ELECTRICAL REVIEW

FOUNDED 1872

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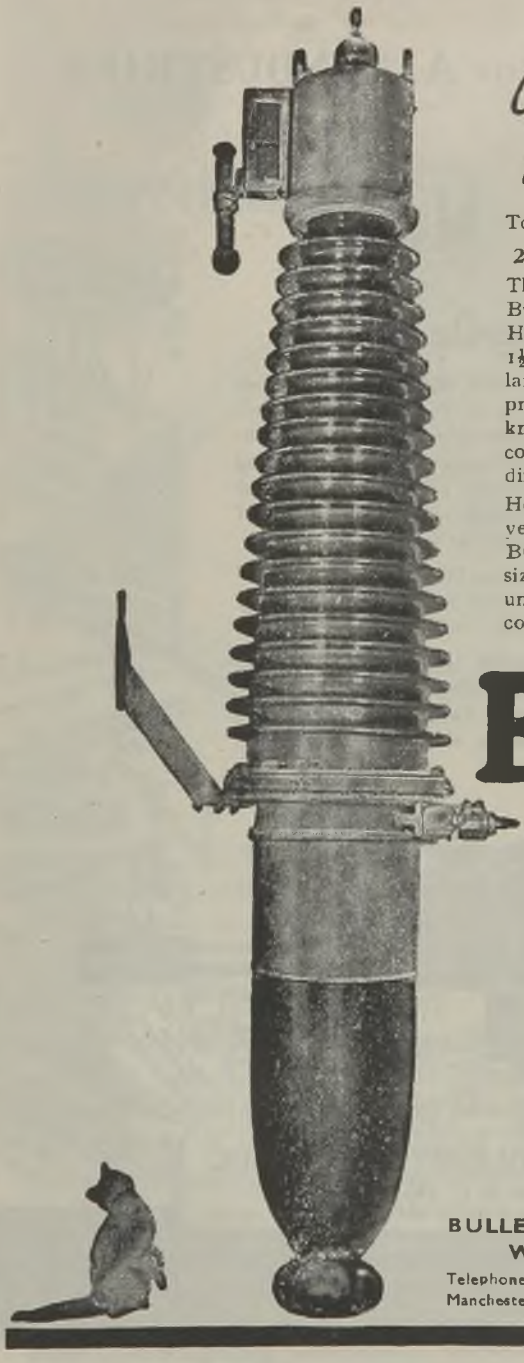

IN 1924 Bullers made the first big bushing of 66 kV capacity. To-day we are able to show this massive

242 kV OIL FILLED BUSHING.

The porcelain parts were made in Bullers' works for the British Thomson-Houston Co. Ltd. It measures 15 ft. 1½ inches overall and is one of the largest bushings of this kind yet produced. Only the skill and knowledge acquired by long experience could produce insulators of such dimensions free from flaws.

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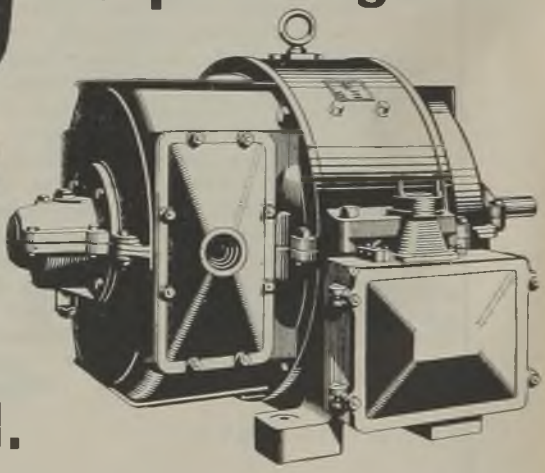
Crompton D.C. field coils

are proof against



them all.

The field coils now fitted as standard in all Crompton D.C. Motors are doubly impregnated with a special varnish which makes them impervious to the attack of any of the elements which usually affect the life and performance of D.C. Motors in marine and other duties. The coils have a smooth, glossy, sealed surface and the interior is quite free from air pockets. In addition, the coils have no former. This assists thorough impregnation and there can be no corner crevices to harbour dirt, oil, moisture, etc. During prolonged heating and cooling tests, immersion in water, 5% brine solution and atmospheres of 99% humidity and other equally onerous tests, the coils have stood up to daily high voltage tests to earth without any sign of breaking down.

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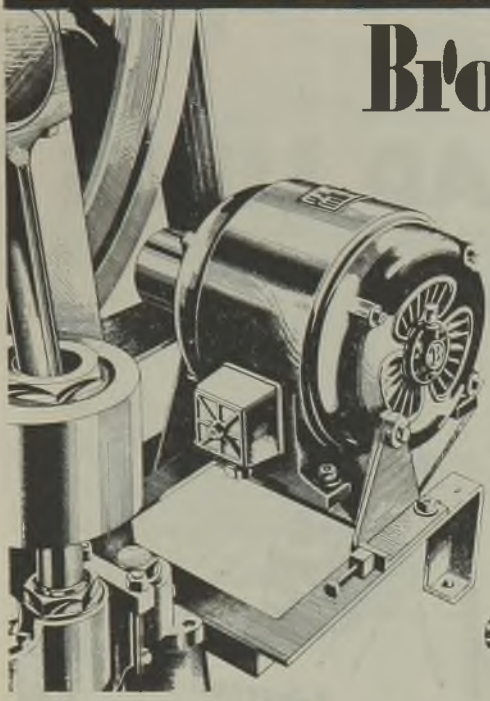
ELECTRA HOUSE VICTORIA EMBANKMENT. LONDON, W.C.2 *and Branches*

PROTECTED-CAGE

Brook Motors



USES

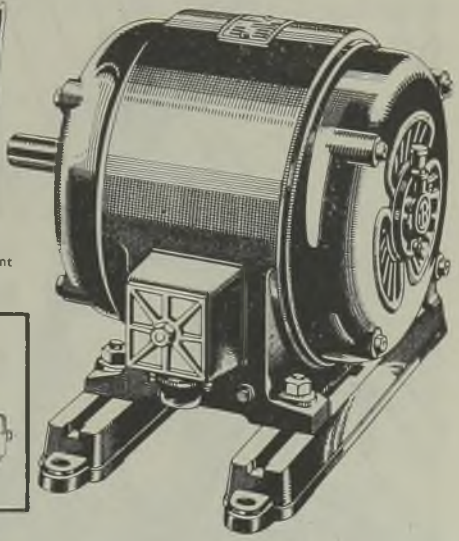
For all normal power drives where current restrictions are not too severe. *Starting direct* 150 per cent. torque with 600 per cent Full Load Current. *Star-delta* starting gives sufficient torque to start a saw-bench, a normal machine tool, a short length of shafting, etc.

GENERAL

It is not always appreciated that an A.C. motor of the CAGE TYPE is the only power unit which has no friction losses apart from the bearings and windage, and, further, that its rotating parts are virtually indestructible, making it the most efficient and reliable type of power unit.

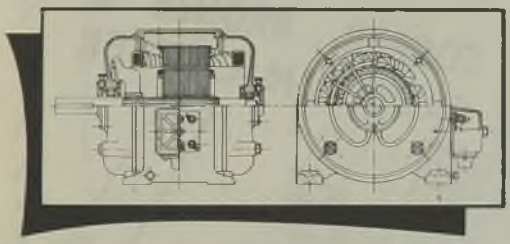
FEATURES

Straight through shaft without weakening shoulders. Roller bearing at driving end. Windings impregnated and baked. Lubricators for addition of grease. Dynamically balanced to eliminate all vibration.

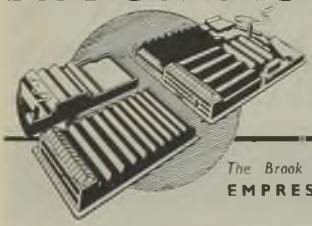


OUTPUTS

½ to 200 H.P. for single, two or three phase alternating current supply.



BROOK MOTORS LTD • Huddersfield



Specialists in the manufacture of Alternating Current Motors in Squirrel Cage and Slip Ring types from 1/3rd to 200 h.p. 20,000 h.p. speed types are listed for every industrial use, and thousands of these motors in all types have been supplied to the various countries of the world. We are the largest Alternating Current Motor Manufacturers in the world.

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THE COMPLETE RANGE

OF

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HIGH RUPTURING CAPACITY CARTRIDGE FUSE LINKS HAS BEEN

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B.S.S. 88 - 1939

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(25,000 kVA at 440 VOLTS)

A.S.T.A. CERTIFICATE No.	RATING AMPS.	LIST No.	RANGE OF CURRENT RATINGS AVAILABLE
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616	60	TIS 60	35 to 60 Amps.
615	100	TC 100	80 to 100 Amps.
251	200	TF 200	125 to 200 Amps.
252	300	TKF 300	250 to 300 Amps.
629	400	TM 400	350 to 400 Amps.
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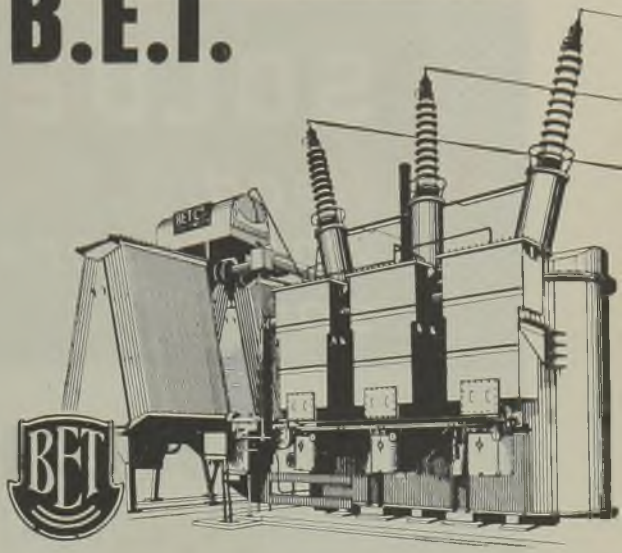
Accepted as the Standard of Quality and Performance the World Over

THE ENGLISH ELECTRIC COMPANY LIMITED
London Office : QUEEN'S HOUSE, KINGSWAY, LONDON, W.C.2
FUSEGEAR WORKS - - - - STAFFORD

Built by B.E.T.



. . . a 45,000 kVA 'Grid' transformer.

B.E.T. have supplied over 3,000,000 kVA of transformers to the C.E.B. Large and small users of transformers find B.E.T.'s exceptional experience and technical resources to be invaluable in arriving at efficient and reliable designs.

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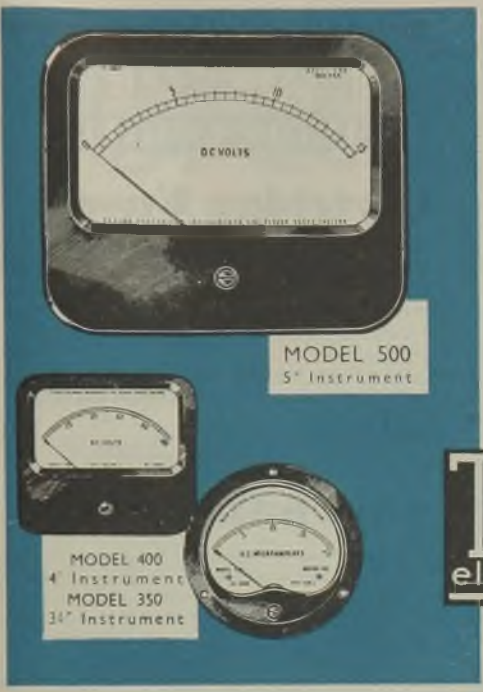
British Electric Transformer
Company Limited
In association with CROMPTON PARKINSON LIMITED

ELECTRA HOUSE, VICTORIA EMBANKMENT, LONDON, W.C.2



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MODEL 200. 2" instrument with either round or square covers.

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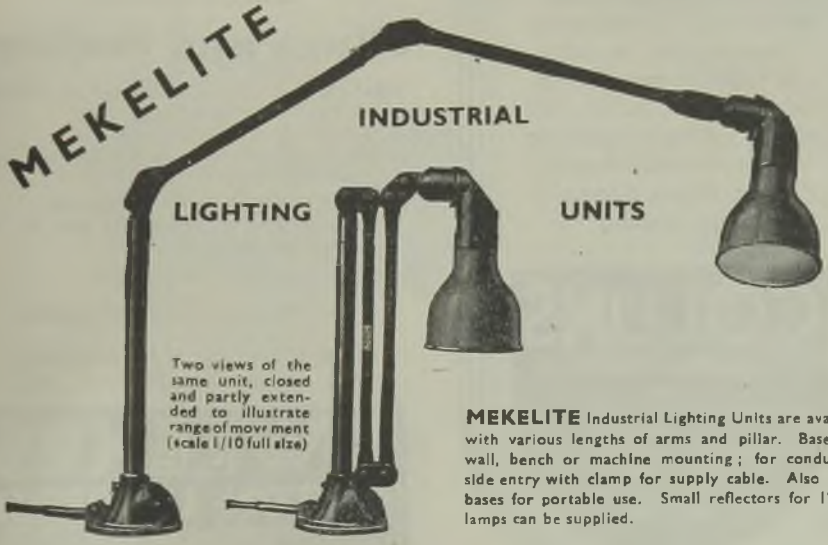

Two views of the same unit, closed and partly extended to illustrate range of movement (scale 1/10 full size)

MEKELITE Industrial Lighting Units are available with various lengths of arms and pillar. Bases for wall, bench or machine mounting; for conduit or side entry with clamp for supply cable. Also heavy bases for portable use. Small reflectors for 12-volt lamps can be supplied.

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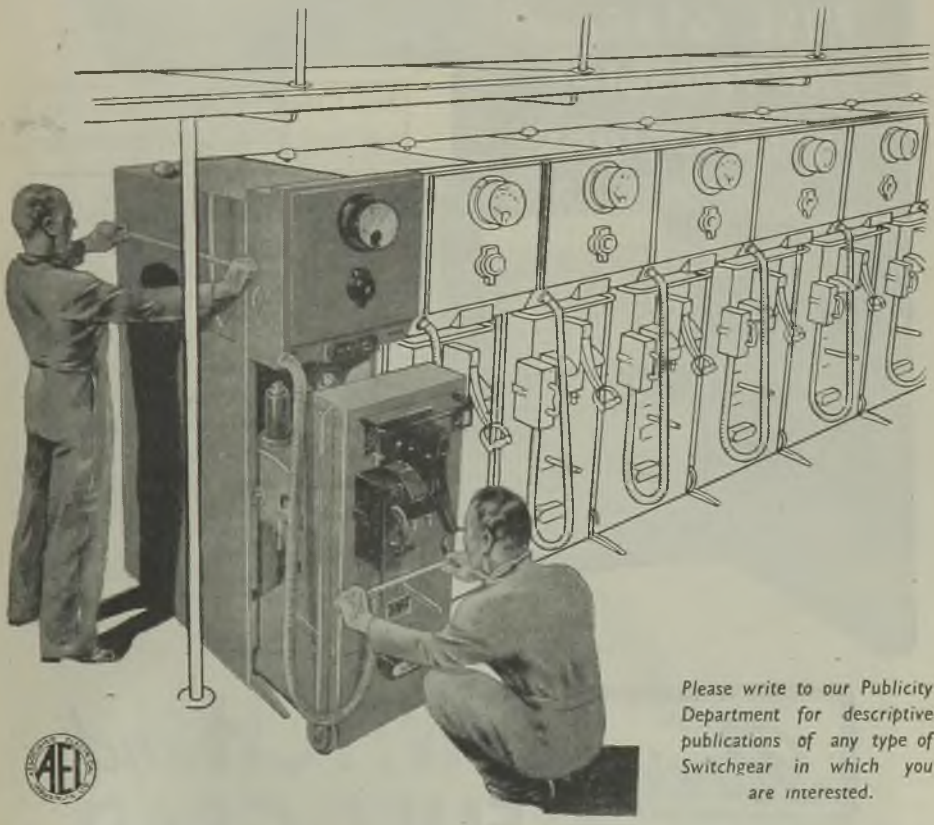

Please write to our Publicity Department for descriptive publications of any type of Switchgear in which you are interested.

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ELECTRICAL REVIEW

September 28, 1945

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXVII. No. 3540. SEPTEMBER 28, 1945 9d. WEEKLY

Electrical Export Trade

Wartime Diversion and Post-War Reorientation

REFLECTING wartime conditions, the Board of Trade export and import figures for the first half of this year are a doubtful guide to post-war probabilities. Yet there are points to which it may be worth while to draw attention. First there is the question of volumes and values. The table published in our last issue showed that the total value of exports of electrical apparatus and machinery (including vacuum cleaners and other electrically-operated portable appliances) in the first half of the year was £12,206,472. This was actually greater than half of the 1938 figure—£10,884,694. (For unexplained reasons half of the 1938 totals are used in the returns rather than the amounts for January-June, 1938.)

Adjusted Values

According to the *Board of Trade Journal* of September 15th the index number of average value for electrical goods and apparatus in the six months ended June 30th last was 171 (1938=100) and the figure for machinery (all descriptions) was the same. The index numbers of volume were 53 and 45 respectively.

Applying the value index figure of 171 to the total given in last week's table (£12,206,472) the equivalent 1938 value of these exports is only £7,138,288, *i.e.*, 66 per cent. of half the 1938 total. This, however, compares very favourably with the 40 per cent. given for exports of all manufactured goods and was largely due to a rise of 86 per cent. in exports of convertors, transformers, switchgear, etc.

All the same these exports were very largely abnormal, in the sense that they went to countries which were not notable markets for British electrical goods before the war. The Board of Trade explains that although the returns exclude "munitions" (which are defined) they embrace exports of military goods other than munitions, machinery and supplies not purely commercial, and exports to the United States under reciprocal aid, *i.e.*, "reverse lend-lease." Thus we find that exports of electrical goods and apparatus to Russia were valued at £634,925 in the first half of this year, against the £220,682 which was half of the 1938 total. To the United States we sent goods and apparatus worth £107,298, against the half-1938 figure of £33,276. Exports to most other markets were maintained or increased in value but the shares of Argentina and Eire were much reduced.

Machinery for Russia

Shipments of electric generators to the Soviet Union showed an even more pronounced rise. That country's share rose in volume from 118 tons in half of 1938 to 1,172 tons in January-June this year and in value from £22,278 to £340,004. Comparison with 1938 in the case of motors, convertors, transformers, rectifiers, switchgear, etc., is not possible but in the first half of this year Russia took 18,411 tons valued at £3,496,664. Half of the total for 1938 of electrical machinery exports to foreign countries was 3,985 tons (£150,677); for January-June, 1938, the figure was 10,004 tons (£4,001,795). There was a general fall in exports of

electrical machinery to Empire countries.

It is questionable whether the United States will import much British electrical equipment now that the war is over, but there seems to be no reason why Russia should not remain a good customer, particularly with German industry practically non-existent. The Dominions will probably seek to supply their own requirements in the way of smaller apparatus, but there is an unsatisfied demand for the heavier plant which this country must endeavour to meet, even though our own needs are clamant. As one of the newer and therefore more up-to-date industries the British electrical industry will be required, and should be able, to contribute more than most others to the restoration and increase of our export trade.

Imports

ON the import side of the Board of Trade returns the wartime rise in the amount of electrical goods and apparatus taken from abroad continued, largely because of imports of radio equipment for operational uses; the value was £12,826,550 as compared with only £1,553,403 as half of the 1938 figure, and radio apparatus accounted for 65 per cent. of this. Practically the whole of these imports were from the United States and Canada. Electrical machinery imports were also considerably greater—£1,972,309 against the half-1938 value of £242,929. Conversely purchases of vacuum cleaners were reduced from £96,587 to £289.

Government Scientists

IT has been notorious that, judged by the salaries paid to them, scientists in the Civil Service have not been considered so important as administrators, although in modern times their work has been of at least equal value to the community. Except for the secretary of the Department of Scientific & Industrial Research, who receives £3,000, no member of the Department gets as much as £2,000 unless it be the director of the National Physical Laboratory whose £1,750 is supplemented by a free residence. It is proposed to improve conditions considerably by a complete reorganisation and the establishment of a "scientific officer class" with salaries comparable with those paid in the administrative class. Recruitment to a new "experimental officer class" will be from boys and girls with some scientific training, from university graduates and from others with experience in industry and engineering. It is hoped that the new salaries and conditions will result in a considerable strengthening of the scientific branch of the Civil Service.

Maximum and Economic

A DEPARTURE from usual practice is to be made in regard to the turbines for Croydon "B" power station, preliminary particulars of which are given in this issue. The continuous and the most economical ratings will be identical. Hitherto the latter has generally been 80 per cent. of the full amount and, with a view to obtaining the highest efficiency, generating sets are operated as nearly as practicable at that proportion of the total output. Since machines are officially rated on a m.c.r. basis, this affects the capital cost per effective kW to be installed. The Croydon basis will, it is to be hoped, set a precedent for the rest of the 4·5 million kW which Mr. Harold Hobson (chairman, C.E.B.) gave as the capacity of extensions now in hand.

Power Station Coal

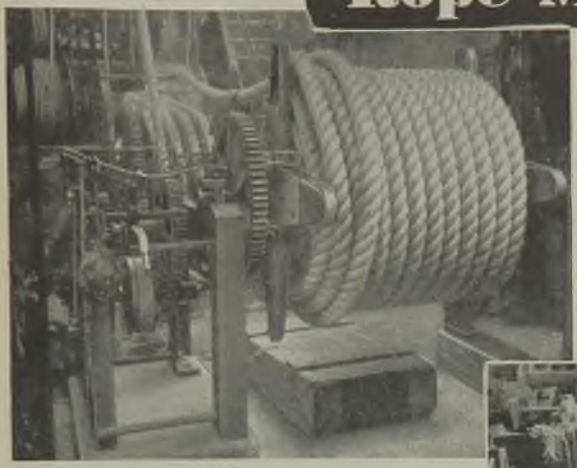
THE Minister of Fuel could have been left in no doubt at Croydon that the electricity supply industry, from its own angle, views the coal situation as seriously as he does himself. Mr. Shinwell evidently realises what the effect of a high ash content must be, on the development of electricity especially when price is not closely related to heating value. In order to secure the highest efficiency, however, it is also of the first importance that the fuel delivered shall be consistently of a type (*e.g.*, in volatile constituents) that is best suited to the combustion conditions in each case. On this question the only competent judges are power station engineers.

Students' Brains Trust

THE London Students' Section of the I.E.E. has again arranged a "Brains' Trust" evening—for November 6th. This popular event should prove very successful with such a panel as Sir Arthur Fleming, and Messrs. W. N. C. Clinch, A. J. Gill, S. E. Goodall, J. Hacking and B. N. McLarty, representing science and industry in a variety of directions. Questions have to be sent in by October 27th.

