam Set, 220 vo. D.C.; Weir Feed Pump, 8¾" × 6" × 13"; Lancashire Boiler, 24' × 7', 120 lbs. w.p.; Fuel Oil Tank, 24' × 9'; 35-kW Tangye Diesel and Dynamo, 220 vo.; 250-kW Steam Generating Set, 220 vo. D.C.—Harry H. Gardam & Co. Ltd. Staines 98. 60

75-kVA Westinghouse Alternator, 400/440 v., 3-ph., 50 cycles. Speed 500 r.p.m., with direct coupled exciter.—R. L. Robinson Ltd., Thongsbridge, nr. Huddersfield. 8065

100-h.p. "Laurence Scott" Slipring Motor, 400/3/50, screen protected, ball bearing, 930 r.p.m. Complete with "Allen West" oil immersed Starter. Date 1941. — Stewart Thomson & Sons, Fort Road, Seaforth, Liverpool, 21. 55

100 kVA TCC. Condenser, and 100-kVA TCC. Oil Transformer, 415/600 volt 2 Igranic Contactors Stator Amps. 35.—Transport Engineering Ltd., Gashouse Lane, Hertford. 3541

220-amp. Welding Generator, 20/75 volt, ball bearing, with regulator, £70.—Electric Machinery Co., New Union Works, Ancoats, Manchester. 3510

250-kVA Alternator, 400 volts, 3-phase, 50 cycles, 750 revs., with direct-coupled exciter; also two 250-kW Rotary Converters, with transformers and switchgear, input 6,600 volts, 3-phase, 50 cycles, output 420/210 volts D.C.—Midland Counties Electrical Engineering Co. Ltd., Grice Street, Spon Lane, West Bromwich. 36

ARTICLES WANTED

REQUIRED

REQUIRED, AUTOMATIC COIL WINDING MACHINES FOR ELECTRICAL COIL WINDING.—Box 38, c/o The Electrical Review. 38

ACETATE and other thermoplastic scrap; polythene and P.V.C. in any form; also scrap cable and insulated wire; urgently wanted.—Elton Levy & Co. Ltd., 18, St. Thomas Street, S.E.1. 30

APPROXIMATELY 80 kVA single- or three-phase Condensers.—Britannia Manufacturing Co., Ltd., 22/26, Britannia Walk, London, N.1. 3464

CONVERTOR required (motor type), suitable for adapting 4-6 A.C. cutting machines.—Ornstein & Masoff Ltd., 6-8, Alie Street, E.1. 3498

D.C./D.C. Welding Sets. Input 440 volts D.C., output 250/300 amps. Full particulars and prices to—Box 7930, c/o The Electrical Review.

DOMESTIC Appliances required for export, such as Irons, Fans, Kettles, etc. Write full details to—Box 3425, c/o The Electrical Review.

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

REQUIRED, 1-2-h.p., variable speed, single-phase A.C. Motor, 220-230 volt. Particulars and price—J. L. Parker, Electrical Engineer, West St., Horncastle. 8037

TAILORS' Pressing Irons wanted (3), 250 volts (for urgent Govt. work), new or secondhand.—Taylor, 106, Dunlop Street, Glasgow. 8039

VULCANISING Pan, horizontal type, steam jacketted (double walled) 4 feet clear inside dia. and 15 feet clear cylindrical length, suitable for 60 lbs. working pressure, inside rails and quick-closing boltless lid. Vulcanising Pan, vertical type, steam jacketted (double walled) 3' 6" clear inside dia. 3 feet clear cylindrical depth, suitable for 60 lbs. working pressure, quick-closing boltless lid.—Box 7976, c/o The Electrical Review.

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

WANTED 100/140-h.p. 3-phase, slipring, ball-bearing, 400-volts, 50-cycle, slow speed Motor with control gear.—Britannia Manufacturing Co., Ltd., 22/26, Britannia Walk, London, N.1 3469

WELDING Generator, 300/400 amps.; also 8/12-h.p., 440-volt D.C. drive Motor. Write—Box W.815, c/o Jackson's, 16, Gracechurch Street, E.C.3. 3500

1-3-h.p., 220-volt D.C. Motors. Write—Box Y.817, c/o Jackson's, 16, Gracechurch Street, E.C.3. 3501

40-h.p. totally enclosed, 3-phase, 50-cycles, 400-volts Slip-ring Motor, 720 r.p.m. Only first-class machine will be considered.—Box 3525, c/o The Electrical Review.