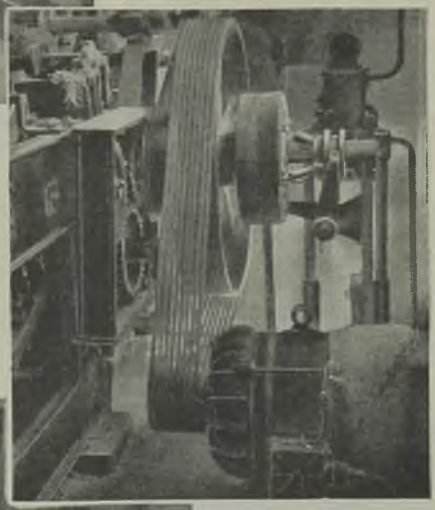
Rope Making

Interesting Group and Individual Drives

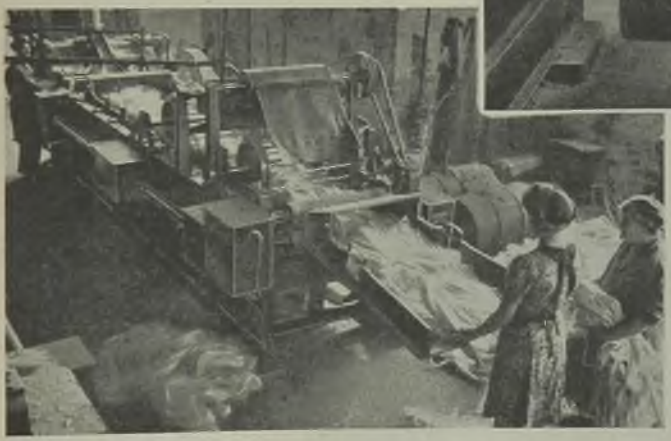


BY the courtesy of Hawkins & Tipson, Ltd., we were recently able to observe the electrical applications to rope making during a visit to the Globe Rope Works at Millwall, London, where the high-grade "Hercules" rope is produced in normal times. The company has suffered rather badly from enemy action during the war years and, in consequence, there is a somewhat curious mixture of both advancement and retardation in the development of the electrical installation at the works.

It should be borne in mind that originally the main motive power of the factory was provided by gas engines driven by producer gas. Some forty years ago a dynamo was installed and many electrical drives were incorporated. In more recent years, 250-kW and 500-kW rotary convertors have been installed to take care of extensions brought about by rapid expansion. To meet additional load a survey of the power requirements was made in 1938 by the firm's technical director, Mr. O. H. Moseley, A.M.I.E.E., and it was decided to dispense with the rotary convertors and to change over the factory completely from DC to AC. This work is still in progress.



A 7½-HP s.c. motor serves each hackling machine, with an initial V-belt transmission to a countershaft; note fabric cover on motor



The fibres are first combed and laid out evenly and parallel on a hackling machine to form "slivers"

Brook motors with Ellison starters are

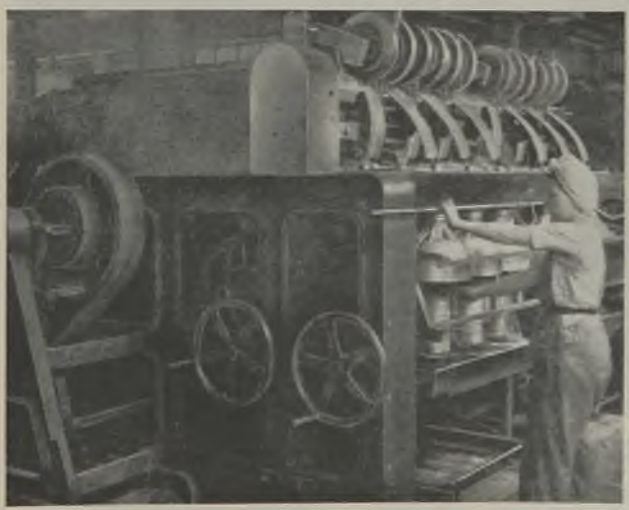
being standardised in units of 7½-, 12½-, 25- and 50-HP, and the installed load is over 1,300 HP. Fluorescent lighting has been adopted where applicable, and a scheme of heating and ventilating has been installed in the preparing and spinning mills. Local transport in the factory is provided by B.E.V. electric trucks.

Broadly there are three main stages of production, namely, preparing the fibre for spinning, spinning the yarn, and building up and laying the ropes from the yarn. The production machinery for the first two stages is similar in many respects to that in certain sections of the textile industry, while in the plant for the third stage we saw a striking resemblance to such equipment as the stranding machines employed in the cable-making industry.

At the top end of the rope walk is a bank of bobbins from which the yarn is drawn through a tube, and a top-end machine to the hooks of which the ends of the strands are secured

Normally the main raw material is manila fibre, a product of the Philippines, and although a limited amount of this material is still used for special purposes under Government control, the bulk of the raw material used to-day is sisal, a plant of the pineapple family which is grown in East Africa.

The raw material is received in bales in a store where it is handled by two half-ton 40-ft. span overhead electric cranes The bales are opened in a preparing mill, and if long manila fibre is being processed it is cut into lengths that will suit the capacity of the machines. The fibres are first combed mechanically and laid out evenly and parallel to form " slivers " —long ribbons of loosely bunched fibres. This is effected progressively on four hackling machines and two drawing frames. Throughout the preparing section a number of " slivers " are run into each machine so that the fibres are continuously parallel, mixed and blended, until from the final drawing frame the " sliver " is drawn down fine enough for spinning into yarn. At the penultimate drawing, the " sliver " is weighed for a known "runnage" to ensure the correct weight for the final " sliver " passing through the faller bars of the spinning frames.



On each gillspinner the " slivers " are twisted into yarn by revolving flyers and finally wound on bobbins

These hackling machines are all similar in principle, and it is not necessary to refer in detail to more than the first machine into which the fibre is fed through fluted rolls and carried along on two endless conveyors carrying coarse combs. The

conveyors are aligned end to end, and the second one travels considerably faster than the first one, so as to effect the required "pulling out" of the fibre. A 7½-HP 750-RPM s.c. motor serves the machine, with an initial transmission to a countershaft by means of a multi V-belt with a speed-reduction ratio of about five to one. From the countershaft transmissions to the two conveyors are *via* pinion gearing. During

As the three strands are twisted together by the bottom-end machine the length of rope between this machine and the "top cart" increases

normal operations the motor runs continuously, and the starting and stopping of the machine is effected by the engagement and release of a hand-lever operated friction clutch on the countershaft.

During its passage on the first conveyors the fibre is dressed with an emulsion, a dressing which mainly provides lubrication to the fibres, so as to render the rope flexible and to eliminate internal friction between the fibres. This emulsion is fed to the machines by an overhead pipeline, and the problem of keeping this in a state of high fluidity has been solved electrically. To the pipeline is bound a metal-sheath resistor of the type used in some quick-heating boiling plates. It is loaded at 40 W per foot run and is fed at intervals from normal conduit junction boxes.

The "sliver" from the final drawing frame is now ready for spinning which is effected on gillspinners. It enters the back of each spinning frame on which it undergoes a further combing process before being passed on to the revolving flyers by which it is twisted into yarn, and finally on to the bobbins on which it is wound. For rope yarn a full bobbin contains about 10 lb. of yarn. The size of the yarn can be varied at will by altering the weight of the "sliver" for a known runnage from the preparing machines and by various wheel changes on the spinning frame. A 24-thread yarn means that in a rope of three-strand construction and measuring three inches in circumference there are 24 yarns in each strand. There is also a definite yardage weight for the yarn, which therefore also controls the weight of the finished rope. For instance, a 24-thread yarn has a runnage of 108 yards per lb.

All the machines so far referred to are subjects of conversion

In the electrified section of the rope walk the bottom-end machine is supplied by an overhead tramway trolley system

schemes resulting in modern individual drives as indicated and illustrated. All the motors are surface-cooled Brook units, and each is fitted with an exterior fan under the end cowl. Difficulties resulting from fibre being drawn

into the motor bearings, etc., have been the subject of a successful investigation which has led to a cover of special fabric being fitted over the suction end of each motor.

The yarn on the bobbins from the spinning frames is now ready for the final processes of strand and rope making which are effected by either of two methods. One of these employs the rope walk, a survival from the days when rope was made entirely by hand. It has the disadvantage of requiring a very large area of covered ground, but it still produces some of the finest rope obtainable.

The walk should be long enough to enable a standard coil of rope to be made during its actual production. In England the standard length of a coil of rope is 120 fathoms (720 ft.), but in America it is 200 fathoms, while on the Continent it is generally 100 metres. In the factory at Millwall the length of the walk is about 1,000 ft. There are several rope runs in the walk which, as a whole, are not electrically driven, although one section of it has been electrified, but is now out of action as the result of labour shortage. A gas engine is still the main driving unit for the rope walk and motion is imparted to the rope machines by means of endless transmission rope.

In the " former " of the horizontal house machine the threads are received by revolving drums, mounted in carriages which also revolve normally to the rotation of the drums themselves

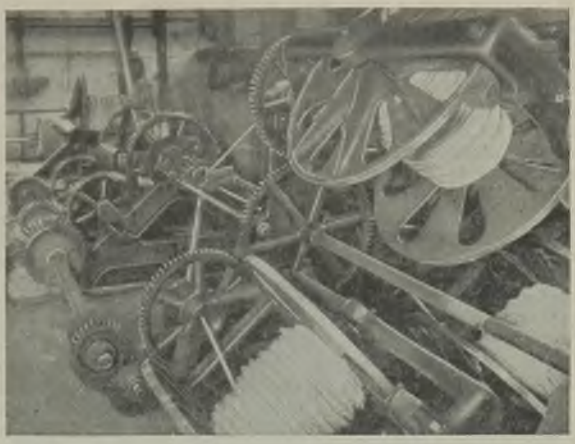
At the top end of the rope walk is a bank of spindles on which are placed the filled bobbins from which the yarn is drawn as the production of the strand progresses. The yarns converge to a central point where they pass through a cast-iron tube in which they are bound together to form a " solid " strand, but just in front of the tube is a circular register plate through holes in which the yarns pass to keep them correctly spaced and placed in relation to one another. The number of yarns drawn out at one time varies according to the size of the rope to be produced, but a 6-inch (circumference) rope of three strands requires 96 yarns per strand for a rope in accordance with B.S. specification.

The strand is drawn out by a travelling (bottom-end) machine which runs on rails along the walk. The number of strands which can be run out at one time is limited by the size of the rope in relation to the driving power available. The end of each strand is secured to the hook of one of the twisting heads on the travelling machine, and as the machine draws the strands out the head revolves and imparts the necessary twist to the strand. An endless-rope transmission scheme throughout the length of the rope walk is responsible for both the propulsion of the travelling machine and driving the twisting heads, *via* a transmission rope drum on the machine itself.

When the strands for a rope have been drawn out to their required length they are cut at the top end of the walk and the ends of the strands are secured to the hooks of separate revolving heads on a top-end machine. This machine is similar to the bottom-end machine, except that it is stationary, and the rotation of the heads imparts a hardening twist to the strands. The other ends of the three strands are then taken off the separate hooks and put together on one hook on the bottom-end machine, while at a point a few feet from the bottom-end machine the strands are held apart in their correct relative positions by a " top "—a large conical piece of wood with grooves which accommodate

the strands—which is carried on a "top cart," *i.e.*, a small truck which also runs on the rails.

With the strands thus laid in the grooves of the "top" and the hook on the bottom-end machine revolving, the strands are twisted together between the bottom-end machine and the "top cart" to form the rope. This twisting action forces the "cart" along the rails, and as the rope on one side of the "cart" increases in length the separate strands on the other side decrease in length. The rope thus produced may be the finished product, or three or more such ropes may be similarly twisted together to form a cable or warp. In the electrified section of the rope walk the bottom-end machine is propelled by its own self-contained motor which is supplied by a tramway-type overhead supply system.



In the "closer" the three strands are unreeled from drums housed in a revolving carriage and are twisted together by the rotation of the carriage

The other method of producing the strands and the finished rope is carried out on house machines which have the great advantage of taking up comparatively very little space. Having fairly fully outlined the processes of rope making on the rope walk it is unnecessary to follow the operations very closely on the house machines. We saw two types of these machines, horizontal and vertical, but they both embody the same principle of the cable-making stranding machines, etc. Each house machine, horizontal and vertical, is in two sections, namely, the "former" or strand producing section, and the "closer" or rope-making section

In the "former" of the horizontal machine the yarns are drawn from banks of bobbins to converge into the rope tubes after passing through the holes in register plates. From the tubes the strand is received by revolving drums which are mounted in carriages; these also revolve in a direction at right angles to the rotation of the drums themselves, thus imparting the necessary twist to the strands. In the "closer" the strands are unreeled from drums housed in a revolving carriage and are twisted together by the rotation of the carriage as they pass through a central "die." Finally the rope is received by a revolving drum at the other end of the machine or directly reeled into coils depending on the type of machine used. This is the finished rope and is ready for packing and dispatch in the warehouse.

Both the "former" and the "closer" of the horizontal machine inspected are group-driven by a 20-HP motor with primary and secondary transmissions to and from a countershaft fitted with fast and loose pulleys. The size of the motor depends on the size and number of machines comprising the unit.

The vertical house machine is also in two parts—"former" and "closer"—and it follows the same principle, except that the rope is built up in a vertical line. The two sections are separately driven by 18-HP and 15-HP motors respectively, but in this case the machine is of the largest type and is capable of manufacturing ropes of up to 12 inches in circumference.

We are indebted to Hawkins & Tipson, Ltd., for permission to visit the factory and publish this description, and to Mr. A. Wills, works manager, and Mr. H. F. K. Dearlove, consulting electrical engineer to the company, for their help in collecting the above information.

Scientific Films

THE Scientific Films Committee of the Association of Scientific Workers has revised its catalogue of scientific films, a grading system showing the suitability of each film for various types of audience. The catalogue can be purchased at 2s. 6d. per copy from the head office of the Association at Hanover House, 73, High Holborn, London, W.C.1.

Views on the News

Reflections on Current Topics

IN order that a jury may not be unduly influenced in arriving at its verdict by considerations outside the evidence actually presented in court, publication of anything that might defeat this intention is prohibited during the court proceedings. Within that period the matter is *sub judice*. The term is nowadays too often misapplied to give a sacrosanct status to any subject that has been referred to a committee and it has become a means of applying a kind of censorship. The implications of this are especially pernicious when the effectiveness of the committee's work may depend upon its members being kept conversant with the most recent information or views from all quarters. Moreover, the investigations of the committee may be protracted or its report may not be generally circulated.

* * *

Those who know the west of Ireland will be surprised at the warnings that are given by the Irish Electricity Supply Board from time to time that drought conditions have upset production at the Shannon hydro-electric station. Yet another announcement of this kind was made recently and consumers were asked to cut their electricity consumption to the essential minimum. Normally the loss of energy from the Shannon could be counterbalanced by generating more at the Dublin steam station, but to-day Eire is as short of coal as she is of water. It seems to me that water-power schemes unsupported by sufficient stand-by steam plant are not the soundest basis for the ambitious electrical development which the Irish Government contemplates.

* * *

I wonder how many people outside America know how bitter is the opposition in some quarters in that country to the system of development exemplified by the Tennessee Valley Authority? I recently came across this sweeping indictment of the T.V.A. by A. J. May, chairman of the Military Affairs Committee of the House of Representatives. As a flood control project it has created a flood menace; as a soil conservation project it has done more harm than it can ever do good; it is really an anti-social institution, its evil effects far outweighing any social progress and reform it professes to have promoted; as a power project it is doomed to be a red-ink bureau forever run at a chronic deficit in spite of alleged paper profits. On the last point he says of the Authority: "After their phony bookkeeping has charged off enormous sums to phony flood control and still phonier navigation benefits, their own figures show an investment cost of $193 per kW of capacity. That's about 114 per cent. more than the cost for steam." Finally, he asserts that this type of organisation "can prove to be a cancerous growth which in the end could destroy the system of government as we now know it." Is there anything left to be said?

* * *

One of the things the war has achieved is a radical change in the attitude of the agricultural community to electricity. Before the war the unenlightened farmer's almost invariable response to overtures to encourage him to use electrical methods was that "he couldn't afford them." Now, with the shortage of labour, coupled with the fact that the price of electricity has risen only very slightly if at all compared with other commodities, he appears to have completely reversed his opinions and come to the conclusion that he cannot afford *not* to have the help of electricity. He realises that for a fraction of the wages of a single farm-worker he can have all the amenities that electricity can bring. Considerations of cost, moreover, seem to enter into his calculations only to a limited extent and so anxious is he to obtain supplies, that he has been known to offer to pay the whole cost of the necessary mains extensions, transformer, etc.

* * *

There is something Solomon-like in the judgment of Mr. F. E. Lawton, of Birmingham, in the case recently referred to him by the Northern Ireland disputants. The Ministry of Commerce wished to extend the Ballylumford station but the Belfast Corporation wanted the new plant added to its Harbour plant. Mr. Lawton considers that each of the stations should be extended by a 30,000-kW set. Apparently the decision has been accepted by the Minister of Commerce, but the Corporation doubts whether so much new plant is necessary—a rather pessimistic view these days.

* * *

It seems that the drawing office of the Swinton Electricity Department is not to be left in charge of the 15-year-old boy after all. It is now reported by the *Manchester Evening News* that the place of the senior draughtsman who is leaving will be taken by "a veteran who has come out of retirement until permanent staff can be found." But if the boy—Ian Johnson—has been deprived of a great opportunity he has at least achieved brief fame and I wish him well.

—REFLECTOR

High-Frequency Heating

Comprehensive Exhibition of Equipment

WHAT is probably the first array of equipment manufactured specifically for industrial processing by high-frequency AC heating is on view at an exhibition (admission by ticket only) in the Dorland Hall, London, organised by Rediffusion, Ltd., and associated concerns.

The exhibits reveal an appreciable degree of standardisation in the design of dielectric heaters on a production basis, which has not yet been attempted in respect of inductors because of their wider range of possible application. "Redifon" equipment, silent in operation, is neat and compact. A metal cabinet normally encloses the power generating outfit with pilot lamps, push switches and regulating knob on the front door. The heating electrodes usually protrude through the top, being enclosed in a hinged perforated metal safety cage with, when needed, a small motor-driven ventilating fan at the back.

Ratings range from ¼ kW upward. Model "RH.21," delivering 250 W at 30 Mc/s, will deal with up to 12 oz. of moulding powder at an average rate of 2 oz. per minute. The heating chamber will take "dielectric loads" up to 6 in. sq. and of ½ to 3 in. in height without adjustment, accommodating itself automatically. The "load" is merely placed on the lower electrode and the cage pulled down, thereby switching on the power and a pilot lamp. Pressure of the "off" switch causes the self-lifting cage to open and the upper electrode to swing clear. This equipment weighs 130 lb., is 12 in. wide, 19 in. deep and 37 in. high when the cage is open.

The largest model made at present is "RH.4," weighing 3 tons. Its output is 25 kW at 1·7 to 3·4 or 5 to 9 Mc/s and it is assembled in three parts: the oscillator with two water-cooled valves, a radiator with circulating pump and water reservoir, and a six-phase mercury pool rectifier delivering up to 40 kW at 10,000 V. This outfit is adaptable to inductive or dielectric processing, the exhibit demonstrating the bulk drying of textiles (baled wool) and refractories (bricks), which are placed in a screened container (fig. 1, right) between perforated electrodes through which air is blown to remove the expelled moisture. This is a necessary precaution to avoid condensation on the outer surfaces of the substance being heated which, in contrast to kiln and hot air dryers, tend to be cooler than the centre of the mass.

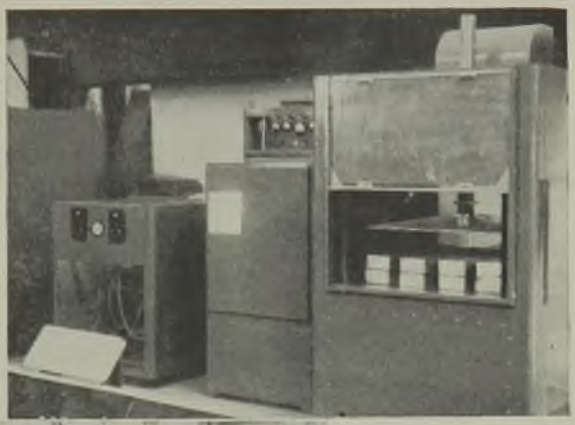


Fig. 1. — (above) Bulk dryer (25 kW) for baled wool, or refractory bricks, fitted with air-cooled electrodes
Fig. 2.—(left) Continuous conveyor dryer (2 kW) for thick fabrics or paper, with subsidiary air heaters

It is, in fact, sometimes advisable to provide warm air (resistance heated) for this purpose, such as is blown by two small fans through the conveyor duct of a continuous dryer of 2 kW (fig. 2) for thick fabrics and paper, which is carried between two perforated fabric belts passing over rollers. Along the belt are upper and lower sets of transverse electrodes, copper

strips or tubes, staggered so that the h.f. field between them is directed along the belt line.

Apart from illuminated diagrams and circuit drawings illustrating the principles involved, many of the exhibits are themselves working demonstrations. Thus in the plastics moulding

Fig. 3.—Miniature motors (DC complete) and AC component parts (200-1,000 cycles) beside matchbox for comparison

section there is a fully automatic outfit coupled with a self-resetting timing device. Another utilises a multiple impression tray for pre-heating several pounds of moulding powder per minute. There is much scope, too, in latex heating, rubber curing and glueing.

" Welding " Machines

For the " welding " of such plastics as the polyvinyl chloride group (PVC) for packaging and making clothing and footwear, the h.f. energy can be applied through water-cooled electrodes to melt the contact line while the outer surfaces of the seam joint remain quite cold. Two machines of this kind are exhibited in collaboration with the Diaplastics concern. One is for seaming two sheets together by passing them between a pair of small metal rollers mounted in similar fashion to an ordinary sewing machine. The other is a " welder " for producing tobacco pouches in two seconds with the aid of a shaped jig actuated by compressed air and a self-timer cut-out.

Pharmaceutical tablets and powders are dehydrated in bottles connected to a vacuum pump, which draws off the extracted moisture and reduces the pressure to enable the water to vaporise at a lower temperature. Vacuum reduction is utilised in a somewhat similar manner for continuous concentration of chemical solutions, the low-temperature boiling flask containing a special device for ensuring constant circulation of the liquid to prevent the formation of air bubbles, thus avoiding geissler discharge and consequent oxidation of the solution.

Metallurgical treatment by eddy current and induction differs radically in both form and time from the dielectric heating of non-conductors. Exhibits in this section are necessarily of limited scope, but demonstrate the melting of small billets in a crucible and the profile hardening of the teeth of a gear wheel placed within a water-cooled heating coil inside a screening cage incorporating a quenching bath.

True " skin " hardening occurs in from one or two tenths to two seconds of time and needs power inputs of the order of 20 kW per sq. in. of area treated. A larger design of h.f. generator is in preparation for delivering over 150 kW continuously, or up to 250 kW for a few seconds intermittently. In addition to automatic operational control, regulation of output by electronic means may be employed to compensate for load variation.

Subsidiary exhibits include radio-telephone, relay broadcasting, sound amplifiers and reproducers, while products displayed by Small Electric Motors, Ltd., comprise fans and blowers for special purposes, small motor-generators, generators (including hand and pedal driven types) and a variety of unusually small motors (fig. 3). Among the last mentioned are a permanent magnet type and a miniature machine incorporating gearing and a magnet brake. There is also an abrasive saw for such difficult materials as brass, aluminium, " Mycalex ", and " Paxolin " and similar laminated boards.

Standard Plugs and Sockets

AT the Electrical Development Association's September meeting held in Manchester on September 19th, the opportunity was taken for the joint discussion by the Council and the North-Western Committee of E.D.A. of various matters of interest and, in particular, the question of standard domestic plugs and sockets.

The opinion was unanimously expressed that the latest B.S.I. proposal to up-grade plugs to deal with 13 A and thus be suitable for 3 kW at normal voltage was ill-judged and would inevitably result in wiring failures in old installations. Moreover the new proposal was contrary to the unanimous opinion expressed in the findings of the Study Group. The E.D.A. Council has appointed a small committee to interview the appropriate B.S.I. committee and press for a new 13-A plug not interchangeable with the old and to be capable of carrying a fuse.

I.E.E. Students' Journal

THE I.E.E. Students' Quarterly Journal, which appears in September, December, March and June of each year, is issued free of charge to students, and also to graduates until their membership of the Students' Section ends, but other members, of any class, may obtain it on payment of an annual subscription of 6s., which should be sent to the secretary of the Institution. The charge to non-members is 10s. per annum.

CORRESPONDENCE

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

Plugs and Sockets

A STATEMENT has been issued to the Press by the B.S.I. dealing with plugs and sockets for post-war housing. This statement claims to be the final settlement of the question, whereas in fact all that has happened is that the B.S.I. has not acceded to the request of the I.E.E. to standardise an entirely new plug and socket with a fuse in the plug and not interchangeable with any existing standard.

The request of the I.E.E. followed the report of a special committee convened by the Institution at the instance of the Ministry of Works, which was fully representative of every section of the industry, including consumers. This committee sat for approximately two years to consider the electrical installations in new houses from every angle, and the question of plugs and sockets was recognised as one of the most important matters for its consideration. Finally a unanimous conclusion was reached, which appears in the appendix at the end of No. 11 Post-War Building Study issued by the Ministry of Works. After further discussion by other committees the I.E.E. put forward the above-mentioned request to the B.S.I. in April of this year.

This request was considered and agreed to by the B.S.I. which set in motion the procedure for producing the required specification. A section of the manufacturing side of the industry had in the meantime developed strong antagonism to any new standard plug and socket and asked the B.S.I. for the matter to be reconsidered; in July of this year the B.S.I. passed a rescinding resolution to the effect that no new standard should be prepared and that the existing 5-A plug and socket to B.S.S. 546 should be rated at 13 A and that a fuse should be provided in the socket instead of in the plug.

The decision of the B.S.I. not to proceed with the new specification cannot be regarded as finally disposing of the situation; it means only that there will be no B.S. Specification to cover the new plug and socket, the need for which has been expressed by an overwhelming majority of installation and supply interests.

The B.S.I. cannot be accepted as the arbiter on a matter of principle affecting any section of the industry, as its primary function is to produce specifications to meet the needs of the industry as ascertained and required by responsible and representative committees of all appropriate sections.

London, W.C 2. L. C. PENWILL,
Director and Secretary,
Electrical Contractors' Association.

THERE can be no doubt whatever that an overwhelming majority of both electricity supply undertakings and electrical contractors will be entirely in agreement with the views expressed by Mr. Forbes Jackson in your issue of September 21st. The position has been so clearly expressed by him that I do not wish to add anything on the technical side but desire to take the opportunity of quoting paragraph 16 of the "Aims and Objects" of the British Standards Institution, as set out on page 18 of its own Handbook of July, 1941:—

> "The underlying principles covering the preparation of the British Standard Specifications are that: They shall be in accordance with the needs of industry and fulfil a generally recognised want; the community interest of producer and consumer shall be maintained throughout the work; periodical review and revision shall be undertaken to prevent crystallisation and keep the work abreast of progress; there shall be no coercion whatever by one section of the community over another section, the standardisation being arrived at by general consent."

I would also quote from "Standards Review," Vol. 1, Part 1 of May, 1944, page 6:

> "Standardisation does not imply an arbitrary control, instituted by some mysterious governing body to frustrate the growth of new ideas in industry. It is very important that any such misconception should be cleared from the public mind. Industrial standardisation, to be really effective, must rest on general consent. . . . Once these fundamental facts are clearly understood, public prejudice is likely to die. Standardisation will be seen in its proper perspective as working for the benefit of all. . . ."

On this occasion, the decision of the British Standards Institution in regard to plugs and sockets recently announced is directly contrary to the considered views of some 90 per cent. of the electricity supply authorities and of the Electrical Contractors' Association. These bodies are undoubtedly

in by far the best position to know what are the needs of the industry and what will fulfil the generally recognised want.

Manchester. R. A. S. THWAITES,
Chief Engineer and Manager.

Re-Employment of Civilians

WITH reference to the letter from "J.E.D. (Works Electrician)" published in your issue of September 7th, as one who *does* wear a Service uniform I, too, would welcome some immediate "consideration" and the opportunity to participate in the great change-over from war to peace production.

Along with many others who finished their apprenticeships in 1939 I, after over six years of service, can "look forward" to a further six months in the Army without the reassurance, that "J.E.D." probably has, that I have been employed in my profession and am therefore abreast of modern practice.

Tentative inquiries during my last leave revealed that Service experience immediately following an apprenticeship does not enjoy the confidence of employers in industry. It appears to me that after my release I shall have the choice of either spending another year in training, or accepting the position of an "improver." My financial responsibilities, however, are those of a married man with a family.

With general demobilisation and the release of civilians from wartime control there is no doubt that those with up-to-date experience will take precedence over the ex-Serviceman out of touch with modern practices and developments. On the face of it, "J.E.D." seems to have little to grumble about.

B.A.O.R. J.W.B.

Chief Engineers' Salaries

YOUR correspondent "Master Mariner" is right when he states that a protest is overdue against the publicity given to the remuneration of chief engineers. Many members of the E.P.E.A. have long felt that too much interest has been devoted to boosting the chiefs' scale, and not sufficient to improving and revising the N.J.B. scale under which so many of these members are paid.

It is time that the salaries as set out on the latter scale were the *minimum* payable, but how many undertakings are prepared to pay more? Is the Association ashamed of the Grade 1 salary scales, as these are not openly published? On the other hand is it a fact that many deputy chiefs are receiving considerably more than the Grade 1 scale, thus stressing the urgent need for stepping up all the gradings to lessen that enormous gap which now exists between the N.J.B. scale and the chiefs' scale?

While on the subject of salaries: when is the E.P.E.A. going to set its own house in order? It is not surprising that difficulties have been encountered in filling recent staff vacancies at the niggardly salaries offered. Poverty cannot be pleaded, as the treasurer announced triumphantly in a recent number of the *Electrical Power Engineer* that the Association's assets had now reached the magnificent total of £100,500.

What is the good of this money if it is not employed in the right direction, and surely to obtain the best men as permanent officials and to encourage old servants the Association should reconsider its present policy. LIVER BIRD.

Low-Voltage Portable Appliances

IN practically every issue of the *Electrical Review* there is reported one or more fatalities due to some fault with portable electrical apparatus. These fatalities occur not only in industry but in the home. There are many cases of electric shock which are not reported.

I would repeat again that the time is long overdue when all portable apparatus should be low-voltage, not only in the industry but also in the home. In many cases there is justification for the installation of a step-down transformer in homes, where use can be made of low voltage for portable apparatus, particularly for those people interested in such applications as soil heating.

In my opinion the introduction of low-voltage portable apparatus requires immediate attention and a memorandum from the Factory Inspectorate.

Sheffield. R. BENNETT.

Toronto Hydro-Electric System.—The 1944 report of the Toronto Hydro-Electric System states that during the year a temporary reduction of 40 per cent. in electricity charges was made in one accounting period, and this was followed early in the present year by a permanent reduction in tariffs. The Commissioners have prepared a tentative programme of extensions involving an expenditure of approximately $2,000,000 a year for three years. Total sales last year were 1,371·6 million kWh as compared with 1,311·9 million kWh in 1943. Revenue amounted to $13,599,961, and there was a net surplus on the year's operations of $1,135,692 which has been transferred to reserve.

PERSONAL and SOCIAL

News of Men and Women of the Industry

MAIDENHEAD Corporation is advertising in this issue for a borough electrical engineer (£932 plus bonus) to succeed **Mr. C. A. Britton** who, it is reported, has accepted a position with the Sudan Light & Power Co., Ltd.

Group Captain C. E. Verity, O.B.E., who was seconded in 1941 from the London Power Co., Ltd., for special service with the Royal Air Force, has been awarded the high American honour of Legion of Merit. It is anticipated that Group Captain Verity will shortly return to this country and rejoin the staff of the London Power Co.

Mr. T. Arthur Pond has been elected a director of the County of London Electric Supply Co., Ltd. He has been with the County group for over forty years and has recently acted as manager while Sir John Dalton was serving as Regional Fuel and Power Controller.

Mr. Arthur M. Parkinson, B.Sc. (Eng.), M.I.Mech.E., M.I.E.E., of Woodford Green, has been appointed principal of the Newton Heath Technical School, Manchester.

Mr. A. Southworth has been appointed chief engineer of the Engineering Department of the General Electric Co., Ltd., Witton, in succession to the late Dr. M. L. Kahn. Mr. Southworth was educated at Liverpool University where he took the degree of B.Eng. He served his apprenticeship with Dick, Kerr & Co., and after four years in the army, from 1914 to 1918, he returned to that company as a designer, specialising in traction. He joined the General Electric Co. in 1936 as chief of the Traction Motor Design Department. During the war he has been engaged exclusively on secret development work in connection with large searchlights, radar and fire-control problems.

Mr. A. Southworth

Mr. A. Sowerbutts, B.Sc., A.M.I.E.E., has been appointed technical assistant and assistant mains engineer with the Dover Corporation Electricity Department. He was formerly assistant mains engineer at Worcester.

Following the appointment of **Mr. W. H. Higginbotham** to the chairmanship of Edgar Allen & Co., Ltd., **Mr. H. L. Wyneken** has become secretary and chief accountant.

Mr. B. C. Robinson, Associate I.E.E., formerly of Rotol, Ltd., Gloucester, and the West Gloucestershire Power Co., Ltd., has been appointed electrical engineer to British Nylon Spinners, Ltd., and will reside at Pontypool where the company's new factory is being erected.

Mr. T. Duerden, chief technical assistant in the Blackburn Electricity Department, has been appointed deputy city electrical engineer at York. Mr. Duerden, who was born at Nelson, Lancashire, forty-two years ago, was educated at the Municipal Secondary School there and at the Manchester College of Technology, gaining the degree of Bachelor of Technical Science, with honours. He was trained with Crompton Parkinson, Ltd., and after acting as a sales engineer with that company from 1924 to 1928 became mains engineer in the Nelson Electricity Department. He went to Blackburn as mains engineer in 1932 and was subsequently substation engineer, mains technical assistant and chief technical assistant. While at Blackburn he was responsible for the planning and construction of the 33-kV transmission scheme and the electrical side of the Blackburn (East) extensions. He is an associate member of the I.E.E.

Mr. T. Duerden

Mr. R. G. Brandon has been appointed a director of the Hotpoint Electric Appliance Co., Ltd. Mr. Brandon's first engagement with the A.E.I. group was in 1924, when he joined the Lamp Sales Department of the British Thomson - Houston Co. In 1929 he became superintendent of lamp sales, London Area, and in 1932 manager, lamp and lighting sales, Southern Area. He was recently appointed manager, lamp and lighting sales for the whole country. After service in the last war, and before joining the B.T.H. Co. Mr. Brandon had a varied experience in the rubber, newspaper and electrical industries.

Mr. R. G. Brandon

Mr. G. McDonald, chief assistant (distribution) with the Preston Corporation Electricity Department, retired on August 28th after twenty-five years' service. On the recommendation of the

borough electrical engineer (Mr. G. A. Robertson, M.Sc.Tech.) the Town Council has approved the following promotions which take effect as from September 1st:—Mr. J. D. Watson from mains superintendent to distribution engineer; Mr. A. Brown from senior mains assistant to substations engineer; Mr. E. W. Hewlett from mains assistant to mains engineer and Mr. J. Eatock from technical assistant to chief technical assistant. Messrs. W. J. Phillips, D. Birkett and C. C. Bacon become assistant mains engineer, assistant substations engineer and senior assistant, technical department, respectively.

Mr. Geoffrey Kennedy, who, as reported on another page, is representing his firm, Kennedy & Donkin, in the execution of the Assuan hydro-electric scheme, is a grandson of the late Sir Alexander Kennedy and son of Sir John Kennedy, deputy-chairman of the Electricity Commission.

Sir Andrew Duncan, who was chairman of the Central Electricity Board for eight years and is still a member, has accepted the position of independent chairman of the executive committee of the British Iron & Steel Federation.

On September 14th the staff and employees of the Rawtenstall electricity undertaking bade farewell to **Mr. J. H. Cooper,** mechanical and maintenance engineer, who is retiring on superannuation after twenty - four years' service with the Corporation. Before going to Rawtenstall Mr. Cooper was with the Yorkshire Electric Power Co., and he also had wide experience of colliery engineering. A cheque was presented to Mr. Cooper by the station superintendent, Mr. M. Trickett, who spoke of the good work he had done at Rawtenstall. Mr. and Mrs. Cooper are taking up residence at Rustington-on-Sea, Sussex.

Mr. J. H. Cooper

Mr. R. S. Atkinson, A.M.I.E.E., A.M.I.Mech.E., power station superintendent at Lincoln, has been appointed to a similar position at the Prince of Wales station, Rotherham. He succeeds **Mr. J. R. Hawes,** who is retiring.

Mr. Brian Buchel has been appointed sales manager of Scottish Plastics, Ltd., and will shortly be taking up his duties in Glasgow.

Mr. Ronald F. Burston, A.M.I.E.E., assistant mains superintendent with the Greenock Corporation Electricity Department, has been promoted to the position of mains superintendent. Previously Mr. Burston served with Wolverhampton Electricity Department as mains assistant and was later in charge of the traction feeder system. In 1935 he was appointed district mains engineer with the North Wales Power Co., Ltd., at its Pwllheli office, going to Greenock at the outbreak of war.

Obituary

Mr. J. Y. Fletcher.—We regret to report the death of Mr. James Young Fletcher, a director of the General Electric Co., Ltd., which occurred at a London nursing home on September 21st; he was in his seventieth year.

The late Mr. J. Y. Fletcher

Mr. Fletcher joined the electric lighting supplies department of the G.E.C. in 1892 and after five years opened the first Irish branch of the company in Dublin. He opened another branch in Belfast a few years later and continued as manager for Ireland until 1906. He then returned to London to take charge of the lighting supplies and switchgear departments. With the invention of the "Osram" lamp he became manager of the Osram Lamp Department and from then on was a leader in the development of electric lighting in all its phases and his work in this direction made him well known to the whole electrical industry.

He joined the G.E.C. board in 1915 and had thus been a director for more than half of his fifty-three years with the company. He was closely associated with the late Lord Hirst in the foundation of the E.L.M.A. and always took a prominent part in its affairs. He served several terms of office as chairman and played an important part in the international trade arrangements conducted by the association. For many years he was hon. treasurer of the E.I.B.A. and he leaves as a memorial of his work for the Association the plastic "penny collection" plates which he had made at his own expense for use at electrical functions. In this and in many other ways Mr. Fletcher showed himself to possess great warmth of heart and feeling for his fellow men and always ready to help those in difficulties.

Mr. C. G. Tegetmeier.—The death occurred at Coulsdon, Surrey, on September 18th of Mr. Charles George Tegetmeier at the age of ninety-two. He was a director of the Northmet Power Co. and was for a time chairman of the former South Metropolitan Electric Tramways & Power Co. Earlier he had been closely identified with the establishment of the Auckland tramways in New Zealand. In 1941 Mr. and Mrs. Tegetmeier celebrated their diamond wedding.

Will.—Mr. W. A. Pearman, general manager and secretary of the London Power Co., Ltd., who died on May 30th last, left £26,060 (net personalty £18,571).

New Croydon Station

Mr. Shinwell at Inauguration Ceremony

BY the cutting of the first sod last Saturday on a site adjacent to that of the existing Croydon power station, the Minister of Fuel and Power (Mr. Emanuel Shinwell) took the first step towards implementing arrangements made to provide a further 300,000 kW for the S.E. England area, one-third of which is intended to be in operation in 1948. Half the ultimate capacity (costing £5 million) will be reached in the following year and will comprise three Metropolitan-Vick 3,000-RPM turbines driving 50,000-kW 11-kV alternators and 2,500-kW 3·3-kV house alternators. Each turbine is to be served by two 300,000 lb. per hr. Simon-Carves pulverised-fuel boilers (set at right angles to its axis) with steam conditions of 650 lb. per sq. in. and 850 deg. F. Three ferro-concrete towers, 260 ft. high, having individual throughputs of 2·5 million gal. per hr. will deal with the cooling water for the condensers, make-up being provided by sewage effluent. DC motors will be used for boiler-house auxiliaries with Ward-Leonard centralised control. All plant will be above ground level. Mr. F. N. Rendell-Baker, the borough electrical engineer, is responsible for the design and construction of the station.

At the ceremony, after brief introductory speeches by the Mayor (Councillor G. Lewin) and the chairman of the electricity committee (Alderman E. E. L. Arkell), the main features of the scheme were described by Alderman A. L. Boddington, chairman of the responsible sub-committee. Provision, he said, would have to be made for storing coal received at the rate of 3,000 tons a day on the railway sidings. Incombustible ash to-day amounted to 20 to 24 per cent. of the whole, compared with 12 per cent. before the war. Owing to increased cost of coal without reference to calorific value and its poor quality, it now cost the Croydon undertaking £156,000 a year more for an equivalent output. Constructional features of the station had been designed by Mr. R. Atkinson to avoid complaints about grit or moisture emissions or general appearance.

Reorganisation Must Not Impede Progress

The Minister of Fuel and Power referred to the set-back to electrical progress in this country caused by the war. Reorganisation, he said, would be necessary, but it must not impede development and must be related to other power-production industries. It was hoped to provide for the supply of coal with less ash. Managements and men at the collieries were now co-operating to secure the desired results.

Cheap power was essential to industry in order to maintain the standard of living. Through switching off public lighting at midnight, he expected a saving of 400,000 tons of coal per annum out of the 900,000 tons used for this purpose. Speculations regarding atomic energy should not hold up normal electrical development.

Mr. Harold Hobson (chairman, C.E.B.) instanced the grid as an outstanding example of national planning. It was a co-operative enterprise of municipal and company undertakings (the owners of the stations) with the Board responsible for the planning of general developments in generation.

The new station at Croydon was part of a scheme amounting to thirty times the 150,000 kW now to be installed there and involving a capital expenditure of some £150 million. Nowadays it was appreciated that a power station could, with the aid of competent architects, be made a thing of beauty harmonising with its surroundings.

Lt.-Col. D. R. Rees-Williams, M.P. for Croydon South, cited as an example of the best method of securing administrative efficiency the case of the chairmanship of the Central Electricity Board, Mr. Harold Hobson having risen from a junior position to the top of his industry and profession.

Fatalities

Substation Accident.—An accident at a railway substation at Lewisham resulted in the death of Victor Liony (19). At the inquest it was stated that he and another assistant were asked to do some cleaning of the high-voltage gear and they obtained the necessary keys, nine in all. Twice during the work the substation operator, Mr. P. E. Ford, was called away to answer the telephone. The accident occurred when Liony went to clean a crossover. The coroner said that the case showed how important it was that the regulations affecting this work should be carried out strictly. The two assistants were sent for the keys and brought back a wrong one. The operator was preoccupied with other work and failed to notice that they were working on a crossover which had not been isolated.

Discontinuous Conduit System.—A verdict of "Death by Misadventure" was returned at an inquest held on Thursday last week on Mrs. Clements, wife of the proprietor of a garment pressing and repairing business in Kensington. Evidence was given by Mr. Harold Bright, A.M.I.E.E., that a metal framework used for supporting clothes was in contact with a conduit which had become live due to a fault in the electrical installation. There was no main earth connection and the conduit system was discontinuous. Deceased must have touched a steam-heated garment press and the metal framework at the same time. An overflowing water tank was a contributory cause of the accident.

I.E.E. Chairmen—II

Biographies of Centre Officers

THIS year's chairman of the North Midland Centre is **Mr. Alexander Kelso,** borough electrical engineer and manager at Harrogate. Mr. Kelso, who was born at Cowdenbeath in 1898, was educated at the Foulford School, Bèath High School, Fife Mining School and the Heriot-Watt College, Edinburgh. He received his practical training with the Lochgelly Iron & Coal Co., Ltd., and in the 1914-18 war he served as pilot in the R.F.C. and R.A.F. In 1920 he joined the Fife Electric Power Co. as rotary convertor sub-station engineer and, going to Dunfermline in 1923 as technical assistant, became installation engineer and consumers' and sales engineer. Mr. Kelso was appointed chief technical assistant at Harrogate in 1934, being promoted to deputy borough electrical engineer in 1937, and chief engineer in 1939. He is a member of the I.M.E.A. Council and the C.E.B. District Technical Consultative Committee, deputy chairman of the E.D.A. Area Executive Committee, past-chairman of the Illuminating Engineering Society, Leeds Centre, and a member of the Institute of Fuel.