500/1,000 lots of Fluorescent Tube Starting Switches, Glo or Thermal. Cash payment.—Box 3529, c/o The Electrical Review.

WORK WANTED AND OFFERED

CAPACITY AVAILABLE FOR THE FOLLOWING WORK

Capstan (up to 14").
Centre Lathe (up to 6").
Milling (High and Low Speed).
Drilling and Tapping, etc.
Sheet Metal and Steel Fabrication.
Welding (Electric, Arc, Spot and Gas).
Engraving.
Light Assembly Work (Electrical and Mechanical).
Plating.

BLUNT & WRAY LTD.,
70, SALUSBURY ROAD, N.W.6.
(MAIda Vale 8151). 3463

COIL Winding!!! H.F., Induction, Chokes and Relays. Capacity available up to 50,000 per week.—E. W. Engineering Co. Ltd., Nether St., N.3. Finchley 5974. 3443

ELECTRICAL measuring instruments skilfully repaired and recalibrated.—Electrical Instrument Repair Service, 329, Kilburn Lane, London, W.9. 8016

AS designers and manufacturers of Coils, Chokes, Transformers, Output Transformers, Wave Wound Coils, Relay Coils, Fluorescent Lighting Chokes, etc., of all types we are able to offer you competitive prices and good deliveries. Send your enquiries to—Green Electrical Industries Ltd., 44/45, Tamworth Road, West Croydon. Telephone, Croydon 7417/8. 7956

ENGINEERS, Precision, South England, seek manufacture of electrical, mechanical or domestic assemblies or components. Press tools, gauges, small stampings, capstan turning. Write—Box 74, c/o The Electrical Review.

MACHINING Work, for Centre Lathes up to 6½ in. centres and medium-sized milling (good grade work preferred).—The London Electric Firm, Croydon. Uplands 4871. 56

MANUFACTURERS have large orders to place for assembly of Electric Fire and Irons, London firm. Write—Box 3497, c/o The Electrical Review.

POLISHING Aluminium Castings. Manufacturers require firm to undertake polishing of quantities of aluminium castings in London or Provinces. Regular work.—Box 3530, c/o The Electrical Review.

SCOPHONY Limited, Wells, Somerset, have immediate capacity for electric plating nickel, black nickel, first grade hard chromium, cadmium, zinc and passivated, black bruno-fix for steel and brass. Trade enquiries invited for small components and accessories. Send samples for specimen finishes and quotations. 8041

SOUTH London firm prepared to undertake limited number of motor repairs, up to 5 h.p.—Box 3542, c/o The Electrical Review.

SMALL Armatures, etc., winding or rewinding, in quantity. High-class work, prompt delivery.—Max Electric Co. Ltd. (formerly Southern Ignition Co. Ltd.), 190, Thornton Road, Croydon. 59

WE specialise in reconditioning Fractional and Small H.P. Motors, Vacuum Cleaners, Washing Machines, electrical tools, etc.—Crown Appliances Ltd., 90, Wellesley Road, Croydon. Telephone, Croydon 6515. 7941

AGENCIES

TO REFRIGERATOR MANUFACTURERS

ELECTRICAL Engineers with substantial connection with Housing Development, and having Showrooms and Works in Central Bristol, are desirous of contacting manufacturers of Domestic and Industrial Refrigerators with a view to Agency for sale, installation and maintenance in Bristol and surrounding counties. Reply to—Box 8055, c/o The Electrical Review.

AGENCE Hanssens, 45, Avenue des Armures, Forest-Brussels, wish to contact British manufacturers of Electrical and Radio Accessories with view to sole representation and distribution in Belgium. 3232

AGENCIES required for Rhodesia for A.C. Motors and Control Gear, Power Line Equipment and Transformers, Radios.—Box 3354, c/o The Electrical Review.

AGENCIES required, South of England, including the London area: (a) Cables; (b) Small Switchgear; (c) Transformers; or any lines suitable for distribution for wholesalers' business.—Box 40, c/o The Electrical Review.