Mr. A. Kelso

Mr. E. H. Miller, chairman of the Hampshire Sub-Centre for the ensuing session, is a past chairman (1942-43) of the Measurements Section of the Institution, or Meter and Instrument Section as it was then called, and has served two terms on the Section Committee. He was born at Charlton, Kent, in 1883 and was educated at St. James' School, Enfield Highway, receiving his technical training with the Edison Swan Electric Co., Ltd., at Ponders End. He also attended the Polytechnic. Regent Street, Finsbury Technical College and Karlsruhe Technical School. From 1902 to 1905 he was successively in the switchgear drawing offices of the Ediswan Co., the Electric & Ordnance Accessories Co., and Johnson & Phillips, Ltd., and for a year was in the Estimating Department of Elliott Bros., Lewisham. In 1906 he rejoined Johnson & Phillips, first as assistant, and later as manager, in the Switchgear Department, and three years later he was appointed chief estimating engineer with Ferranti, Ltd. In 1912 he became assistant in the Meter and Instrument Department of the British Westinghouse Co., and was subsequently appointed manager of that department. He rejoined the Ediswan Co., in 1919 as manager of the Meter and Instrument Department and in 1925 again went to Ferranti, Ltd., carrying out special missions for Dr. Ferranti. From 1929 to date he has been with Sangamo Weston, Ltd., serving in various capacities.

Mr. E. H. Miller

Mr. Miller is a member of the American Institute of Electrical Engineers. He has travelled extensively on various technical missions for the companies with which he has been associated, to the United States and most European countries.

Mr. J. B. J. Higham, senior lecturer in electrical engineering in the Engineering Department of the School of Mines and Technology, Treforest, Glam., is the chairman of the Western Centre. A native of East Claydon, Bucks, Mr. Higham attended the Wolverhampton Higher Grade School and the Wigan and District Mining and Technical College.

Mr. J. B. J. Higham

After practical training with Walker Bros., Wigan, he served a college apprentice course with the former British Westinghouse Co. and studied AC and DC machine design at the Manchester College of Technology. In 1913 he was put in charge of the H.V. Transformer Test Department of the British Westinghouse Co., afterwards becoming workshop instructor and laboratory demonstrator at the School of Mines, Treforest.

From 1914-18 Mr. Higham served in the Royal Naval Air Service and the R.A.F., returning in 1919 to Treforest as lecturer in mechanical and electrical engineering. Mr. Higham is an associate member of the Institution of Mechanical Engineers and a member of the Association of Mining Electrical and Mechanical Engineers; he was president of the South Wales Branch of the latter Association from 1932 to 1934.

New Zealand Trolley-bus Orders

Orders to the value of about £30,000 for trolley-buses for New Zealand have been received by Crossley Motors, Ltd. Wellington Corporation has ordered ten vehicles and New Plymouth four.

Three-Phase Commutator Motors—I

Construction of Moving-Brushgear Type

By K. C. Howison,
A.M.I.E.E.

WHERE a variable-speed drive is required the three-phase alternating-current commutator is in many ways superior to the slip-ring motor. Its characteristics may be summarised as follows:—

1. Wide range of speed variation, ratios of ten to one being easily obtained or, by special design, from zero to maximum speed.

2. Constant-torque characteristic which is satisfactory for most machine drives though sufficient horse-power must be available at low speeds if the torque then required is greater.

3. High efficiency and power factor throughout the speed range; speed is controlled by internal voltage variation and not, as in the slip-ring motor, by resistance voltage drop; consequently, there is no power loss proportional to the slip.

4. Unlike the slip-ring motor, it can be provided with shunt characteristics, so that the speed is almost unaffected by load variations.

Two types are available, *viz.*, the moving-brushgear (Schrage) motor and the induction-regulator type. The former has its primary winding (a normal star or delta winding in slots) mounted on the rotor and supplied by means of slip-rings. Also on the rotor and in the same slots is a DC regulating winding, which is connected to a commutator mounted at the opposite end to the slip-rings. The stator carries the secondary winding in three separate phases, each of which is terminated in brushes on the commutator. Each pair of brushes can be rotated so as to bring them nearer or further apart.

The theory of operation can be considered by reference to an ordinary slip-ring motor. At standstill a voltage at supply frequency and of a magnitude proportional to the ratio of primary to secondary turns can be measured at the slip-rings. At synchronous speed this e.m.f. is of zero frequency since the rotor is travelling in unison with the rotating field due to the stator. At 80 per cent. of synchronous speed the frequency and voltage

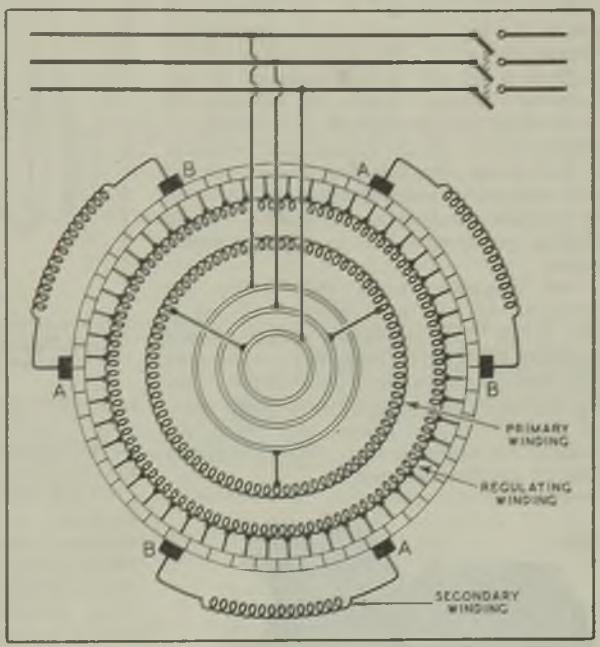


Fig. 1.—General arrangement of brushgear-controlled commutator motor

fall to 100–80 per cent. of that at standstill. For the rotor to run at speeds above or below synchronous speed it must be supplied at a voltage having values of frequency, phase and magnitude which coincide with those induced in it by the stator or primary winding.

This is precisely what occurs in the Schrage motor, with the following differences. First, in order to avoid the complication of rotating brushgear the primary is carried in the rotor and the secondary in the stator. Secondly, the voltage impressed on the secondary is supplied by a separate regulating winding

carried in the rotor slots and connected to the stator by means of the brushes A, B (Fig. 1).

With the rotor locked the rotor winding is fed at supply frequency and likewise the regulating winding. In Fig. 2 the rotor is shown rotating at a speed (1 — s) N where s is the percentage slip, and N the synchronous speed in RPM. Consequently the field rotates at a speed of sN with respect to the stator and in the reverse direction. The secondary induced voltage, therefore, has a frequency of s times the supply frequency.

The regulating winding being on the rotor has induced in it a voltage of a magnitude depending only on the number of turns between brushes A and B. Its induced frequency is f but the action of the commutator changes this to sf. Hence the voltage at the brushes is of the same frequency as the secondary voltage. Again, the windings are so arranged that the axis of the brushes corresponds to the axis of the secondary windings in each phase, thus fulfilling the requirement that the induced and impressed voltages shall be in phase. In practice the brushes may be slightly non-symmetrical to improve power factor.

The condition when the brushes are advanced to pass each other is shown in Fig. 2 (*b*). The regulating voltage is now reversed, while the rotating field is in the same direction as the rotor at a speed of sN. Thus the secondary runs above synchronous speed at (1 + s) N. It follows that when the brushes are opposite each other, the motor runs at synchronous speed.

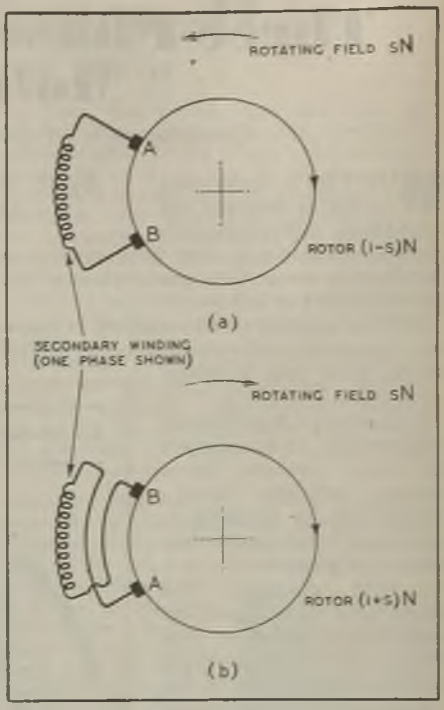
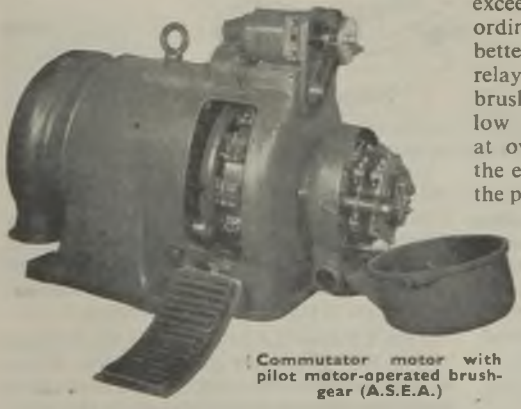


Fig. 2.—Conditions with rotor revolving, (a) at under and (b) at over, synchronous speed



Commutator motor with pilot motor-operated brush-gear (A.S.E.A.)

By virtue of its constant field and the approximately constant rotor current, the machine has a constant torque, since torque is roughly proportional to the product of current and flux. Consequently the horse-power output is proportional to the speed of the motor.

At low speeds the rated power must not be exceeded since ventilation is limited and ordinary overcurrent protection is useless; better protection can be provided by thermal relays within the motor. With symmetrical brush positions, Fig. 3, the power factor is low at sub-synchronous speeds but is good at over-synchronous speeds. Fig. 4 shows the effect of non-symmetrical brush position, the power factor being considerably improved at low speeds. Efficiencies are not greatly affected and the values shown are fairly typical as are the values of speed against torque.

A machine for reversible duty must be designed for symmetrical brush position and this should be stated when ordering. A standard reversing switch interchanging two phases can then be used. The non-symmetrical brush motor can be reversed, but a change in connections and brush arrangement is necessary.

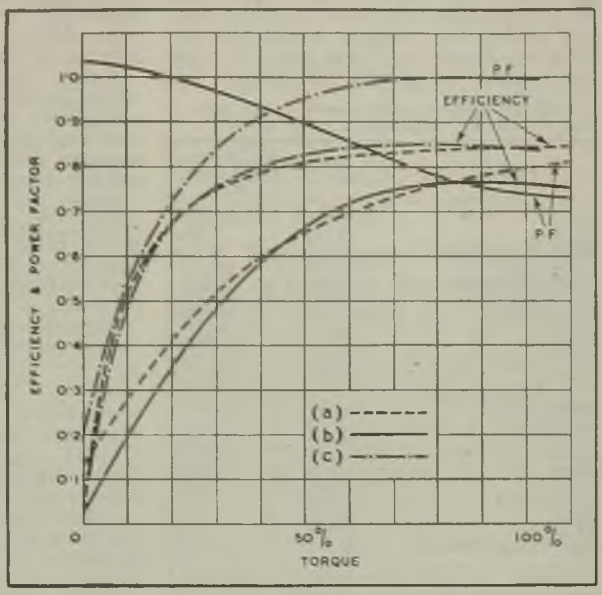
Schrage-type motors have a normal speed range of one to three, but can be specially designed for any greater range, which would necessitate an increased frame size and a larger commutator. The power range is from about 3 HP to 400 HP for all the usual enclosures.

Control of these motors may be effected in a number of ways according to the requirements. Some of the systems employed are very complex, but give valuable facilities. A few of them are summarised below :—

1. Speed control by hand-wheel mounted either on the motor or remotely. A normal contactor starter may be employed.

2. Speed control by pilot-motor-operated brushgear, with remote push-buttons to give any desired control such as: start, stop, inch, increase speed and decrease speed. A special control panel is necessary. A device can also be fitted to ensure that the motor runs up to a pre-determined speed. This device can be set and locked by the foreman to prevent its unauthorised use.

3. Motor-controlled brushgear but with two-speed pilot motor for dynamic braking.



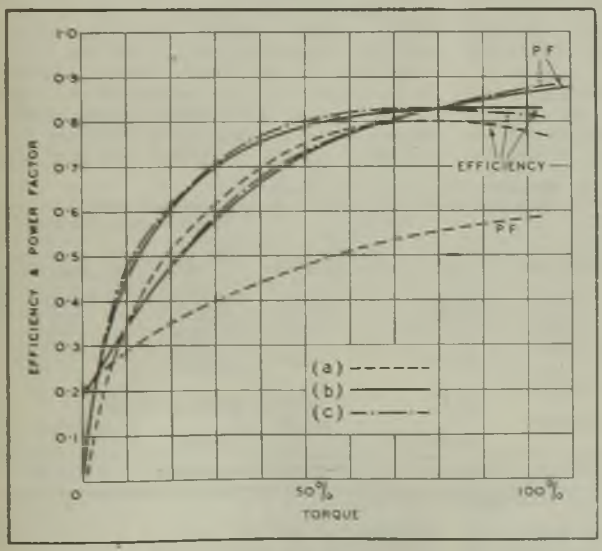


Fig. 3.—Power factor and efficiency curves for motor with symmetrical brush positions, (a) under synchronous, (b) synchronous, and (c) over synchronous position

Fig. 4—Power factor and efficiency curves for motor with unsymmetrical brush positions, (a) under synchronous, (b) synchronous, and (c) over synchronous position

4. Brushgear - controlled motors used for printing machinery frequently employ Selsyn equipment to synchronise several driving motors. Automatic registration can also be effected.

All the above systems are, of course, suitably interlocked to prevent incorrect operation which may endanger the motor or the machinery. With regard to the type of enclosure adopted, it is advisable to use either the pipe-vent or drip-proof machine where there is a dusty atmosphere, as a commutator motor is more susceptible to these conditions than a straight induction motor.

If the motor is liable to be heavily loaded at low speeds the use of forced ventilation is recommended.

Exports and Imports

Analysis of Figures for First Half of Year

A TABLE published in last week's issue gave details of the value of British electrical exports and imports during the first half of the current year. The Board of Trade returns from which this information was extracted also contain an analysis of the main groups showing the destinations of exports and countries of origin of imports.

Some of the fluctuations in export values have naturally been caused by the changing war situation during the period covered by the returns. Thus while the value of electrical goods and apparatus shipped to Russia fell from £1,298,787 to £634,935, there was an increase in exports to India from £720,683 to £1,062,654.

Table I shows the principal countries to which goods and apparatus have been sent. A further analysis is made in respect of electric wires and cables (other than telegraph and telephone) and telegraph and telephone apparatus (not radio), as follows, values for the first half of 1944 being given in parentheses:—

Rubber insulated wires and cables: South Africa, £51,047 (£9,499); British India, £273,173 (£132,790); Australia, £128,356 (£266,173); New Zealand, £35,887 (£25,302); other British countries, £46,463 (£37,536); foreign countries, £63,363 (£430,430).

Wires and cables insulation other than rubber: South Africa, £68,634 (£44,649); British India, £235,199 (£174,551); Australia, £101,329 (£206,246); other British countries, £117,579 (£202,744); foreign countries, £102,636 (£110,461).

Telegraph and telephone apparatus: South Africa, £183,444 (£84,325); British India, £91,198 (£51,193); Australia, £298,710 (£209,431); New Zealand, £35,235 (£78,697); other British countries, £99,468 (£72,269); Argentina, £2,045 (£3,586); Soviet Union, £314,311 (not separately classified); other foreign countries, £88,048 (£384,924, including Soviet Union).

Volume figures are given in a few instances. For example, electrical machinery exports in the first half of this year amounted to 27,828 tons as compared with 33,787 tons in the first half of 1944 and 22,323 tons in one half of 1938. Radio receiver exports have substantially declined, numbering 2,587, 4,449 and 42,320 respectively in the three periods. House-service meters also are well down this year compared with 1938 (21,312 against 82,668). Electric lamps exported up to June this year numbered roughly 8,300,000 compared with 7,000,000 in the first half of last year and 9,800,000 in one half of 1938.

In the case of imports there is a brief classification of the goods and apparatus section indicating that out of a total of £12,826,550 goods to the value of £9,453,075 came from the United States and £3,365,173 from Canada.

TABLE I.—EXPORTS OF ELECTRICAL GOODS AND APPARATUS.

Country	Jan.-June, 1945	Inc. or dec. on Jan.-June, 1944
Eire	£137,614	+ £62,328
Palestine	28,172	— 8,391
British West Africa	89,867	— 10,154
South Africa	941,464	+ 186,450
Southern Rhodesia	53,869	— 17,361
British East Africa	96,827	+ 29,266
British India	1,062,654	+ 341,971
Ceylon	62,303	— 26,336
Australia	1,231,197	— 438,917
New Zealand	541,434	— 629,338
Canada	144,890	— 136,185
Other British Countries	266,437	+ 97,619
Soviet Union	634,935	— 663,852
Netherlands	2,752	—
Portugal	40,401	— 173,760
Turkey	71,586	— 66,975
Egypt	123,356	+ 43,705
Iran	81,063	+ 2,903
United States	107,298	— 595
Brazil	46,220	+ 15,484
Argentina	21,964	— 1,328
Other Foreign Countries	284,838	+ 137,130
Total	£6,071,141	—£1,263,484

TABLE II.—EXPORTS OF ELECTRICAL MACHINERY.

Country	Generators		Motors		Other Electrical Machinery	
	Jan.-June, 1945	Inc. or dec. on Jan.-June, 1944	Jan.-June, 1945	Inc. or dec. on Jan.-June, 1944	Jan.-June, 1945	Inc. or dec. on Jan.-June, 1944
South Africa	£52,721	+ £23,845	£152,307	+ £66,154	£241,727	+ £71,281
British India	60,863	— 19,468	152,869	— 58,124	502,843	+ 63,150
Australia	216,437	+ 138,831	27,617	+ 6,217	131,632	+ 40,909
Canada	3,029	— 75,687	*	—	9,511	— 2,740
New Zealand	*	—	85,382	+ 27,456	185,045	+ 11,277
Other British Countries	41,014	— 124,729	66,863	+ 12,192	181,231	+ 38,343
Soviet Union	340,004	— 713,417	378,173	+ 99,400	3,118,491	— 339,002
Other Foreign Countries	34,853		41,694		88,580	
Total	£748,921	— £770,585	£904,905	+ £153,295	£4,459,060	— £116,782

*Not classified separately

COMMERCE and INDUSTRY

Man-Power Needs. Export Handicap Removed.

War Damage to Public Utilities

COMPENSATION to public utilities for damage sustained through enemy action has been discussed from time to time but the promised special legislation has not yet been produced. Now the Electricity Commissioners have informed authorised electricity undertakings that the Government is giving further consideration to the matter and it is contemplated that the principles by which the amount payable will be determined are those outlined in paragraphs 24 to 36 of the 1942 White Paper on the subject. (*Electrical Review*, November 20th, 1942, p. 657.)

Consequently the Commissioners ask undertakings to provide by October 15th information regarding the amount expended by them in repairing and reinstating damaged property; the estimated further amounts still to be incurred for the purpose; and the amount of "value" payments claimable, as distinct from "cost of works" payments.

Man-power for Electricity Supply

The latest returns of the Electricity Commissioners show that the electricity supply industry requires 970 workers in various categories for the operation, maintenance and overhaul of generating plant. Stressing the urgent need for additional man-power, the Ministry of Labour and National Service states that the main occupations in which vacancies exist are: Auxiliary plant attendants, stokers, turbine drivers, switchboard attendants, electrical and mechanical fitters and mates, boiler cleaners, electricians and wiremen, cable jointers, overhead linesmen, meter and instrument mechanics.

To secure this additional labour the following steps have been taken or are contemplated by the Ministry of Labour and National Service and the Ministry of Fuel and Power: (1) The electricity supply industry has been "designated" as regards labour and operation, maintenance and overhaul of generating plant: in consequence, vacancies in the industry are accorded first preference. (2) Small numbers of key workers have been returned to their work in electricity undertakings. (3) Special arrangements are being made for withdrawing redundant workers in munitions who have experience in electricity undertakings. (4) Class B releases from the forces are under consideration.

Scientific Civil Servants

A White Paper (Cmd. 6679, Stationery Office) published last week sets out Government proposals for the complete reorganisation of the scientific staffs of the Civil Service, involving a substantial improvement in salaries and conditions of service. It is proposed that the salary of the Permanent Secretary to the Department of Scientific and Industrial Research shall be raised from £3,000 to £3,500. A scientific officer class is envisaged; this will be recruited from highly qualified scientific graduates and salaries will be on a similar plane to those of the administrative class. At the higher levels the salaries in this class will range from £2,250 to £3,000.

The existing scientific assistant class will be replaced by an experimental officer class recruited partly from boys and girls of 18 to 19 and partly from university graduates and men and women with industrial and engineering experience. General supervision of the scientific service will be exercised by an inter-departmental scientific panel under the chairmanship of Sir Edward Appleton, secretary to the D.S.I.R., and a principal duty of this panel will be to foster contacts between the service and outside scientists and scientific developments.

Export Control Relaxed

Under the Export of Goods (Control) No. 7 Order, 1945 (S.R. & O. 1945 No. 1146) Stationery Office, 4d., which came into operation on September 24th, export licences will no longer be required for a very large number of items. The principal changes are as follows:—Electrical goods have been reduced to the following items, *viz.*, Lead-acid accumulators; boiling plates, heating plates, cookers and grill-boilers; enamel-insulated single-strand wire (not including wire having any further covering other than textile lappings) and multi-strand Litz wire. Machinery has been removed entirely except for contractors' plant, mobile cranes and certain other (non-electrical) plant, and ball bearings have been removed.

The list of metal manufactures has been greatly reduced and now only covers certain goods in short supply. Semi-manufactures of some non-ferrous metals including copper and zinc have been deleted. Instruments and apparatus, etc., are now free except surgical instruments and appliances and a few other items.

Overtaking Telephone Arrears

But for the war the London Telephone Region would have had a hundred new telephone exchanges, built as part of normal telephone expansion. Now, besides having to overtake arrears on the work of modernising equipment, the Post Office has to keep pace with the normal growth of the service. Before the war plans were prepared for many new exchanges in London, and throughout the country. In some cases the work had begun but nearly all of it came to a sudden stop on the outbreak of war, and not until now could steps be taken to put the original schemes into operation.

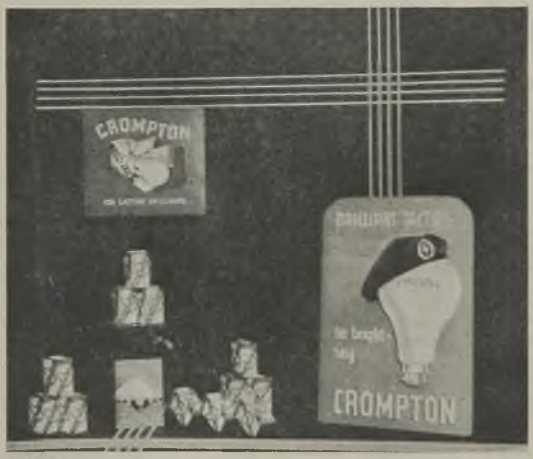
Exeter Agricultural Show

A one-day Agricultural Show and Gymkhana was held in Exeter on September 5th which was attended by more than 6,500 people. The Exeter Electricity Department and the Exe Valley Electricity Company were responsible for staging the electrical exhibit, which was housed in a 60 ft. by 40 ft. marquee. The display comprised a wide variety of farm and domestic equipment together with posters and photographic enlargements by E.D.A. All the apparatus was working, with the exception of some individual motors. A mains water supply

was brought into the marquee and water heaters, pumps, and steriliser were shown in operation under normal conditions. It is difficult to say what particular item attracted the most interest, but probably the honours in this respect were shared between the hammer mill (Essex) and the automatic pressure water system. Inquiries for supplies and for apparatus in areas covered both by the Exe Valley Company and Exeter Corporation were proportionately greater than those received in the pre-war three-day shows of a similar nature, which appears to indicate a growing interest in electrical farming and dairy equipment.

Crompton and Kye Lamps

Plans for Crompton lamp publicity for the 1945-46 season include advertisements in London daily and evening newspapers, many provincial newspapers, and also weekly and monthly periodicals. Kye lamps will be similarly featured. In addition, posters will appear in a number of the most important centres throughout the country, together with printed signs at



Crompton window display

railway stations and along arterial roads. The keynote of the Crompton campaign will again be various types of hats on lamp "heads," and the Kye lamp appeal will be once more one of economy. While display material is still restricted owing to the paper position, good window displays can be arranged as the accompanying photograph shows.

South Shields Appliance Factory

Production has started at the new factory erected for Wright & Weaire, Ltd., which is intended for the making of electrical appliances. The factory covers 50,000 sq. ft. and will eventually employ about 500 people, most of them women.

Aid for Science Students

Particulars were published last week of a scheme for assisting research workers and students by means of grants by the Department of Scientific and Industrial Research. The aim is to increase the numbers available for research in Government establishments and industry. Assistance will take the form of maintenance allowances together with the payment of fees for students who have no other adequate resources; grants will range from £180 to £260 a year. Two- or three-year research awards not exceeding £400 per annum, plus fees, may be made to senior research workers.

Register of Disabled Persons

Persons whose names are on the Register of Disabled Persons now being compiled by the Ministry of Labour and National Service will qualify for special schemes to assist their satisfactory resettlement. Employers with twenty or more workers will be obliged to employ a quota of disabled persons, and vacancies in certain "designated" classes of employment will be reserved for disabled persons. Facilities will also be provided to enable the seriously disabled who cannot work under ordinary conditions to obtain employment or to undertake work on their own account under special or sheltered conditions, together with training for that purpose. Application for registration is voluntary and is open to persons who are in employment as well as those seeking employment. The scheme does not apply only to persons who have been disabled due to the war but to anyone who on account of injury, disease or congenital deformity is substantially handicapped in obtaining or keeping employment.

Lightning Protection

A partly revised safety code of practice for protection against lightnng (handbook H.40) has been issued by the U.S. National Bureau of Standards, price 20 cents, Superintendent of Documents, Government Printing Office, Washington 25, D.C. It is a pocket size book of 99 pages, including a bibliography of 15 pages that has been revised and augmented. Parts I and II, concerned with the protection of persons, buildings and miscellaneous property, were revised in 1932 and slight revision of all three sections took place in 1937. The current revision affects Part III only, which is concerned with inflammable liquids and gases. When dealing with specifications for protective lightning rods, practical construction aspects have been taken into account as well as detailed requirements of good design. The standards advocated are largely American, but foreign practice has not been ignored. An appendix contains a general discussion of lightning, its origin, characteristics and the effects it produces.

Wesel-on-the-Rhine Repeater Station

A key-point in the Army's communication system in Germany is the Royal Signals repeater station at Wesel-on-the-Rhine. The town's telephone exchange and almost all of its equipment were found to have been damaged beyond repair, and it was necessary to install Army equipment and improvise the necessary frames in a roadhouse near Wesel. German under-

ground cables, with a ring system providing alternative routing by-passing Wesel, were found after some searching, and within about two weeks carrier telephone systems were in operation back to Venlo, 50 trunk circuits being established in all. Steelwork for frames and racks was obtained from damaged factories in Wesel, and a certain amount of German equipment from the damaged German repeater station was adapted. Power was provided by three 15-kVA Lister Diesel generators lined up outside the building under a temporary tarpaulin cover until a power house could be built round them.

Napier and English Electric Factory

The 1,110,000 sq. ft. of factory space at Walton, Liverpool, where the famous "Sabre" aero-engine was produced, has been jointly allocated to the English Electric Co., Ltd., and D. Napier & Sons, Ltd., for the production of electrical equipment and also engines. It has not yet been decided what type of electrical production will be carried out. The English Electric Co. does not expect to start work until 1946. The company expects to employ 3,000 to 4,000 workers.

Institution of Metallurgists

The Institution of Metallurgists was registered on September 15th as a company limited by guarantee without share capital. The word "Limited" is omitted from the title by licence of the Board of Trade. The number of members is unlimited, each being liable for £1 in the event of winding up. The objects are to promote the study and science of metallurgy and the status and prestige of metallurgists, to collaborate with the Iron & Steel Institute and the Institute of Metals, etc. Members are classified as "Fellows," and "Associates," and such other classes as may be prescribed in the bye-laws for the time being. The solicitors are Ashurst Morris Crisp & Co., 17, Throgmorton Avenue, E.C.

Housecraft Course for A.T.S.

Members of the A.T.S. stationed in Bradford are taking a course in electric cookery and housecraft at the Corporation electricity showrooms prior to their demobilisation. The course has been arranged by the Corporation Electricity Department (engineer and manager, Mr. T. H. Carr) in conjunction with the Army education authorities and the Ministry of Food. The girls attend for two evenings a week and the course will probably extend over twelve weeks.

St. Dunstan's

Lt.-Col. Sir Ian Fraser, M.P., gives some indication of the many ways in which St. Dunstan's helps and trains blinded men and women in an illustrated pamphlet just received. He aims at showing employers how the institution is fitting men for places in ordinary industry and for many types of professional work. The accounts for 1944-45 show a total income of £720,185 and a favourable balance (after transfers to special funds) of £26,181.

Zinc Development

A report on the activities of the Zinc Development Association during 1944-45 records the esumption of advertising, initiation of an Empire propaganda scheme, wider distribution of monthly abstracts, and the development of new methods of using zinc in building. The Association's information and library service has been more widely made use of than ever, an increased demand for publications has been met and more translations have been prepared. The report includes surveys of the work of the Zinc Alloy Die Casters Association and of the Zinc Pigment Development Association.

Southampton Docks

Another indication of the return to normal conditions is the receipt of the Southern Railway Company's handbook of general information upon the Southampton Docks. Although not so large or so elaborately produced as the pre-war handbooks, it still imparts a great deal of useful information about the construction and equipment of the docks. One illustrated section gives an account of the part played by the docks during the war.

Concrete Lighting Fittings

Referring to the concrete street lighting fitting illustrated on page 401 of our last week's issue, Concrete Utilities, Ltd., ask us to point out that they hold the original patent (No. 504,325). Development was held up during the war, but Siemens Electric Lamps & Supplies, Ltd., have since collaborated with them in the development of the unit shown at the A.P.L.E. Conference at Glasgow.

Trade Announcements

We are informed that an arrangement has been made with the Metropolitan-Vickers Electrical Co., Ltd., under which the section manufacturing laminated plastics, under the trade name of "Traffolyte," is being taken over by De La Rue Insulation, Ltd., as from October 1st. Until the completion of a new factory now under construction, the manufacture of "Traffolyte" will continue to be carried out at Trafford Park, and all inquiries and orders should be sent there for the present.

The Coventry Gauge & Tool Co., Ltd., Taylor, Taylor & Hobson, Ltd., and E. R. Watts & Son, Ltd., have agreed to co-operate in the development and distribution of precision equipment. They will pool their technical and manufacturing resources for the development of new instruments, and the sales and service departments will handle the products of all three companies.

British Insulated Callender's Cables, Ltd., the new company formed by the amalgamation of Callender's Cable & Construction Co., Ltd., and British Insulated Cables, Ltd., ask that for the time being all communications should be sent to the addresses of the two companies to which correspondence has hitherto been sent.

The address of the Industrial & Engineering Development Association has been changed to 7, Gower Street, London, W.C.1 (telephone : Museum 7952-3).

As from September 29th, the address of the London office of Bull Motors (E. R. & F. Turner, Ltd.) will be:—Grand Buildings, Trafalgar Square, W.C.2 (telephone: Whitehall 3282–4).

Alex Lawrie & Co., Ltd., have returned to London to offices at 8/10 Brown's Buildings, St. Mary Axe, E.C.3 (telephone : Avenue 5641; telegrams: Wahab, Ald, London).

Overhead-Line Charts—VII*

Load-Carrying Capacity and Voltage-Drop

By *J. S. Forrest*, M.A., B.Sc., F.Inst.P.

FOR electrically "long" lines, that is, lines more than, say, 100 miles long, conductor capacitance cannot be neglected. For example, if the short-line chart is used for a 100-mile 132-kV line (0·175 sq. in. conductors), for a 10 per cent. voltage drop, the receiving-end power will be 57 MW. Calculations or charts using the exact formulæ, taking line capacitance into account, show that the true result is 66 MW, so that the figure obtained by the approximate method is 13 per cent. low. For lines less than 100 miles long, the errors of the short-line charts diminish rapidly, while for lines several hundred miles long the approximate method would give quite misleading results. The short-line charts, however, give solutions of ample accuracy for the majority of transmission line problems encountered in this country.

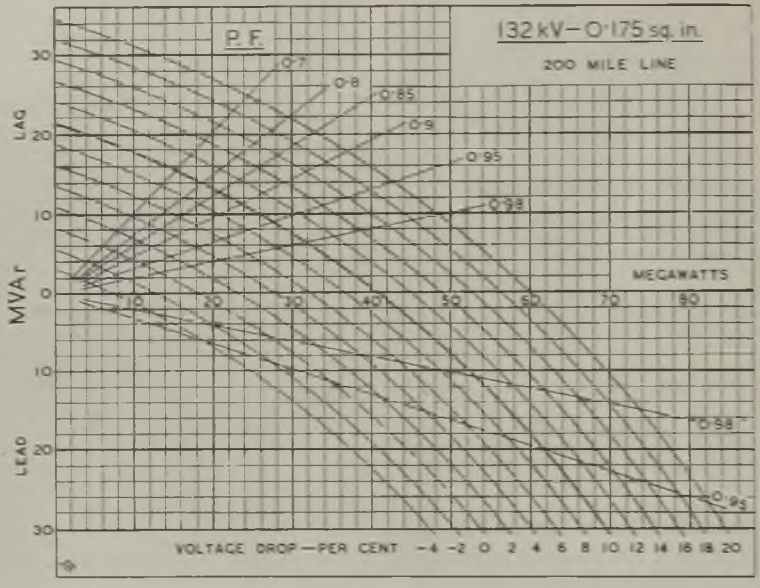


Fig. 18.—Voltage-drop chart for 132-kV line, 200 miles long, 0·175 sq. in. equivalent copper s.c.a. conductors

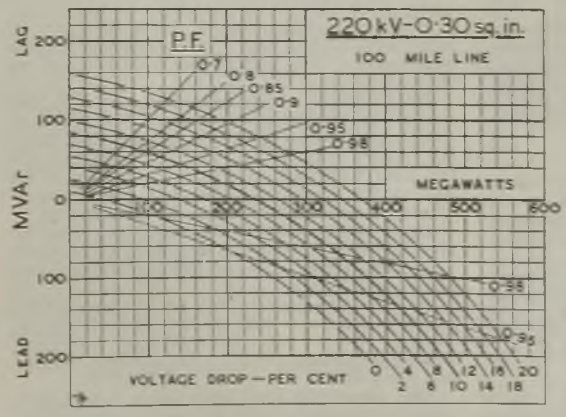


Fig. 19.—Voltage-drop chart for 220-kV line, 100 miles long, 0·30 sq. in. equivalent copper s.c.a. conductors

Circle diagrams can also be constructed for long lines, but the load-carrying capacity is no longer inversely proportional to the line length and therefore cannot be

* Concluded from *Electrical Review*, September 14th, 1945.

expressed universally in MW-miles. Accordingly, a separate chart must be constructed for each line. This is not a serious disadvantage, however, as a line, say, 200 miles long working at 220 kV, is clearly of such importance as to merit the construction of a special chart. In the writer's experience, circle diagrams for long lines are most easily constructed with the help of the charts of complex hyperbolic functions prepared by Professor L. F. Woodruff (see his book: "Electric Power Transmission and Distribution;" McGraw-Hill). Examples of long-line charts likely to be of interest to engineers in this country are given in Figs. 18 to 22. In constructing these the values of resistance and reactance assumed are those given in Table 1*, and the line capacitance has been taken as 0·015 μF per mile for 132-kV lines, and 0·014 μF per mile for 220- and 264-kV lines.

Example 10

(a) *A 132-kV line with 0·175 sq. in. conductors is 200 miles long. What load can be supplied at unity power factor without any voltage-drop in the line?*

Fig. 18 shows that the zero voltage-drop

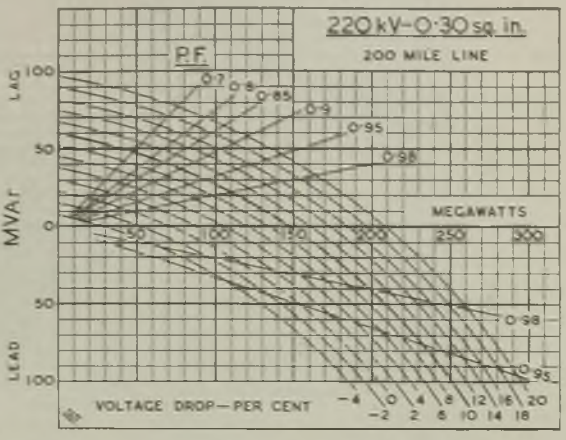


Fig. 20.—Voltage-drop chart for 220-kV line, 200 miles long, 0·30 sq. in. equivalent copper s.c.a. conductors

circle intersects the unity power factor line at 18 MW, giving the required load.

(b) *What is the voltage-drop for a load of 30 MW at 0·98 lagging power factor?*

Further reference to Fig. 18 shows that the required voltage-drop is 9 per cent. It is interesting to compare this value with that

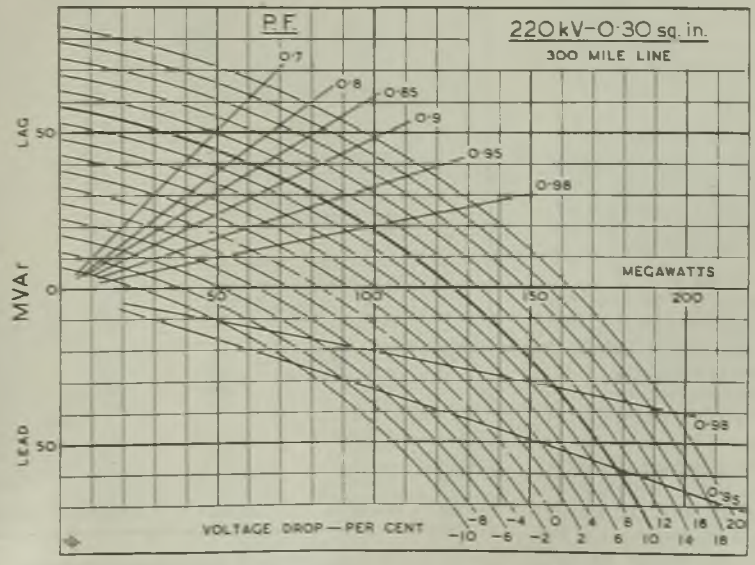


Fig. 21.—Voltage-drop chart for 220-kV line, 300 miles long, 0·30 sq. in. equivalent copper s.c.a. conductors

* See Part I, June 22nd issue

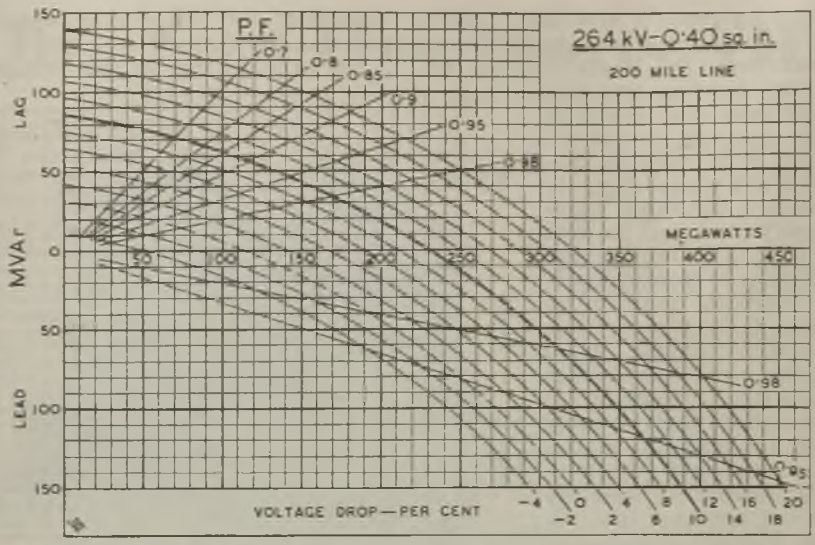


Fig. 22.—Voltage-drop chart for 264-kV line, 200 miles long, 0·40 sq. in. equivalent copper s.c.a. conductors

given by the "short" line chart—Fig. 17. It is seen that the voltage-drop, corresponding to a load of 6,000 MW-miles at 0·98 power factor lagging, is 15 per cent.—much too high a value, the error being due to neglecting the effect of capacitance which is of importance in lines of this length.

Example 11

(a) *A load of* 300 *MW at unity power factor is supplied at* 264 *kV by a double-circuit line* 200 *miles long, each circuit having* 0·40 *sq. in. conductors. What is the voltage-drop in the line?*

The load is 150 MW per circuit, and it is seen from Fig. 22 that the voltage-drop in the line is 3 per cent.

(b) *What is the voltage-drop in the line when one circuit is out of commission?*

The load is now 300 MW on one circuit, and further reference to Fig. 22 shows that the voltage-drop will be increased to nearly 18 per cent.

TABLE III.—LOAD-CARRYING CAPACITIES OF OVERHEAD LINES

kV	Conductor	MW-miles for 10 per cent. voltage-drop		Power limit MW-miles†
		0·8 P.F.	1·0 P.F.	
0·4	0·05 copper	0·013	0·018	0·02
,,	0·10 ,,	0·021	0·034	0·07
,,	0·20 ,,	0·030	0·064	0·18
3·3	0·05 copper	0·80	1·2	1·7
,,	0·10 ,,	1·28	2·3	5·8
,,	0·20 ,,	1·80	4·1	11·8
6·6	0·05 copper	3·2	4·7	6·9
,,	0·10 ,,	5·1	9·2	23
,,	0·20 ,,	7·2	16·4	47
11	0·05 copper	9·0	13·3	19
,,	0·10 ,,	14·3	26·2	65
,,	0·20 ,,	19·6	45·5	131
22	0·05 copper	36	53	77
,,	0·10 ,,	57	105	260
,,	0·20 ,,	78	182	520
33	0·075 s.c.a.	103	175	410
,,	0·10 ,,	120	230	610
,,	0·15 ,,	145	320	920
,,	0·175 ,,	155	360	1,040
66	0·075 s.c.a.	410	730	1,630
,,	0·10 ,,	480	910	2,400
,,	0·15 ,,	580	1,280	3,700
,,	0·175 ,,	620	1,440	4,200
132	0·175 s.c.a.	2,300	5,500	15,900
,,	0·175 ,,	3,700*	8,200*	16,400*
220	0·30 s.c.a.	12,000*	29,000*	58,000*
264	0·40 s.c.a.	17,500*	46,000*	89,000*

* For 200-mile line.
† Equal voltages at sending and receiving ends.

ELECTRICITY SUPPLY

Site for New Leeds Station. Assuan Scheme Arrangements

Brierfield.—HIGHER "UNIT" CHARGE.—The Urban District Council has decided to increase the tariff for electricity on the rateable value scale from ½d. to ¾d. per kWh as from the end of the December quarter.

Guildford.—NEW ELECTRICITY SHOWROOMS.—The Electricity Committee is considering the establishment of electricity showrooms in a more central position and recommends premises in High Street.

EQUIPMENT FOR NEW HOUSES.—The borough engineer recently reported to the Housing Committee that the net cost of buying a cooker, wash boiler, immersion heater and electric fire for new houses on the Stoke Hill estate would be £27 10s. 3d. per house, adding that quotations for refrigerators were not at present available. Simple hire per annum based on the average life of ten years would amount to £3 1s. 10d. The Committee recommended that appliances should be purchased outright and that the Electricity Department should be asked to provide free maintenance throughout the life of the appliances.

Hammersmith.—SITE FOR SHOWROOMS.—The Electricity Commissioners have consented to the use of surplus revenue up to £7,500 in the year ending March 31st, 1946, for the purchase of a site (Arlington House, 262, Uxbridge Road) for the erection of new showrooms, offices, etc., for the Electricity Department.

Leeds.—NEW POWER STATION.—On a 55-acre site at Skelton Grange, Knostrop a new power station is to be erected at a cost of between £4,000,000 and £5,000,000. The land is already owned by the Corporation, having been purchased for the city's sewage works at Knostrop.

Renfrewshire.—GAS-ELECTRICITY VOTE.—At a recent meeting of the Renfrewshire Housing Committee it was proposed that houses to be erected at Kilbarchan and Elderslie should be provided with gas for cooking and electricity for lighting. An amendment that cooking and lighting facilities should be provided by electricity was carried on a vote.

Rochdale.—INVITATION OF TENDERS.—The Electricity Committee has decided to revert to its pre-war practice of inviting annual tenders for the supply of cables, transformers and meters.

Scarborough.—UNDERTAKING REGRADED.—The classification of the Electricity Department has been changed from E (8,001-13,000 kW) to F (13,001-25,000 kW).

St. Pancras.—REDUCED FLAT RATE.—For the winter period (December and March quarters) the flat rate charge for lighting is being reduced by ½d. to 3½d. per kWh. It is estimated that this concession will benefit consumers by £18,250 during the half-year.