AGENCIES required for London, South of England, for the following: (1) Domestic electrical appliances; (2) Brass electrical accessories, switch plugs, etc.; (3) Conduit. Advertisers have clientele with every wholesaler in the territory mentioned. Immediate turnover can be guaranteed. Either commission or buying basis. Post-war arrangements considered.—Box 64, c/o The Electrical Review.

BRUSSELS (Anglo-Belgian) firm (electrical engineering) wishes to contact makers of electrical products, in particular of Time Switches, Heating Elements, Resistances (chrome-nickel), Electrical Tools, Soldering Irons, Hand Drills, Household Apparatus, Clocks, Boilers, Immersion Heaters, Toasters, Waffle Irons, material for Overhead Lines in Bronze, Ties, Joints, etc., with a view to representing them in Belgium. Replies to—Mr. M. J. Fitzpatrick, 70, Hawthorn Road, Erdington, B'ham, 23. 7959

BUSINESS man requires agencies for London and Southern England of Electrical Equipment on commission basis only. Write—Box No. 208, c/o Crossley & Co. Ltd., 5, Racquet Court, Fleet Street, E.C.4. 3350

CONNECTION wanted with factories in electrical articles and metals, able to deliver. Catalogue and offers to—Fa. A.C. Aabak, Amalievej 20, Copenhagen V, Denmark. 3523

EIRE and Northern Ireland. Advertiser, 20 years' commercial experience in electrical industry, is interested in sole agencies (or representation) all classes of electrical products. Particulars to—Box 8033, c/o The Electrical Review.

ELECTRICAL Engineer, A.M.I.E.E., requires agency, London and South Coast, for Cables and small Switchgear, own car.—Box 7964, c/o The Electrical Review.

EXPORTING Agents have open connections with most of the leading merchants and importing houses in the M.E. countries. If interested in this market and able to obtain export licence, state full particulars to—Box P3398, Samson Clarks, 57/61, Mortimer Street, W.1. 3433

LANCASHIRE area. Agent with 30 years' experience design and manufacture desires agencies for Switchgear, Machines, Accessories, etc. Commission and small contribution towards expenses.—Box 8013, c/o The Electrical Review.

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

MANUFACTURERS' Agents covering the whole of Great Britain are open to consider one or two exclusive agencies for household electrical goods. Write—Box 3547, c/o The Electrical Review.

MANUFACTURERS' Agents operating in London and South of England open for additional Agencies for Switchgear, Accessories, Appliances and any products suitable for distribution through wholesalers.—Box 76, c/o The Electrical Review.

NORTHERN Ireland Agent, with first-class connections, desires agencies for cookers, refrigerators, heaters, accessories, switchgear, etc. All replies confidential.—Box 8052, c/o The Electrical Review.

OLD-established firm of Motor Engineers, Bus Operators and Electrical and Wireless Contractors, with extensive premises midway between Glasgow and Edinburgh and at Glasgow, are increasing their activities and desire to act as agents or representatives for the whole of Scotland, or certain defined territory over industrial belt. Such lines as Refrigerators, Washing Machines and special Electrical Fittings could be energetically handled. Please communicate—6212, Wm. Porteous & Co., Glasgow. 8043

SOUTH Africa. Agent, with own offices in Salisbury and Cape Town, desires to contact British manufacturers view to representation.—Berns Agencies, P.O. Box 575, 2, Bein Bro. Building, First St., Salisbury, S. Rhodesia. 3395

SPECIAL Announcement. Messrs. Leons, of 153-155, High St., Epsom, Surrey, the actual manufacturers of Leons Decorative Electric Lighting Fittings, wish to announce to the numerous enquirers that an excellent range of Ultra-Modern Floor Standards and other Fittings, in the most exquisite designs and finishes, with immediate stock deliveries for most lines, can now be seen in London, at one of their branch factories. Immediate appointments can be made, by phoning Epsom 2400, with wholesalers and fittings factors. 67

BUSINESSES FOR SALE AND WANTED

TO ELECTRICAL WHOLESALERS

ADVERTISER wishes to purchase interest (preferably controlling) in established electrical wholesalers' business. Large turnover not essential provided the business is of good trade standing and capable of development. E.W.F. member operating in London or Home Counties preferred. Preliminary replies will be treated in very strictest confidence.—Box 8022, c/o The Electrical Review.