Scotland. — OPPOSITION TO TUMMEL-GARRY SCHEME.—At a meeting of the Local Authorities' Hydro-Electric General Committee last week Mr. T. B. Marshall, county clerk of Perthshire, reported on the present position of the Tummel-Garry scheme. He said that the Electricity Commissioners seemed to have "a compelling say" in what was to be done or approved which was never the intention of the Cooper Committee. The Hydro-Electric Board had never considered an alternative scheme. The matter had been discussed with Members of Parliament and a motion would be put forward for the annulment of the Order. He hoped that the local authorities represented would give their support to this motion. Some representatives were in favour of the motion but Mr. Gardner, city electrical engineer, Aberdeen, asked that his Council should be disassociated from it. The need for more power was "desperate" and the scheme could provide it more quickly than one for a steam station.

LABOUR FOR CONSTRUCTION WORK.—It is reported that prisoners of war are to be employed on construction work for the North of Scotland Hydro-Electric Board as it is not yet possible to provide British labour for road making and other initial works.

Swindon.—ELECTRICITY FOR ESTATES.—Permission has been obtained to borrow £6,800 for supplying electricity to housing estates.

Watton (Norfolk).—STREET LIGHTING CONTRACT.—The Council has approved a ten-year contract with the East Anglian Electric Supply Co. for street lighting.

Overseas

Angola.—HYDRO-ELECTRIC PROJECT.—Tenders have been invited in Angola (Portugese West Africa) for a hydro-electric scheme based on the Mabubas rapids for the electrification of Luanda. The cost is estimated at £260,000.—*Reuter.*

Egypt.—ASSUAN HYDRO-ELECTRIC SCHEME.—Kennedy and Donkin have been appointed to collaborate with the Hydro-Electric Commission, headed by Dr. Abdel Aziz Ahmed Bey, in carrying out the Assuan hydro-electric scheme. Mr. Geoffrey Kennedy recently met the Egyptian Premier, Nocrashy Pasha, and the Minister of Public Works, Mahmud Ghaleb Pasha and discussed with them the scope of the work and terms of tender. It is expected that tenders will shortly be called for and the Egyptian Government is arranging to float a loan to meet the cost of the work.

Eire.—CRITICAL SUPPLY SITUATION.—The Electricity Supply Board is appealing to the public for an immediate reduction in electricity consumption to the "essential minimum." In consequence of the prolonged drought the inflow to the Shannon is now negligible and in the absence of normal rainfall the Board is unable to maintain output at the present levels.

Tasmania.—DEVELOPMENT PLANS.—Estimates of expenditure during 1945-46 by the Tasmanian Hydro-electric Commission include the following: Butler's Gorge project, £300,000; Waddamana plant, £80,000; Tarraleah, £10,000; Meander-Railton transmission line, £20,000; retail supply, £50,000; and substations at Launceston and Ulverstone, £40,000.

Papers on Development

E.D.A. Mid-East Area Conference

AS was reported in our last issue, the Mid-East Area Committee of the British Electrical Association held a two-day conference in Scarborough this week when three papers were presented. In the first of these Mr. D. Bellamy, general manager, Hull Electricity Department, dealt with "Post-War Problems of Domestic Electrical Development." The author surveyed the major effects of the war which had to be faced—increased costs, as affecting tariffs and hire and hire purchase; shortage of generating capacity; planning and replanning; the greater popularity of electricity; the consequent alteration in the character of advertising and publicity; and the rehabilitation and retraining of staffs. On each of these points he made some useful suggestions.

Educative Advertising

Mr. W. K. Fleming, borough electrical engineer, Scarborough, introduced the subject of "Publicity and Advertising," dealing with policy and methods rather than planning and execution. He referred to the growth of informative and educative advertising during the war which would influence future practice. It was certain that advertising would have to be directed towards a more informed, better educated and serious-minded public and this applied more particularly to the new generation of housewives.

The public must not be led to expect the industry to supply more than the economic situation permitted. The keynote of advertising should be advisory, informative and educative with strong emphasis on service. Closer, more human, relationships should be established with consumers. As regards newspaper advertising, Mr. Fleming considered that the industry should not be exclusively influenced by large circulations; more regard should be paid to the type of reader. He suggested that British periodicals might be improved with advantage and so secure the large potential readership in this country. Views were also expressed upon the effective use of films, exhibitions and posters; the design of appliances; and the nature and scope of consumer research.

Large-Scale Installations

The purpose of a paper on "Electricity in Large-Scale Cooking and Space Heating," by Mr. W. H. Dunkley, deputy general manager, Hull Electricity Department, was to consider the economic position of electricity in these directions; the author gave particulars of actual installations and indicated appropriate subjects for sales effort and study. In Mr. Dunkley's opinion it was morally wrong and commercially unsound to sell large electrical cooking and heating installations if the cost as compared with other methods was greater than could be justified by the added amenity or convenience. An attempt was made to compare the gross fuel consumption, and cost, of electricity, gas, coal and fuel oil for equal heating duty, and the definition of "efficiency" was discussed.

As regards cooking the importance of keeping operation records was stressed; these should cover energy, capital and maintenance costs. Simplicity of operation and amenity could only be impressed upon prospective customers by getting them to inspect actual installations. A classification of kitchens was suggested. Various systems of space heating were enumerated and methods of comparing results with estimates were touched upon. After setting out the merits of electrical systems Mr. Dunkley dealt with the selection of the best method of heating and gave indications of the places for which electrical methods stood the greatest chance of success. His examples of actual installations were of varied character.

The conference proceedings included a civic welcome and luncheon and a reception by the Area chairman, Mr. A. G. Connell.

West Midlands J.E.A.

Operations During the Past Year

THERE was a slight increase—from 278,300 to 279,700 kW—in the maximum load on the stations of the West Midlands J.E.A. during 1944; this was very close to the total plant capacity of 288,530 kW. Output decreased from 1,133 million kWh to 1,052 million: "exports" to the Central Electricity Board fell from 154 million to 45 million kWh. The Central Board's programme provides for an output of 1,052 million kWh during 1945, of which the Authority's own requirements are estimated at 911 million.

Contracts for the two 30,000-kW turbo-alternators and five boiler units for the Ocker Hill station were allocated to the B.T.H. Co. and Babcock & Wilcox, respectively. It was agreed that the work should be put in hand at once, the settlement of prices to be reached subsequently. The revised estimate of the cost of the extensions is £2,123,300, or £35·4 per kW. The main switchgear is being provided by the B.T.H. Co. and the auxiliary switchgear by Geo. Ellison, Ltd. Man-power shortage has delayed the work, particularly the construction of the cooling towers.

A direction was received to extend the Walsall station by two 30,000-kW sets, boiler plant and two cooling towers. The estimated cost is £2,299,750 (£38·3 per kW) and to save time the Ocker Hill boilers and turbo-alternators are being duplicated. The plant is required for commercial operation by September, 1948.

Details are given in the Authority's report

for the past year of the operation of the five power stations. Ironbridge with 864 million kWh contributed 87 per cent. of the total kWh sent out and the thermal efficiency was 21·1 per cent. Particulars are included of the repairs found to be necessary to some of the plant at the Authority's stations.

The price for the 992 million kWh supplied to the Central Board averaged ·480d. per kWh; the price to be paid for re-purchases from the Board during the past three years has not yet been settled. Coal costs showed a further rise, from 0·276d. to 0·301d. per kWh sent out. In 1938 the figure was 0·138d.

A table shows bulk supplies to other undertakings, the principal being the Midland Electric Corporation for Power Distribution, Ltd. (329 million kWh), Wolverhampton (274 million), West Bromwich (108 million) and Walsall (103 million). The bulk supply to Lichfield was commenced at the beginning of this year. Sales in the Shropshire distribution area totalled 79 million kWh, a decrease of 2 per cent.

Forthcoming Events

Saturday, September 29th.—*Cardiff.*—South Wales Institute, Park Place, 6.30 p.m. Association of Mining Electrical and Mechanical Engineers (South Wales Branch). Address by Branch president, T. R. Thomas, and presentation of certificates.

Monday, October 1st.—*London.*—New Austrian Centre, Swiss Cottage, 69, Greencroft Gardens, N.W.6, 7.30 p.m. Association of Austrian Engineers, Chemists and Scientific Workers in Great Britain. Informal meeting of members and friends.

Birmingham.—James Watt Institute, Great Charles Street, 6 p.m. I.E.E. South Midland Centre Radio Group. Chairman's address by A. Brookes on "Atomic Structure in Relation to Chemical Reactions and Transmutations."

Cardiff.—South Wales Institute of Engineers, Park Place, 5 p.m. I.E.E. Western Centre. Inaugural address by J. B. J. Higham, chairman.

Liverpool.—Royal Institution, Colquitt Street, 6 p.m. I.E.E. Mersey and North Wales Centre. Address by the chairman, J. O. Knowles, M.A.

Tuesday, October 2nd.—*Manchester.*—Engineers' Club, Albert Square, 6.30 p.m. I.E.E. North-Western Centre. Inaugural address by Dr. J. L. Miller, chairman, and presentation of premiums by W. Kidd, retiring chairman.

Coventry.—Electricity Showrooms, Corporation Street, 6 p.m. Coventry Electric Club. "Flameproof Gear," by R. Court.

Wednesday, October 3rd.—*Manchester.*—Engineers' Club, 12.30 for 12.45 p.m. North Western Fuel Luncheon Club. Inaugural luncheon with short addresses by Sir Frederick J. West, K.B.E., Miles K. Burrows, M.C., and Gordon Macdonald.

Birmingham.—James Watt Institute, 6.30 p.m. Junior Institution of Engineers (Midland Section). Annual general meeting.

Thursday, October 4th.—*London.*—Institution of Electrical Engineers, 5.30 p.m. Inaugural address by the president, Dr. P. Dunsheath, O.B.E., M.A., and presentation of premiums.

Friday, October 5th.—*Manchester.*—Engineers' Club, 6.45 p.m. Manchester Association of Engineers. Presidential address by C. S. Youatt.

Saturday, October 6th.—*Manchester.*—Engineers' Club, 1.15 p.m. I.E.E. North-Western Students' Section. Luncheon (tickets 5s.) followed at 2.30 p.m. by chairman's address on "The Place of the Gas Turbine in Future Electricity Generation," by B. V. Poulston.

Monday, October 8th.—*Newcastle-upon-Tyne.*—Neville Hall, Westgate Street, 6.15 p.m. I.E.E. North-Eastern Centre. Chairman's address by W. Dixon.

Tuesday, October 9th.—*London.*—School of Hygiene and Tropical Medicine, Keppel Street, W.C.1, 6 p.m. Illuminating Engineering Society. Induction of new president, H. C. Weston, and presidential address. (Refreshments, 5.30 p.m.).

Wednesday, October 10th.—*London.*—Institution of Electrical Engineers, 5.30 p.m. Radio Section. Chairman's inaugural address by A. H. Mumford, B.Sc.(Eng.).

London.—E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, Strand, 5 p.m. Illuminating Engineering Society. Exhibition of film "Let us See" (Lessons in Industrial Lighting) by courtesy of the American Illuminating Engineering Society.

Thursday, October 11th.—*London.*—Institution of Electrical Engineers, 5.30 p.m. Installations Section. Inaugural address of the chairman, Forbes Jackson.

Cardiff.—Electricity Offices, The Hayes, 6.30 p.m. Electrical Power Engineers' Association (Western Division). "A Modern Earth-Fault Relay Equipment for Use on Systems Protected by Petersen Coils," by L. S. B. Golds.

Friday, October 12th.—*London.*—St. Stephen's Tavern, Bridge Street, Westminster, 6.30 p.m. E.P.E.A. Meter Engineers' Group (Southern Division). "Meter Jewels and Pivots," by G. F. Shotter.

Commodity Control

IT is over two years ago that Butterworth & Co. (Publishers), Ltd., 11-12, Bell Yard, Temple Bar, W.C.2, produced their compendious work on "Commodity Control". Since then changes have been numerous and are still occurring at an accelerating pace so that a second edition was clearly necessary and it has now appeared (21s.)

This revised version has been prepared by J. Bray Freeman, Barrister-at-Law; it follows the lines of the first edition and commences with tables of statutes, statutory orders and relevant cases. The complexity of the subject may be judged from the fact that the list of statutory orders occupies twenty-six closely-printed pages and references are made to all of them in the body of the work. The matter is reprinted from the publishers' Emergency Legislation Service which keeps pace with alterations in the law and regulations.

Institution of Factory Managers

The council meeting of the Institution of Factory Managers is to be held in London on October 13th, when the result of the Sir Henry Fildes' Essay Competition will be announced. It is hoped also to make a definite statement regarding the Supervisors' Discussion Groups.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Venner Time Switches, Ltd.—The trading profit for the past year was £30,779 (against £89,483) and the balance on profit and loss account after meeting depreciation, superannuation fund contribution, etc., is £5,128 (against £56,342). The amount available after adding the balance brought in and £4,000 from war contingency reserve is £24,681. A dividend of 10 per cent. is to be paid on the ordinary stock (against 15 per cent.) and £15,716 (£15,733) is carried forward. Last year £10,000 was transferred to war contingency reserve and £31,300 provided for income tax on the current year's profits.

In his speech at Wednesday's annual meeting Mr. A. A. Rowse (chairman), referring to the drop in profit, said that over 75 per cent. of the company's output was being absorbed by the Air Ministry when at the end of 1943 a contract representing more than half the output was cancelled owing to a change in Service requirements. Orders for other supplies were secured but it took some time to bring these into production. Moreover, the company had been paid at prices fixed by the Ministry on conditions existing in 1943 and no longer representative; the Ministry would not agree to a revision. The flying-bomb attacks (in which the company's works suffered) had also interfered with production. A claim for £38,000 representing unrecovered overhead expenses had been preferred but the Treasury declined to recognise that there had been any hardship or inequity. Since the close of the financial year war contracts had been cancelled and the company was embarking on its peacetime activities, facing the future with a well-organised and equipped factory.

Pye, Ltd.—Speaking at the annual meeting on September 19th, Sir Thomas Polson (chairman) referred to the "happy state of affairs" in which the company found itself. After reviewing the company's outstanding share in the development of radiolocation, Sir Thomas spoke of the future. He considered that there was no indication that the problems of industries such as theirs in meeting a very serious industrial situation were clearly understood. The first outstanding point was whether this country was going to get back its lead in television and the immediate attention of the Government to this matter was necessary. Television and export were very closely associated for, Sir Thomas said, television was the best export salesman we had. In the radio field much more help was required if this country was to compete at all.

Lisbon Electric Tramways, Ltd.—The need for a long-term plan of expansion of the company's services is mentioned by Sir Alexander Roger, acting chairman, in a statement circulated with the report and accounts. After referring to the difficulties encountered and successfully overcome he says that in 1944 the number of passengers carried increased by 14,000,000 to 200,000,000, and compared with the last pre-war year there was an increase of 80,000,000. In the company's opinion the demand for transport can only be satisfied by a substantial increase in services involving a comprehensive plan with large expenditure which a preliminary estimate puts at more than £1,000,000 over a very few years. In this programme, which the company is actively developing, the co-operation of the Portuguese authorities in several directions will be needed. Meanwhile the company will be fully occupied in reconditioning the existing service, which will cost about £300,000.

Aron Electricity Meter, Ltd.—After providing for taxation, deferred repairs and contingencies the profit for the year ended March 31st was £19,266 (against £19,064 in 1943-44), to which is added £17,379 brought forward. A sum of £7,500 is transferred to general reserve and from the balance it is proposed to pay a dividend of 15 per cent. (same), leaving £17,750 to be carried forward. The report states that the company's factory has been fully employed during the year, but cancellations of orders for war materials are now coming in.

The Dubilier Condenser Co. (1925), Ltd., reports a net profit of £19,917 for the year ended March 31st last (against £25,682 for 1943-44), after providing £18,000 (£13,000) for income tax. In spite of the decreased profit it is proposed to double the ordinary dividend, making 20 per cent. The balance carried forward is £3,848 lower at £22,895.

Mid-Wales Electric Power Co., Ltd.—Total income from dividends receivable, etc., in 1944 amounted to £1,598 and after payment of directors' fees and debenture interest there remains a profit of £23. A sum of £841 (£818) is carried forward.

The Yale Electric Power Co., Ltd., a subsidiary of the Mid-Wales Co., reports a trading profit for 1944 of £4,815. The balance after deduction of professional charges and depreciation is £3,507, from which £2,050 is provided for taxation and the carry-forward is increased from £28 to £1,485.

The United River Plate Telephone Co., Ltd., in a preliminary statement for the first half of 1945, shows a net income of £614,556 as compared with £588,054 for the corresponding period of 1944. The number of telephone stations at June 30th last was 495,436 as compared with 491,943 at December 31st.

Calcutta Tramways Co., Ltd.—At the annual meeting last week the chairman (Sir Geoffrey Clarke) said that conditions in Calcutta had thrown an additional heavy burden on the system: more than three times the pre-war traffic was being carried. Basic fares had not been increased but the receipts constituted a record in 1944. Sir Geoffrey outlined the progress of the negotiations with the Calcutta Corporation which still awaited the approval of other local authorities and the Government of Bengal to an agreement which had been arrived at. If these approvals were not given by January 1st next, it had been provided that

the company should continue in possession and the agreement be cancelled. In the meantime, however, the Bengal Government had undertaken to form a transport board for Calcutta and the outlying districts. By legislation the Government could abrogate the Corporation's acquisition rights and hand over the undertaking to the new board, in which case it might reasonably be anticipated that the assessment of compensation would be on the same basis as that provided for in the agreement with the Corporation.

The Madras Electric Tramways (1904), Ltd.—The accounts for 1944 show a net profit of £25,192 (against £17,095 for 1943), after providing for debenture interest and sinking fund, Indian and British income tax, £40,000 (£15,000), depreciation and renewals, £10,000 (same). It is proposed to pay a dividend of 10 per cent. on the ordinary shares as compared with 5 per cent. last year, and the carry-forward is raised from £11,392 to £21,639.

The chairman, Mr. K. A. Scott Moncrieff, in a statement circulated with the report and accounts, says that during 1944 traffic receipts continued to improve, although the increase was accompanied by considerable additions to expenditure.

The Altrincham Electric Supply, Ltd., is to pay interim dividends of 5 per cent. on the ordinary and 10 per cent. on the deferred ordinary shares, as last year.

The Ascot District Gas & Electricity Co., announces an interim dividend of 2½ per cent. (same).

New Companies

Transformer & Bobbin, Ltd.—Private company. Registered September 12th. Capital, £1,000. Objects: To acquire the business of a transformer and bobbin manufacturer carried on at 451, Lincoln Road, Enfield, by Walter Stokes. Directors: W. Stokes and Rosalie F. Ball, both of 451, Lincoln Road, Enfield, F. C. Stokes, 38, Springfield Gardens, N.W.9, and Ivy A. Graham, 225, Ladysmith Road, Enfield. Secretary: Rosalie F. Ball.

H. D. Wight & Son, Ltd.—Private company. Registered September 13th. Capital, £1,000. Objects: To carry on the business of electrical marine, aircraft, motor, radio and mechanical engineers, tool makers, metal workers, etc. Directors: H. D. Wight, Newlands, The Mount, Fetcham, Leatherhead, and R. B. Wight, 7, Kylemore Road, Oxton, Birkenhead. Registered office: 27, Cheriton Gardens, Folkestone.

Salient Industries, Ltd.—Private company. Registered September 13th. Capital, £100. Objects: To carry on the business of manufacturers of, and dealers in, wireless, electrical and electronic apparatus and equipment, musical and precision instruments, tools, etc. Subscribers: A. H. Alexander, 85, Camp Street, Salford, and M. Heiner, 12, Apsley House, N.W.8. Registered office: 265, Strand, W.C.2.

Pioneer Electrics (North West), Ltd.—Private company. Registered September 15th. Capital, £1,000. Objects: To carry on the business of electrical and mechanical engineers, electricians, radio engineers, etc. Directors: H. Jakeman and three others. Registered office: 35, Chester Street, Wrexham.

Companies' Returns

Statements of Capital

Bude Electric Supply Co., Ltd.—Capital, £30,000 in £1 shares. Return dated June 14th. All shares taken up. £30,000 paid. Mortgages and charges: Nil.

Flather & Co., Ltd.—Capital, £20,000 in £1 shares. Return dated April 23rd, 1945. 13,208 shares taken up. £11,708 paid. £1,500 considered as paid. Mortgages and charges: Nil.

Pertrix, Ltd.—Capital, £10,000 in £1 shares. Return dated March 2nd, 1945. All shares taken up. £10,000 paid. Mortgages and charges: Nil.

Increases of Capital

Morphy-Richards, Ltd.—The nominal capital has been increased by the addition of £5,000 in 5,000 cumulative redeemable second preference shares of £1 beyond the registered capital of £50,000.

Mortgages and Charges

Nigerian Electricity Supply Corporation, Ltd.—Satisfaction to the extent of £13,622, on June 30th, 1945, of trust deed dated August 24th, 1933, securing £300,000 6 per cent. first mortgage redeemable debenture stock authorised August 2nd, 1933, and registered August 31st, 1933, and supplemental trust deed dated July 6th, 1939, authorised by resolution of the debenture stock holders dated June 28th, 1939, cancelling £20,000 of the original stock remaining unissued and amending the terms of the original trust deed.

Dalyte Electrical Co., Ltd.—Charge on Deco Engineering Works, London, W.10, dated August 29th, 1945, to secure all moneys due or to become due from the company to Midland Bank, Ltd.

Progress Cables & Accessories Co., Ltd.—Satisfaction in full on November 27th, 1944, of debenture dated April 20th, 1939, and registered April 28th, 1939, securing £1,000. (Notice filed August 9th, 1945.)

Liquidations

B. & B. Batteries, Ltd.—Liquidator, Mr. A. E. Attwood (with a committee of inspection), Queen Street Chambers, 90, Queen Street, Cheapside, E.C.4, appointed July 30th.

Bankruptcies

R. A. Young, Gullet Passage, Shrewsbury, electrical and mechanical engineer.—Supplemental dividend of 8s. 3d. in the £ payable at the Official Receiver's office, 12, Lonsdale Street, Stoke-upon-Trent.

A. C. W. Wilson, Wepre, Higher West Cross Lane, Swansea, electrical engineer.—First and final dividend of 1s. 6½d. in the £ payable at the Official Receiver's offices, Government Buildings, 10, St. Mary's Square, Swansea.

F. O. Tosswill, electrical engineer, 60, Wodeland Avenue, Guildford, lately carrying on business at 15, Portsmouth Road, Guildford.—Application for discharge to be heard at the County Court, Guildhall, Guildford, on October 25th.

STOCKS AND SHARES

TUESDAY EVENING.

STOCK EXCHANGE markets find that they have a good deal of business to handle, and that the amount of capital which constantly seeks investment is little affected by the Thanksgiving Campaign. Investment and speculation are throwing off the apprehension which seized them upon the return of the Labour Government to power, and it is noticeable that even preference shares which stand at high premiums are once more in active request. Prices in the majority of ordinary stocks and shares keep very steady. The return of many of those who have been serving in the Forces, has the effect of making the Stock Exchange look decidedly more populated than it has done during the war years. The Stock Exchange Council and the Treasury continue to adopt a policy of granting permission to issue and to deal in, new shares, more particularly in companies that are concerned with reinstatement of export and industry.