BUSINESS OPPORTUNITIES

ADVERTISER wishes to contact small motor manufacturers with a view to obtaining Capacitor Motors, with special flange and shaft extensions, in quantities not less than 100, ¼ and ½ h.p., for building into special machines. Urgent delivery essential. Reply in first instance to—6175, Wm. Porteous & Co., Glasgow. 8040

IMPORTANT firm with large export organisation requires contacts with manufacturers of moulded switches, shades etc., also any electrical equipment suitable for export.—Box 3545, c/o The Electrical Review.

MANUFACTURERS wish to purchase original designs for single-phase fractional h.p. Motors.—Box 3485, c/o The Electrical Review.

NEW store opening in Richmond, Surrey (large floor space) wish to contact manufacturers for regular line of Electrical Goods. Write—28, Hill St., Richmond. 3373

FACTORIES FOR SALE AND WANTED

5,000 sq. ft., Fulham, Freehold Ground Floor Factory, with part 2-storey. Possession 25th December, 1945. Apply—Leopold Farmer & Sons, Factory Agents, 46, Gresham Street, E.C. 3509

PARTNERSHIPS

ADVERTISER having wide practical experience on design, manufacture and maintenance of light electro-mechanical equipment, telephone systems, etc., and with good organizing ability, is desirous to engage in business on own account. Requires capital assistance and is desirous of establishing contact with others with like intention.—Box 8042, c/o The Electrical Review.

MARKETING man, with thorough knowledge of the modern technique, experience as sales manager, salesman, abundant health, adequate capital to obtain initial distribution and develop sales, recently demobilised, volunteer R.A.F. radar section, wishes to contact owner of a process or product where co-operation can develop a business. Write—Box 8028, c/o The Electrical Review.

PATENT NOTICES

PATENT Agents.—A. E. Hill, Chartered Patent Agent, 27, Chancery Lane, London, W.C.2. 65

PATENT Electric Tool Tipping Machine. For tipping machine and other tools with tungsten carbide, stellite, high-speed steel, or flash welding H.S.S. to low carbon steel. Advertiser has for disposal, either on royalty or will sell outright, British patent rights to manufacture and sell patent Electric Tool Tipping Machine, already marketed. Also new Prototype Tipping Machine of 6-kVA capacity, bench model, capable of tipping tools from one square inch in cross section, down to one-eighth. Good opportunity for export trade. Interested parties should write to—Box 8015, c/o The Electrical Review.

PREMISES WANTED

SMALL London office, with or without adjacent room, for electrical test-assembly, required by young engineer.—Box 8020, c/o The Electrical Review.

MISCELLANEOUS

BATTERY Chargers Modernised. Your old Charger made like new by specialists. Conversion from valve to metal rectification. Send for interesting leaflet "Q.D." on this service.—Runbaken Electrical Products, Manchester, 1. 45

PHOTOGRAPHY. Victory ends restrictions. For a permanent pictorial record of your war-time factory and products, for your peace-time advertising, catalogue and general purpose photographic illustrations, phone Holborn 6858.—Miles & Kaye Ltd., 100, Southampton Row, London, W.C.1. Specialists in commercial and industrial photography for over 60 years. 3246

TO Office and Works Executives, please apply for our complete catalogue which is now available, together with 1946 Calendar (encl. 1d. stamp to comply) so that your records of Plant, Electrodes and Accessories manufactured are up-to-date.—Petbow Ltd., Watford, Herts. 3550

EDUCATIONAL NOTICES

ENGINEERING CAREERS AND QUALIFICATIONS

BOTH Government and industry have announced and emphasised that young men with technical knowledge and qualifications must receive every chance of rising to the highest posts within their capacity in post-war engineering and allied industry. Write to-day for "The Engineer's Guide to Success"—200 courses—free—which gives particulars of the first-class training supplied by the T.I.G.B. for the A.M.I.E.E., A.M.Inst.C.E., A.M.I.Mech.E., A.F.R.Ae.S., A.M.I.P.E., B.Sc.(Eng.), C. & G., etc., examinations in which T.I.G.B. home-study students have gained 44 FIRST PLACES AND OVER 1,000 PASSES. The Guide covers careers in all branches, Electrical, Mechanical, Radio, Aeronautical, etc.

THE TECHNOLOGICAL INSTITUTE OF GREAT BRITAIN.
35, TEMPLE BAR HOUSE,
LONDON, E.C.4.

77

EDUCATIONAL NOTICES– *Continued*

LATEST A.M.I.E.E. RESULTS

IN the recent Examinations held by the Institution of Electrical Engineers 477 Candidates sat who had taken B.I.E.T. courses. Of these 457 were successful in passing the examinations. We believe this record of 457 successes out of 477 entrants has never before been approached by any oral or correspondence tutorial organisation, and indicates the very high efficiency of the modern system of Technical training which we have laid down.

The B.I.E.T. tutorial organisation is waiting to assist you either with a short specialist course or complete training for a recognised examination.

We have available a large full-time staff of instructors, while the efficiency of our extensive organisation is a byword among engineers.

WE GUARANTEE—"NO PASS—NO FEE"

May we send a copy of "ENGINEERING OPPORTUNITIES"? Containing a great deal of useful advice and detailed information on over 200 Home-Study Courses and examinations, this handbook is of very real value to the ambitious engineer.

Our highly informative handbook will be sent FREE and without obligation on request.

BRITISH INSTITUTE OF ENGINEERING TECHNOLOGY.

Established 1927—over 200,000 students.

12, Shakespeare House, 17, 18 & 19, Stratford Place, Oxford Street, London, W.1.

33

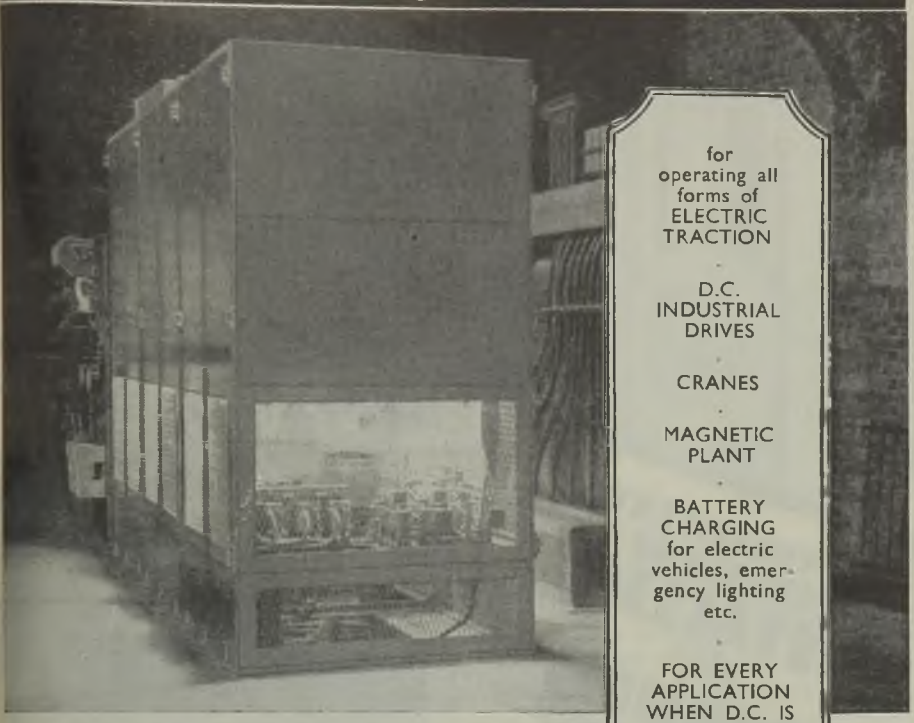
Index to Advertisers

(*Continued on page* 74)

INDEX TO ADVERTISERS

Index to Advertisers (*Continued from page 72*) PAGE

Converting A.C. to D.C.



Typical Hewittic Rectifier supplying D.C. for large Steel Mills

for
operating all
forms of
ELECTRIC
TRACTION

D.C.
INDUSTRIAL
DRIVES

CRANES

MAGNETIC
PLANT

BATTERY
CHARGING
for electric
vehicles, emer-
gency lighting
etc.