A Month's Price Movements

The melancholy catalogue of falls—some of them fairly serious—set out in our tables of August 24th last, has been partially rectified by recoveries in many prices. The downward movement served to attract investment notice, and to bring in bargain-hunters. In spite of this, however, the month has left further declines in a number of cases. Southern Railway preference and preferred stock, to mention two instances, are down by 6 and 4½ points at 104½, and 67½ respectively. On the other hand, London Passenger Transport stocks are better, the 4½ per cent. "A" gaining 4, at 119½ and the 5 per cent. "B" 2 points at 118½, while the speculative "C" issue is up 1 at 62, after being still better. British Electric Traction deferred at 1005 is 30 down since a month ago, but the preferred regained 10 of its previous loss, rising to 180. Thomas Tilling, at 51/6, are 1s. to the good.

War and Peace Stocks

Tokyo Electric 6 per cent. bonds, after going above 60, came back to 55½, leaving the price 18 points higher since August 17th. Great Northern Telegraphs rose 2½ to 36, and Oriental Telephone 2s. 9d. to 64s. Singapore Traction preference hardened to 26s. The dollar stocks are mostly better on a sharp rally in Wall Street; this helped to lift Brazilian Tractions 2½ to 30¾. Montreal buying is again declared to be responsible for a rise of 2s. 9d., to 19s. 3d., in Canadian Marconi.

Further Recoveries

Tube Investments at 5 9/16 are 7s. 6d. better. Ransome & Marles at 91s. 3d. have risen 6s. 3d., Murex 5s. 6d. to 102s., Telegraph Constructions 4s. 6d. to 57s. 6d., Metal Industries "B" 3s. 9d. to 50s. and British Vacuum Cleaners 3s. 3d. to 36s. 6d. General Electrics, 96s. 6d., and Associated Electricals, 57s., are up 3s., so are Siemens at 39s. Gains of 2s. 6d. made Crabtrees 43s. 9d., English Electric 55s. 6d. and De la Rue 10⅞. Other improvements range from 6d. to 2s. Losses are mostly small. Some are due to prices being quoted ex dividend. Electricity supply shares in the home group show few changes, and none of any note, as compared with those of August 24th. A feature in the overseas group is a rise of 5s. 6d. in Madras Electric to 46s. on the increase in the dividend from 4 per cent. to 6 per cent.

Reassurance

The Governor of the Bank of England, Lord Catto, at last week's meeting of proprietors, expressed his confidence that the present Government will deal fairly with the stockholders when the Bank is nationalised. Lord Catto's reassurance served to cheer other markets where the shadow of socialisation had led to vague fears of what might be in store for shareholders in nationalised industries. Home railway stocks started to emerge from previous depression, and prices of shares in the iron, coal and steel group showed a firmer front.

Pye and Television

Pye Radio shares have risen a florin to 33s. 3d. The chairman's speech at the meeting last week was interesting, not only for the way in which he dealt with the affairs of the company, but for the wider view which he expressed in regard to the future of industrial companies, more especially those connected with television. He referred to the very serious situation which this country will have to face in the industrial world from now on. "We led the world," he said, "in television in 1939, and we have only weeks left in which to act, if we are ever to get this lead back. The Government's attention to television, without which we could neither have defended ourselves against the enemy, nor have beaten him to his knees, is called for now, if this great industry, is to be saved from disruption."

Manufacturing and Equipment

Upon a rumour of the company amalgamating with W. T. Henley's Telegraph Works, Johnson & Phillips' shares were run up to 81s. 6d. before the report was denied. At 80s. a gain of 6s. on the month, Johnson & Phillips pay 3¾ per cent. on the basis of the 15 per cent. dividend paid annually for some years past. A small line of Laurence, Scott "A" 5s. shares has come in at 14s. at which the yield is a trifle under 4½ per cent. on the money. The dividend is paid once a year, in May. Of the new Telegraph Construction shares, 5,000 are on offer in the market at 58s. Assuming maintenance of the 10 per cent. dividend that the company has been paying annually of late years, the yield, at this price, would be £3 9s. per cent. The

(*Continued on page* 462)

ELECTRICAL INVESTMENTS

Past Month's Price Changes

Company	Dividend Previous	Dividend Last	Middle Price Sept. 21	Month's Rise or Fall	Yield p.c.
Home Electricity Ordinary					
Bournemouth and Poole	12½	12½	56/6	−2/−	£ 4 6 10
British Power and Light	7	7	27/6	−6d.	5 1 10
City of London	5½	6	29/6	..	4 1 4
Clyde Valley	8	8	38/−	..	4 4 3
County of London	8	8	37/−	−6d.	4 6 6
Edmundsons	6	6	27/6	..	4 7 3
Elec.Dis.Yorkshire	9	9	39/−	..	4 12 4
Elec. Fin. and Securities	12½	13½	57/6	..	4 13 9
Elec. Supply Corporation	10	10	46/6	−1/−	4 6 0
Lancs. Light and Power	7½	7½	33/6	−9d.	4 9 7
Llanelly Elec.	6	6	25/−	−6d.	4 16 0
Lond.Assoc.Electric	3	4	24/6	..	3 5 2
London Electric	6	6	29/−	−2/6	4 2 9
Metropolitan E.S.	8	8	38/6	+6d.	4 3 3
Midland Counties	8	8	38/3	..	4 4 0
Mid. Elec. Power	9	9	41/6	−1/−	4 6 9
Newcastle Elec.	7	7	28/3	−6d.	4 19 1
North EasternElec.	7	7	30/3	..	4 12 7
Northampton	10	10	46/3	..	4 8 6
Northmet Power	7	7	37/−	−6d.	3 15 8
Richmond Elec.	6	6	26/6	..	4 10 7
Scottish Power	8	8	36/−	−6d.	4 9 0
Southern Areas	5	5	22/−	+1/−	4 11 0
South London	7	7	29/−	−6d.	4 16 7
West Devon	5	5	25/−	..	4 0 0
West Glos.	4½	3½	25/−	..	2 16 0
Yorkshire Elec.	8	8	39/−	+6d.	4 2 2
Public Boards					
Central Electricity					
1955–75	5	5	114	−1	4 7 9
1951–73	4½	4½	106	..	4 5 0
1963–93	3½	3½	105	+½	3 6 8
1974–94	3½	3½	102	+1	3 3 9
LondonElec.Trans.	2½	2½	98	..	2 11 0
London & Home Counties 1955–75	4½	4½	111	..	4 1 4
Lond.Pass.Trans.Bd.					
A	4½	4½	119½	+4	3 15 4
B	5	5	118½	+2	4 4 5
C	3½	3	62	+1	4 16 9
West Midlands J.E.A. 1948–68	5	5	106½	..	4 14 0
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	8/3	+1/−	16 7
Calcutta Elec.	6*	6*	65/6	−6d.	1 16 7
Cawnpore Elec.	7	13	59/6	−6d.	4 7 10
East African Power	7	7	37/−	..	3 17 9
Jerusalem Elec.	7	5	27/−	..	3 14 1
Kalgoorlie (10/−)	5	5	11/6	+1/−	4 7 0
Madras Elec.	4	6	46/−	+5/6	2 12 2
Montreal Power	1½	1½	25/−	+10d.	—
Nigerian Elec.	10	10	39/−	−1/−	5 2 7
Palestine Elec."A"	5*	5*	37/6	+6d.	2 13 4
Perak Hydro-elec.	6	7	18/−	+6d.	—
Tokyo Elec. 6%	6	6	55½	+18	—
VictoriaFallsPower	15	15	96/3	+2/6	3 2 3
Whitehall Inv. Pref.	—	6	25/3	−9d.	4 15 1

Company	Dividend Previous	Dividend Last	Middle Price Sept. 21	Month's Rise or Fall	Yield p.c.
Equipment and Manufacturing					
Aron Elec. Ord.	10	15	62/6	..	4 16 6
Assoc. Brit. Eng.	6	7	52/6	−½	2 13 4
Assoc. Elec. :					
Ord.	10	10	57/−	+3/−	3 10 2
Pref.	8	8	40/−	−6d.	4 0 0
AutomaticTel.&El.	12½	12½	68/3	+3d.	3 14 0
Babcock & Wilcox	11	12	57/−	+2/−	4 4 3
British Aluminium	10	10	42/−	−1/6	4 15 3
British Insulated & Callender's	..	..	44/−	−1/−	—
British Thermostat (5/−)	18½	18½	20/−	..	4 12 6
British Vac. Cleaner (5/−)	30	30	36/6	+3/3	4 2 2
Brush Ord. (5/−)	9	10	9/9	..	4 12 4
Burco (5/−)	15	15	16/−	+1/6	4 13 9
ChlorideEl.Storage	15	15	82/6	−½	3 12 10
Christy Bros.	12½	17½	75/−	−½	4 13 4
Cole, E. K. (5/−)	15	20	37/6	−9d.	2 13 4
Consolidated Sig.	24	27½	6½	..	4 4 8
Cossor, A. C. (5/−)	10*	12½*	42/6	+2/−	1 9 6
Crabtree (10/−)	17½	17½	43/9	+2/6	4 0 0
Crompton Parkinson Ord. (5/−)	20	22½	32/6	+1/−	3 9 2
De La Rue	40	40	10½	+½	3 14 0
E.M.I. (10/−)	6	8	33/9	+9d.	2 7 4
Elec. Construction	10	12½	59/−	−1/−	4 4 9
Enfield Cable Ord.	12½	12½	63/6	+6d.	3 18 7
English Electric	10	10	55/6	+2/−	3 12 3
Ericsson Tel. (5/−)	22*	20*	50/−	..	2 0 0
Ever Ready (5/−)	40	40	41/6	+6d.	4 16 3
Falk Stadelmann	7½	10	36/−	+6d.	5 11 1
Ferranti Pref.	7	7	33/6	..	4 3 7
G.E.C. :					
Pref.	6½	6½	34/−	−6d.	3 13 6
Ord.	17½	17½	96/6	+3/6	3 12 5
GeneralCable(5/−)	15	15	17/−	−2/−	4 8 3
Greenwood&Batley	15	15	42/6	−5/−	7 1 2
H.T.A. (10/−)	12½	12½	28/−	−1/−	4 9 2
Henley's (5/−)	20	20	29/−	+1/−	3 9 0
4½% Pref.	4½	4½	24/6	..	3 13 6
Hopkinsons	17½	20	83/9	+½	4 15 6
India Rubber Pref.	5½	5½	24/−	..	4 11 9
Intl. Combustion	30	32½	8	..	4 1 3
Johnson& Phillips	15	15	80/−	+6/−	3 16 0
LancashireDynamo	22½	22½	5½	..	4 8 0
Laurence,Scott(5/−)	12½	12½	13/6	+3d.	4 12 5
London Elec. Wire	7½	7½	40/	..	3 15 0
Mather & Platt	10	10	51/3	−6d.	3 18 2
Metal Industries (B)	8½	9	50/−	+3/9	3 12 0
Met. Elec.Cable Pref.	5½	5½	21/3	..	5 3 6
Mid. Elec. Mfg.	25	25	7½	..	3 6 8
Murex	20	20	102/−	+5/6	3 18 6
Newman Ind.(2/−)	20	20	7/6	..	5 6 5
Philco (2/−)	—	—	14/6	+6d.	—
Power Securities	6	6	27/−	..	4 9 0
Pye Deferred(5/−)	25	25	33/3	+2/−	3 15 4
Ransome & Marles	20	20	91/3	+6/3	4 7 9
Revo (10/−)	17½	17½	45/6	+6d.	3 17 0
Reyrolle	12½	12½	72/−	..	3 9 5

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend Previous	Dividend Last	Middle Price Sept. 21	Month's Rise or Fall	Yield p.c. £ s. d.
Equipment and Manufacturing (*Continued*)					
Siemens Ord. ..	7½	7½	39/–	+3/–	3 17 0
Strand Elec. (5/–)	10	12½	10/–	..	6 5 0
Switchgear & Cowans (5/–) ..	20	20	20/–	..	5 0 0
T.C.C. (10/–) ..	7½	10	24/–	–1/–	4 3 4
T.C. & M. ..	10	10	57/6	+4/6	3 8 0
Telephone Mfg.(5/–)	9	9	11/9	–3d.	3 16 8
Thorn Elec. (5/–)	20	20	28/9	..	3 9 6
Tube Investments	20	22½	54/6	+3/6	4 1 0
Vactric (5/–) ..	Nil	22½	21/–	–1/–	5 7 1
Veritys (5/–) ..	7½	7½	7/9	..	4 16 9
Walsall Conduits(4/–)	55	55	56/3	..	3 18 3
Ward & Goldstone (5/–)	20	25	32/–	+1/6	3 18 2
Westinghouse Brake	14	14	74/6	+1/–	3 15 3
West, Allen (5/–)	7½	7½	8/–	..	4 13 9
Traction and Transport					
Anglo-Arg. Trans :					
First Pref. (£5)	Nil	Nil	2/6	..	—
4% Inc. ..	Nil	Nil	6	..	—
Brit. Elec. Traction :					
Def. Ord. ..	45	45	1005	–30	4 9 7
Pref. Ord. ..	8	8	178	+10	4 9 0
Bristol Trams ..	10	10	53/3	+1/6	3 15 0
Brazil Traction	1¾	2	30¾	+2½	6 10 1
Calcutta Trams	6½	7½	76/6	–2/6	1 19 3
Cape Elec. Trams	5	6	25/–	..	4 16 0
Lancs. Transport	10	10	43/3	–5/9	4 13 0
Southern Rly. :					
5% Prefd. ..	5	5	67	–4½	7 9 4
5% Pref. ..	5	5	104½	–6	4 15 8
T. Tilling ..	10	10	51/6	+1/–	3 18 0
West Riding ..	10	10	42/6	..	4 14 1
Telegraph and Telephone					
Anglo-Am. Tel. :					
Pref. ..	6	6	126½	+1½	4 15 3
Def.	1½	1½	30½	..	4 18 4
Anglo-Portuguese	8	8	29/6	+1/–	5 8 6
Cable & Wireless :					
5½ Pref. ..	5½	5½	114	+2½	4 16 6
Ord. ..	4	4	91½	+2	4 7 5
Canadian Marconi	$1 Nil	4 cts.	19/3	+2/9	—
Globe Tel. & Tel. :					
Ord. ..	8¼*	5*	42/6	+2/–	2 7 0
Pref.	6	6	30/6	+1/6	3 18 8
Great Northern Tel. (£10) ..	Nil	Nil	36½	+2½	—
Inter. Tel. & Tel.	Nil	Nil	32	+4	—
Marconi-Marine	7½	7½	37/–	+1/–	4 1 1
Oriental Tel. Ord.	4	4	64/–	+2/9	—
Telephone Props.	Nil	6	22/–	..	5 9 1
Tele. Rentals (5/–)	10	10	12/6	+6d.	4 0 0

* Dividends are paid free of Income Tax.

Stocks and Shares (*Concluded from page* 460)

new shares, it will be remembered, were issued at the beginning of August, one new share at 50s. being offered for every two old shares held.

Cable & Wireless

Cable & Wireless ordinary stock has risen to 91½ and the preference at 114 is 2½ better, as compared with a month ago. The preference stock, it will be noticed, gives a yield at the present price of £4 16s. 6d. per cent. on the money, a higher rate than can be obtained from many other preferences. To pay the yearly dividend takes £499,507, and in the last accounts there was £650,000 available to meet it. Income tax is deducted at the reduced rate of 9s. 2d. in the £.

Lisbon Electric Trams

Lisbon Electric Trams are a favourite investment for people prepared to take a certain degree of risk in order to obtain a good yield on their money. Sir Alexander Roger, is taking the chair on Wednesday in this week at the annual meeting and his statement is of interest to a considerable circle. The company's revenue has increased, but the overcrowding that has helped to produce this result will have to be met by maintenance long overdue, and extensive work required on various sections of the system. The directors have added £55,000 to the fund already provided for work that will have to be carried out. Another factor to be taken into account is the increase in wages from the beginning of this year. This is expected to cost the company something like £160,000 per annum, a sum which will be difficult to cover by extra revenue from further traffic increase. The company is paying 5 per cent. free of tax and at the present price of the shares, 31s. 3d., the yield comes to the equivalent of £6 8s. per cent. gross, with a 10s. tax.

Surplus Machine Tools

IN order to facilitate the clearance of large factories, and to make the best Government machine tools at these factories quickly available for use on production elsewhere, the Machine Tool Control is arranging to sell these tools direct from site at selected factories and stores. Each factory will have a sales depot with a self-contained organisation to enable intending purchasers to inspect and purchase machines where they lie.

Lists of approved merchants are available at each sales depot, as well as at the permanent disposal centres, and the services of a merchant in the selection of machines may be utilised without extra cost. The first of these special site sales was to commence at Rootes Securities, Ltd., No. 2 Engine Factory, Ryton-on-Dunsmore, near Coventry, on September 26th, and further sales will be notified from time to time.

Among the equipment available at the Rootes factory are centre lathes, capstan and turret lathes, automatics, and machines for milling, drilling, polishing, etc., and gear cutters.

Particulars of the machines on offer can be obtained at the sites but will not be available at any other permanent or temporary disposal centre.

NEW PATENTS

Electrical Specifications Recently Published

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

ALLMANNA Svenska Elektriska Aktiebolaget.—" Vertical thrust bearings." 8508/44. May 27th, 1943. (571745.)

Asea Electric, Ltd., and S. Baynes.—"Electric trolley wire conductor systems." 20048. December 1st, 1943. (571771.)

Automatic Telephone & Electric Co., Ltd., J. W. McClew and O. A. Pearce.—" Finder switch arrangements for use in telephone or like signalling systems." 3019. February 18th, 1944. (571811.)

British Thermostat Co., Ltd., and E. J. Brush.—" Safety valves for pressure vessels." 1070. January 26th, 1942. (571655.)

British Thomson-Houston Co., Ltd.—" Resinous condensation products." 5475/43. April 11th, 1942. (571660.) " Magnetic core structures." 21777/43. December 30th, 1942. (571796.)

British Thomson-Houston Co., Ltd., J. G. Wellings and B. Withers.—" Operation of electric fuses." 4128. March 6th, 1944. (571742.)

A. Buchi.—" Turbines having overhung rotors." 3352/43. May 23rd, 1942. (571658.)

G. R. E. Cleveland.—" Thermionic valve for use with a circuit for amplifying, rectifying or generating electric wave oscillations." 1091. January 20th, 1944. (571678.)

H. Frost & Co., Ltd., and A. W. Moss.—" Electric fires or radiators." 37. January 3rd, 1944. (571797.)

General Electric Co., Ltd., and E. Friedlander.—" Moving contact electric current convertors." 4361. April 1st, 1942. (571656.) " Alternators." Cognate applications. 9087/42 and 16718/42. July 1st, 1942. (571689.)

Igranic Electric Co., Ltd.—" Electric motor controllers." 16876/43. October 14th, 1942. (571669.)

Sir H. Ingram.—" Electrical condensers." 67. January 3rd, 1944. (Addition to 552707.) (571798.)

H. W. K. Jennings (Sun-Kraft, Inc.).—" Electric lamps for therapeutic treatment." 12753. August 6th, 1943. (571785.)

O. K. Kolb.—" Condenser microphones." 20678. December 10th, 1943. (571778.)

Marconi's Wireless Telegraph Co., Ltd. " Variable permeability tuning arrangements." 17502/43. October 24th, 1942. (571787.)

J. Marr.—" Plunger-type electric switches." 333. January 7th, 1944. (571801.)

T. A. Oxley and F. Y. Henderson.—"Method of and electrical apparatus for sorting granular material according to its moisture content." 21185. December 17th, 1943. (571791.)

B. F. Schweig.—" Manufacture of fluorescent glass." 4026. March 3rd, 1944. (571781.)

H. Silten.—" Portable suction apparatus." 15188. September 16th, 1943. (571706.)

H. Sonnenfield.—" Design of power cable and means for producing it." 18280/44. October 26th, 1943. (Divided out of 570640.) (571684.)

Standard Telephones & Cables, Ltd.—" Artificial line and method of making same." 20065/43. August 8th, 1942. (571776.) "Sweep synchronising and beam blanking device." 20679/43. January 21st, 1943. (571776.) " Surface hardening of metal." 1621/44. February 5th, 1943. (571808.)

Standard Telephones & Cables, Ltd., B. B. Grace and E. Mills.—" Manufacture of magnetic articles." 19374. November 19th, 1943. (571676.)

Standard Telephones & Cables, Ltd., G. C. Hartley, E. M. S. McWhirter and J. Handley.—" Electrical indication at a distance." 3300. March 11th, 1941. (571687.)

Turley & Williams, Ltd., D. C. Smith and D. H. Otton.—" Gas, electric or other stoves." 1435. January 26th, 1944. (571807.)

Westinghouse Electric International Co.—" Thermionic devices." 15629/43. October 17th, 1942. (571709.) " Vapour electric discharge devices." 19125/43. May 7th, 1942. (571764.)

R. W. Worrall and Metropolitan-Vickers Electrical Co., Ltd.—" Protective equipment for mine hoists and like winding gear." 13738. August 23rd, 1943. (571700.)

Amended Specification

565871. J. Lucas, Ltd. and another.—"Electric battery plate separators."

Oswestry Jubilee

A LUNCHEON was held on September 18th to celebrate the completion of fifty years of public electricity supply. The undertaking was started by the Oswestry Electric Lighting & Power Co., Ltd., and was purchased by the Corporation on October 1st, 1929, for £19,300.

The initial generating equipment, so far as can be ascertained, consisted of two 20-25 kW dynamos rope-driven by two Marshall engines, steam being obtained from two Marshall locomotive-type boilers. A storage battery of about 50 Ah capacity was also installed. The distribution system was 2-wire, 220 V DC. A change-over scheme was put in hand by the Corporation in 1930 and by 1935 the whole system had been converted to 400/230 V, 3-phase, 4-wire, 50 cycles. The area of supply now covers 100 sq. miles, much of it sparsely populated. Since the Corporation acquired the undertaking the number of consumers has increased from 932 (in 1930-31) to 3,935 (1944-45), total sales expanding from 0·7 million to 7·8 million kWh. The first engineer was the late Mr. E. Bremner-Smith, who was succeeded in 1926 by Mr. H. W. Edwards; the present borough electrical engineer, Mr. H. Breckell, was appointed in 1940.