FOR EVERY
APPLICATION
WHEN D.C. IS
REQUIRED FROM
AN A.C. SUPPLY

THE simplest, most reliable converting plant made, backed by over 30 years of rectifier experience ; robust, easily installed, occupying minimum floorspace, **operating unattended** (even in the largest installations), with high efficiency (down to the lowest loads) and corresponding economy in operation.

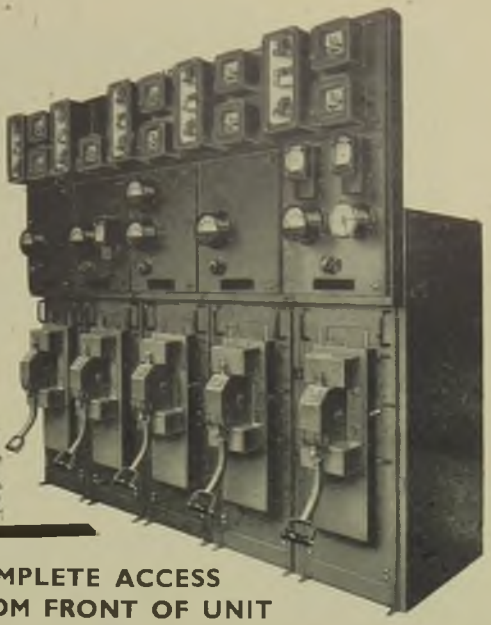
OVER
750,000 kW
IN
WORLD-WIDE
SERVICE

Hewittic Rectifiers

HEWITTIC ELECTRIC CO. LTD., WALTON-ON-THAMES, SURREY

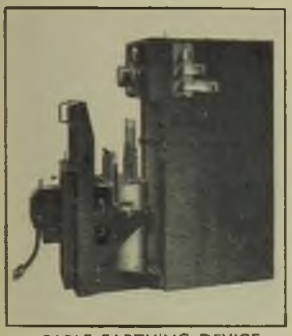
Telephone : Walton-on-Thames 760 (8 lines). *Telegrams : " Hewittic," Walton-on-Thames*

Metal-clad Switchgear for Restricted Spaces

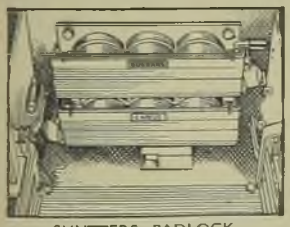


AIR-INSULATED H.V. UNIT

Type AC



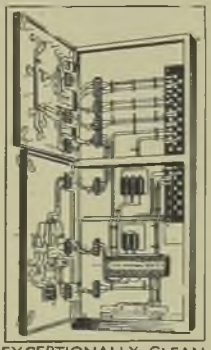
CABLE EARTHING DEVICE FITTED



SHUTTERS PADLOCK INDEPENDENTLY

- COMPLETE ACCESS FROM FRONT OF UNIT
- FULL COMPLEMENT OF INTERLOCKS
- CABLE EARTHING VIA O.C.B.
- Safe Access to C.T. and Cable Box compartment while Busbars are alive.
- Busbar and Feeder shutters padlock independently.
- Circuit checking and re-connecting facilitated by clean wiring system.
- Operating Handle gives maximum effort at contact "make."
- Easily distinguishable On-Off indicators.
- A.S.T.A. Certified O.C.B.

250 MVA at 11 kV Cert. No. 644.
150 MVA „ 11 kV „ „ 547 & 550.
150 MVA „ 6·6 kV „ „ 551.
75 MVA „ 3·3 kV „ „ 548.



EXCEPTIONALLY CLEAN WIRING

ASK FOR PUBLICATION S.G. 66

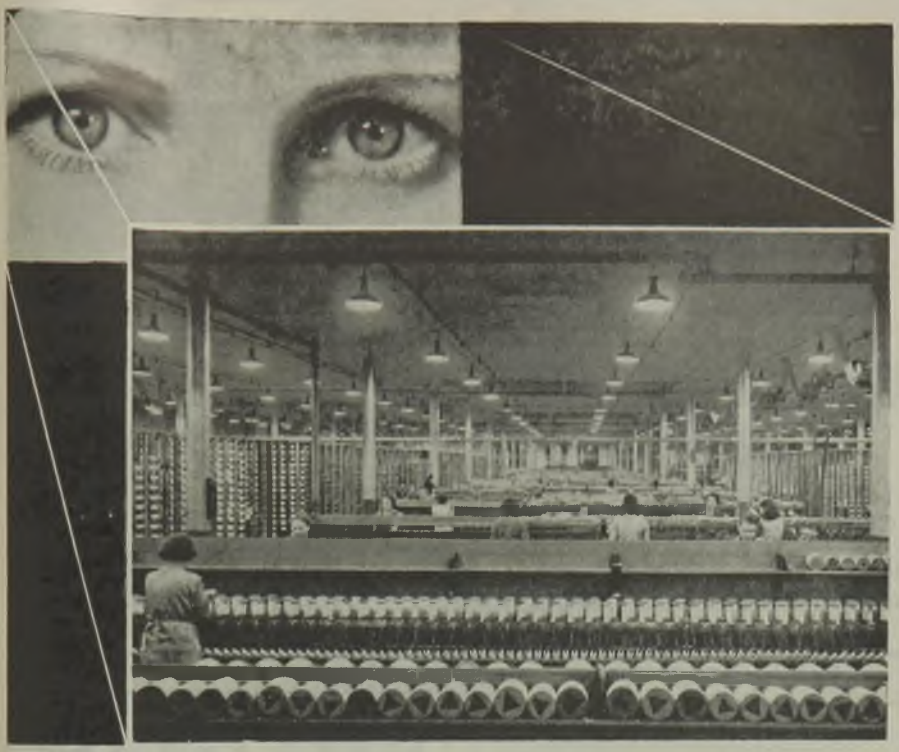
JOHNSON & PHILLIPS LTD.

CHARLTON, LONDON, S.E.7

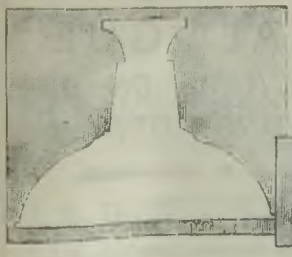
Telephone : Greenwich 3244 (13 lines). *Telegrams : "Juno," Charlton, Kent*

The mark that means that "little more" in quality

G



MAKE LIGHT OF IT. Let the Crompton Lighting Service do the worrying over your lighting problems. Hundreds of installations owe their high visual efficiency to Crompton planning and Crompton equipment.



CROMPTON LIGHTING EQUIPMENT

FOR THE LATEST IN LIGHTING

CROMPTON PARKINSON LTD. ELECTRA HOUSE, LONDON, W.C.2
Telephone: Temple Bar 5911 Telegrams: Crompark, Estrand, London

Tucker

A631 Range

PUSH-BAR SWITCH-LAMPHOLDERS

Description			Cat. No.	Doz.
INSULATED (BROWN) STANDARD TYPE "2" TYPE PORCELAIN INTERIORS	SHADE CARRIER Cord Grip		A671/2306	31/4
	Screwed	⅜" Brass	A666/2303	31/–
	"	½" "	A667/2303	31/–
	"	⅜" Conduit	A668/2400	32/–
	H.O. SKIRT Cord Grip		A691/2500	33/4
	Screwed	⅜" Brass	A686/2409	33/–
	"	½" "	A687/2409	33/–
	"	⅜" Conduit	A688/2506	34/–
METAL TYPE (Polished Brass) "2" TYPE PORCELAIN INTERIORS	SHADE CARRIER Cord Grip		A631/1900	25/4
	Hex. Top		A632/2006	27/4
	PLAIN Cord Grip		A630/1803	24/4
	Hex. Top		A637/1909	26/4

Rapid Q.M. & Q.B. switch action. Vitreous Porcelain Interiors in both shockproof and metal types. Non-detachable push-bars cannot come adrift. Metal liners in moulded types interlocked at bayonet slots, where greatest reinforcement is necessary.

Catalogue numbers: — ***Shockproof A 671 range. Metal A 631 range.***

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

Makers of First Grade Electrical Accessories for over 50 Years

Tucker TELAC

FOR CLASSIFIED ADVERTISEMENTS SEE PAGE 57
INDEX TO ADVERTISERS—SEE PAGES 72 AND 74

Printed in Great Britain at THE CHAPEL RIVER PRESS, Andover, Hants, and published by ELECTRICAL REVIEW, LIMITED, at Dorset House, Stamford Street, London, S.E.1.