At the luncheon the speakers included Alderman Sir William Walker (president of the I.M.E.A.), Col. J. Rankin (director and general manager of the North Wales Power Co., Ltd.), Col. O. Poole, O.B.E. (M.P. for the Division), Councillor D. Stone (Mayor), Councillor L. D. E. Turner (chairman of the Electricity Committee), Alderman J. Barlow, M.B.E. (a past chairman) and Mr. E. H. Bradley (chairman of the Oswestry R.D.C.).

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

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

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

Eire.—January 28th. Electricity Supply Board. Hydro-electric generating plant at Cathaleen's Fall and Cliff stations on the River Erne. (See this issue.)

Grimsby.—October 3rd. Electricity Department. Transformers, switchgear and cables. (September 21st.)

Lostwithiel.—October 1st. Borough Council. Pumping plant. Borough surveyor, Municipal Offices, Lostwithiel (deposit, £3 3s.)

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

Redcar.—October 6th. Town Council. Cable laying, etc. (September 21st.)

Salford.—October 3rd. Electricity Department. Power transformers. (September 21st.)

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

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

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

Orders Placed

Brighton.—Re-wiring at sanatorium (£693).—Sayers & Sons.

Swansea.—Electricity Committee. Accepted. Six 750-kVA transformers.—British Power Transformer Co. 12,500-kVA transformer.—Hackbridge Electric Construction Co. Switchgear for twelve months.—Ferguson, Pailin; Cooke & Ferguson.

Swinton & Pendlebury.—Electricity Committee. Recommended. Feeder cables and transformers.—Henley's; English Electric Co.; Metropolitan-Vickers.

Warrington.—Electricity Committee. Accepted. Busbar section unit (£7,336).—Ferguson, Pailin.

Contracts in Prospect

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

Alnwick.—Houses (60), Wash Burn estate; G. Beaty, surveyor, Council Offices, 8, Green Batt.

Aspatria (Cumberland).—Factories for Larma, Ltd.; West Cumberland Industrial Development Co., Ltd.

Brighton. — Workshops, Francis Street (£2,050); Barnes & Llewellyn, Ltd.

Block of flats, London Road, Patcham; Mutual Flat Building Association.

Cheetham.—Factory and offices, Fairy Lane; A. M. Isaacs, architect, 136, Middleton Road, Crumpsall, Manchester, 8.

Glasgow.—Houses on Council estates; C. & J. Weir, Ltd. (500); Scottish Orlet Co., Ltd. (500); and Atholl Steel Houses, Ltd. (60).

Hatfield.—Rebuilding St. Audrey's Senior Mixed School (£18,000); H. V. Lobb, architect, 19, The Butts, Brentford, Middlesex.

Hensingham (Cumberland). — Factory for Eugene, Ltd.; John Laing & Sons, builders, Carlisle.

Kilmarnock.—Conversion of mansion house into home for aged people, and provision of blocks of cottages; Gabriel Steel, architect, Kilmarnock.

London.—CAMBERWELL. — Conversion of 30 large properties and almshouses into flats; borough engineer.

Manchester.—Additions to works, Lythgoe Street, Moss Side, for J. H. Robinson & Co. (Liverpool), Ltd.; W. Johnson & Sons, architects, 27, Oldham Road, Miles Platting.

Maryport.—Factory (56,000 sq. ft.) for Gulstad & Graham, Ltd.

Northampton. — Conversion of premises, Cheyne Walk, into Council offices for R.D.C.; R. J. Miller, surveyor, Council Offices, 1, Spencer Parade.

Oldham.—Factory and offices, Beehive Street; C. Wild, architect, 72, Bridge Street, Manchester, 3.

Penrith.—Houses (450), Scaws estate; U.D.C. surveyor.

Rawmarsh.—Houses (50), Monkwood estate, for U.D.C.; J. R. S. Creighton, surveyor, Council Offices, Parkgate, Yorks.

Repton.—Houses (312), for R.D.C.; A. P. Hancock, surveyor, Council Offices, The Poplars, Rolleston Road, Burton-on-Trent.

Sunderland.—Factory, St. Mark's Road, for R. Powley & Sons, Ltd., and rebuilding of war damaged factory in Portobello Lane for Hartley Wood & Co.; W. & T. R. Milburn, architects, 17, Fawcett Street, Sunderland.

Swanscombe (Kent).—Houses (38), for U.D.C.; L. E. Croucher, surveyor, Council Offices.

Swansea.—Factory, Ystrad Road; Hodges & Sons (Clothiers), Ltd.

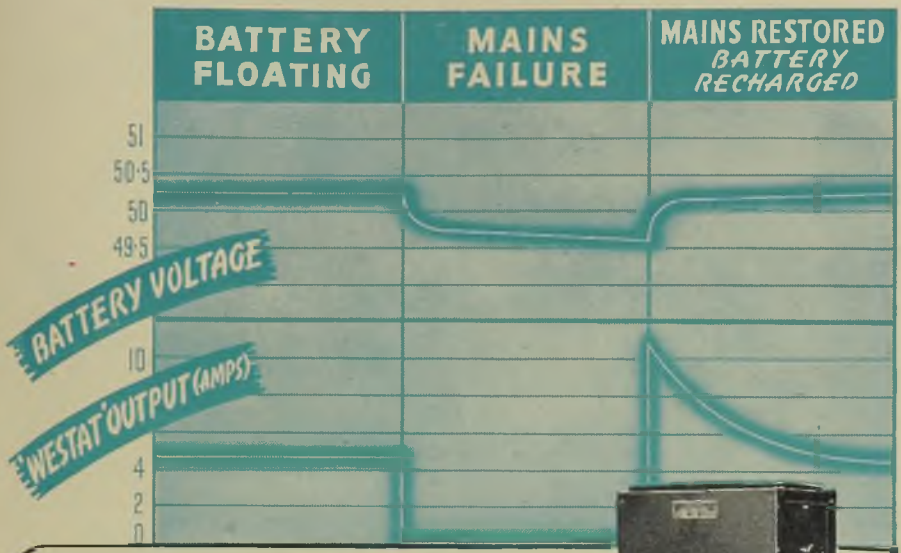
Waterworks (£45,200); A. Jackaman & Son, Ltd., Slough.

Houses (250), Sketty Park; A. G. Roxburgh, Lisvane, near Cardiff.

Tynemouth.—Rebuilding of war damaged houses. Contractors: B. Peel, Ltd., Tynemouth (7); F. L. Hall, Cullercoats (21); and J. M. Liddell & Son, South Gosforth (18).

Walsall. — Ambulance station, Birchills (£4,000); borough engineer.

Warrington. — Houses (50), Dallan New Road; borough engineer.



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CONSTANT VOLTAGE RECTIFIER EQUIPMENT

for use with batteries

In addition to compensating for load variations, the "Westat" Constant Voltage Rectifier Equipment will maintain the output voltage between limits of ± 1% at constant load for mains variations of ± 10%. After a mains failure, when the battery voltage is low, the "Westat" automatically provides a fairly heavy charge, which tapers as the voltage reaches the specified level.

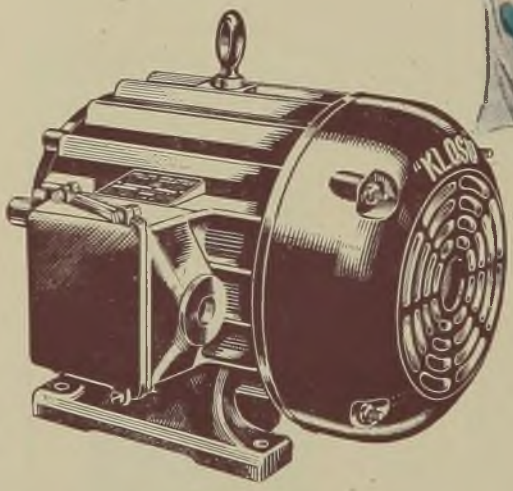
Typical 1,200 watt "Westat" supplied to the Southern Railway for floating batteries

WESTINGHOUSE

Write for descriptive pamphlet No. 11.L

WESTINGHOUSE BRAKE & SIGNAL CO., LTD.
Pew Hill House, Chippenham, Wilts.

MOTORS that combine them all



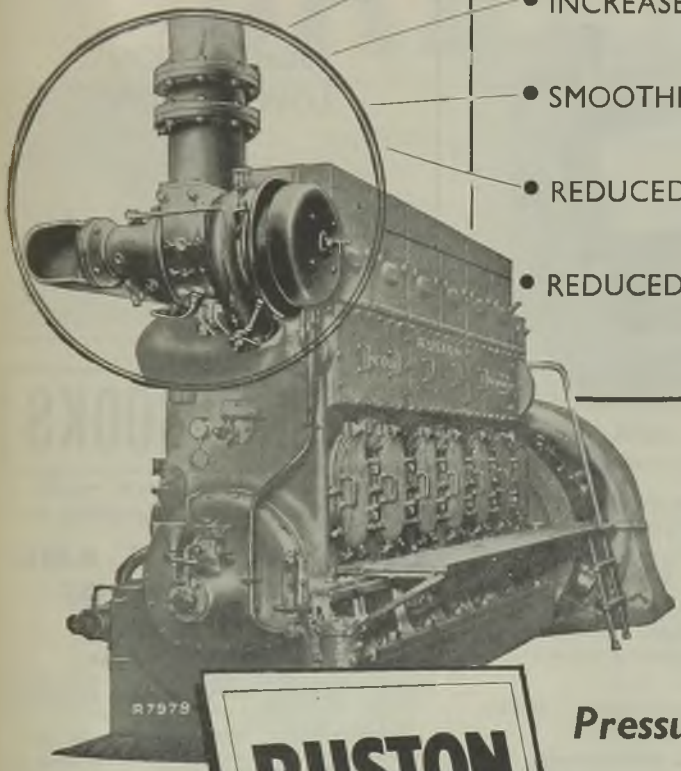
Do you realise the scope of the Parkinson range of over 2,000 types of A.C. Motors? Do you realise how almost any need can be met out of the standard range? There is, for instance, the "QT" Motor for quiet running, the "Klosd" Motor for cool running in damp and dirty situations, and the "Tork" Motor for use when an exceptionally high starting torque with moderate starting current is required. But there is also the "QT-Klosd-Tork" Motor that combines all these features! And it is the same with other combinations of special duty features. Whatever the needs of the drive it is easy to select the correct motor by calling on the Parkinson A.C. Motor Service.

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

PRESSURE CHARGING

THE RUSTON ENGINE

- INCREASED POWER
- INCREASED ECONOMY
- SMOOTHER RUNNING
- REDUCED SPACE
- REDUCED COST



RUSTON

Pressure Charged

OIL ENGINES

RUSTON & HORNSBY LTD., LINCOLN

Associated with DAVEY PAXMAN & CO. LTD., COLCHESTER

G

DON'T MENTION IT!

Why say "polyvinyl chloride" when all you need say is "BX P.V.C."? That is, if you are needing a plastic material for cable and wire covering and conduit tubing made to Specification G.D.E.S. No. 18.*

BX P.V.C. has many advantages. It is tough and non-inflammable; resistant to chemical attack and corrosion. It can be supplied in black or colours for various needs as an extrusion compound, as paste or dough for coating, and in calendered flexible sheets or rolls up to 36 inches in width.

We will gladly tell you more about BX P.V.C. and discuss its unlimited post-war possibilities, which will extend in every direction as controls are relaxed. Why not send for full information and the advice of our technical experts?

* *This material can only be obtained on allocation from Plastics Control.*

BX PLASTICS LIMITED · LONDON E.4

LH/BX245

PURITY

"Pure as the lily," though poetic, is not very precise. We *can* be precise as to the purity of hydrogen and oxygen produced by Knowles Electrolytic Plant—guaranteed to give hydrogen 99·95% pure with oxygen 99·8% pure.

Hydrogen of this purity can be used without further treatment for processes such as the hydrogenation of oils for foodstuffs, synthetic processes involving catalysts, reduction of metals, etc.

Besides the merit of producing such pure gases, Knowles equipment has many technical and operating advantages, including absolute safety under all conditions, very low maintenance charges and long trouble-free life.

Plants in operation all over the world, from small to the largest sizes. A typical large plant absorbs 10,000 amps. at 650 volts, yielding 49,500 cu. ft. of hydrogen per hour. Electrolytic plant forms a highly suitable off-peak load.

KNOWLES ELECTROLYTIC PLANT FOR HYDROGEN & OXYGEN

IEPCO

THE INTERNATIONAL ELECTROLYTIC PLANT Co. Ltd.
SANDYCROFT - - - CHESTER

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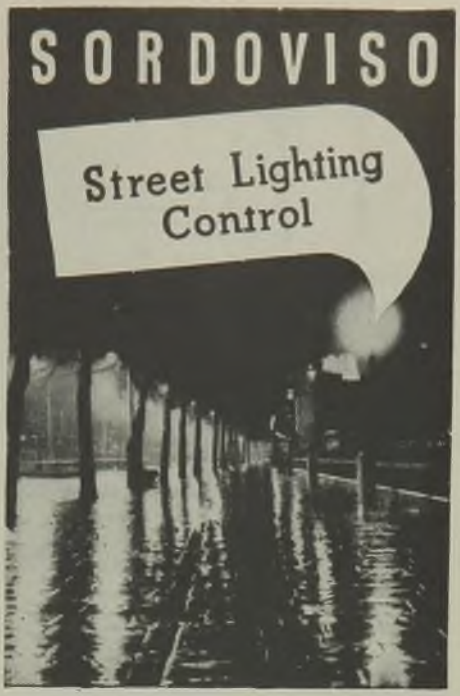

THE forms of control for Street Lighting are many and varied, but now CENTRALISED CONTROL is generally accepted as essential.

Sordoviso Street Lighting Control units embodying the Sordoviso non-tilting Mercury Switch with its inherent features of non-burning contacts, low energising current, silence in operation and freedom from climatic effects, provide a most efficient remote or automatic control with low installation and maintenance costs.

If you are contemplating a new scheme or modifications to an existing one, the advice of our Technical Staff is always available.

We shall be pleased to forward, on application, our brochure, "Controlled Street Lighting."

SORDOVISO SWITCHGEAR LTD.
Falcon Works, Loughborough
LOUGHBOROUGH 3131

M.S.M. are specialist manufacturers of tilting type mercury switches suitable for instrument work, domestic and industrial apparatus and power control gear.

THE MERCURY SWITCH MANUFACTURING CO. LTD.
WEST DRAYTON, MIDDLESEX

DENNIS SWITCHGEAR

SPECIALISTS IN FUSES, DISTRIBUTION BOARDS, SWITCH FUSES, SWITCH BOARDS, CONTROL PANELS, ETC.

* Perfection in Design
* Reliability in Service

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EARTHING CLIPS WITH SPECIAL BITE AND GRIP INTO TUBE OR ARMOURING

Note the tongue which ensures perfect and permanent contact. Easy to fix. Nuts cannot turn. All sizes from half to two inches

THE DONOVAN ELECTRICAL CO. LTD.
BIRMINGHAM 9
Electrical Manufacturers and Stockholders

BAKELITE MOULDINGS AND ERINOID TURNINGS TO ANY SPECIFICATION

FREDERICK W. EVANS LTD.
PLASTIC WORKS
LONG ACRE, BIRMINGHAM 7
TELEPHONE : EAST 1286 & 1287

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 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, IRELAND

Erne Power Development

THE Electricity Supply Board invites tenders for the supply, delivery and erection of THE HYDRO-ELECTRIC GENERATING PLANT AT 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 the 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 HYDRO-ELECTRIC GENERATING PLANT," must be delivered to the undersigned not later than 12 o'clock noon on Monday, the 28th January, 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.
25th September, 1945. 2851

LAMPS

ADVERTISER WISHES TO CONTACT MANUFACTURER TO CONTRACT FOR ANNUAL PURCHASE OF 100,000 HOUSEHOLD LAMPS, 200/240 VOLTS. 40, 60 AND 100 WATTS.

Box 2859, c/o The Electrical Review.

APPOINTMENTS FILLED

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

SITUATIONS 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 CHEPPING WYCOMBE
(High Wycombe)

Electricity Department

APPLICATIONS are invited from men with suitable qualifications for the position of:—

(1) MAINS ASSISTANT, to be responsible to the Mains Engineer and experienced in the installation and operation of H.T. and L.T. underground and overhead distribution systems and equipment. Salary will be in accordance with N.J.B. Schedule, Class E, Grade 8 (£371-£388).

(2) FOREMAN—CONTRACTING DEPARTMENT, to be responsible to the Installations Engineer and experienced in supervision of wiring staff engaged in the construction and maintenance of wiring installations in domestic, business and industrial premises, and in the repair and maintenance of domestic appliances. Salary will be at the rate of £260 per annum, plus war bonus, the present value of which is £59 16s. per annum.

Both 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.

Sealed and endorsed applications, accompanied by copies of recent testimonials, should be delivered to the undersigned not later than Saturday, 6th October, 1945.

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

HENRY ROBSON,
Borough Electrical Engineer.
Frogmoor,
High Wycombe. 2892

MECHANICAL ENGINEER

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

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

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

BOROUGH OF MAIDENHEAD

Appointment of Borough Electrical Engineer

APPLICATIONS are invited for the appointment of Borough Electrical Engineer from Corporate Members of the Institution of Electrical Engineers experienced in the management and administration of an electricity undertaking.

Salary for the position will be in accordance with the agreement dated 9th July, 1941, made by the National Joint Committee of Local Authorities and Chief Electrical Engineers, and in accordance with the agreement the salary for the first year will be 85% of the full salary and for the second year 92½% thereof, the full salary being payable for the third and subsequent years. The full approximate salary for the financial year ending 31st March, 1946, would be £932. In addition, a temporary cost of living bonus is payable.

The appointment will be determinable by three months' notice on either side and 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, on forms to be obtained from the undersigned, must be received not later than 12th October, 1945.

Canvassing, directly or indirectly, will be 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.

J. A. BAIRD,
Town Clerk.

Guildhall, Maidenhead.
September, 1945. 2875

HARROGATE CORPORATION

Electricity Department

Administrative Assistant

APPLICATIONS are invited for the position of Administrative Assistant to take charge of the clerical staff in the Corporation's Electricity Undertaking. Salary £400, rising to £450 by two annual increments of £25, plus cost of living bonus, at present £59 16s. 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 pass a medical examination.

Candidates who have had a responsible appointment with a progressive authorised Electricity Undertaking would be preferred.

Applications, stating age and qualifications, and giving detailed particulars of experience, should be sent (together with copies of two recent testimonials) to the undersigned not later than Monday, 15th October, 1945.

This advertisement is issued with the consent of the Ministry of Labour and National Service.

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

A. KELSO, M.I.E.E.,
Borough Electrical Engineer.

Municipal Offices,
Harrogate. 2857

BOROUGH OF KING'S LYNN

Electricity Department

Appointment of Switchboard Attendant

APPLICATIONS are invited for the above position from applicants with technical training and experience in the control of high and low pressure switchboards and rotary converting plant.

Conditions of service and rate of pay will be in accordance with the District Council (No. 8), Zone B, at present 26.29 pence per hour.

The successful candidate will be required to pass a medical examination and to contribute to the Corporation's Superannuation Scheme.

Applications, giving age, whether married or single, details of training and experience, together with copies of two recent testimonials, to be delivered to the undersigned not later than Friday, 12th October, 1945.

Published by permission of the Ministry of Labour and National Service under the Control of Engagement Order, 1945.

C. W. JACKSON, Engineer and Manager.
2852

COUNTY BOROUGH OF WALLASEY

Electricity Department

Appointment of Senior Demonstrator (Female)

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

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

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

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

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

EMRYS EVANS,
Town Clerk.

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

CITY OF LINCOLN

Electricity Department

Appointment of Power Station Superintendent

APPLICATIONS are invited for the above appointment at the Corporation's St. Swithin's Generating Station. Candidates should be qualified Engineers with experience in the operation and maintenance of a Selected Generating Station.

The present salary will be in accordance with Grade 3, Class F, of the National Joint Board Schedule (£583 to £608), with prospects of higher reclassification on the completion of extensions now in progress.

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

Applications, stating age, particulars of education, training and experience, accompanied by copies of not more than three testimonials, endorsed "Station Superintendent," should be addressed to The Electrical Engineer and Manager, Electricity Department, Brayford Side North, Lincoln, and received not later than Saturday, the 13th October, 1945.

J. H. SMITH,
Town Clerk.

Corporation Offices,
Lincoln.
22nd September, 1945. 2910

COUNTY COUNCIL OF DURHAM

Education Department

Stockton-on-Tees Technical School and Evening Institute

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

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

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

THOS. B. TILLEY,
Director of Education.

Shire Hall, Durham.
15th September, 1945. 2830

COUNTY BOROUGH OF SOUTHAMPTON

Electricity Department

Appointment of Chief Assistant Engineer (Amended Advertisement)

APPLICATIONS are invited for the above-named position, at a salary for Class H, Grade 1, of the National Joint Board Schedule, of £826 per annum, subject to the national increments and adjustments and a deduction for superannuation. The successful applicant must pass a medical examination.

Applicants should each possess an Engineering Degree and/or be a Corporate Member of the Institution of Electrical Engineers, and must have held the appointment of Deputy Chief Official, or an executive position of considerable responsibility, in a large undertaking operating a selected generating station, and be possessed of sound administrative ability. Previous experience in all engineering matters appertaining to generation and distribution and in the commercial administration of an undertaking is essential.

Applications, on forms to be obtained from Mr. W. G. Turner, Borough Electrical Engineer, Civic Centre, Southampton, and accompanied by not more than three testimonials, and endorsed "Chief Assistant Engineer," must reach the undersigned not later than noon on 19th October, 1945.

Canvassing, directly or indirectly, will disqualify.

R. RONALD H. MEGGESON,
Town Clerk.

Civic Centre,
Southampton. 2916

COUNTY BOROUGH OF BOLTON

Electricity Department

Appointment of Power Station Chemist

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

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

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

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

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

PHILIP S. RENNISON, Town Clerk.

Town Hall, Bolton. 2801

BOROUGH OF WORKSOP

Electricity Department

Appointment of Meter Mechanician

APPLICATIONS are invited for the position of Meter Mechanician with the above undertaking. Wages will be in accordance with Section B of District Council No. 2, which is at present 2s. 0¼d. per hour.

Applicants should have had a wide experience in the repair of all types of electricity meters, ordinary and prepayment, D.C. and A.C., single and polyphase. A knowledge of instrument repairs will also be an advantage.

The selected candidate will be required to pass a medical examination and contribute to the Council's Superannuation Scheme.

Applications, to be addressed to the undersigned, should be received not later than first post on the 16th October. Copies of not more than three testimonials to be enclosed.

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

G. R. LAITHWAITE,
Borough Electrical Engineer.

Electricity Works,
Canal Road,
Worksop, Notts. 2907

LONDON COUNTY COUNCIL

REQUIRED at School of Engineering and Navigation, High Street, Poplar, E.14, Graduate Teacher of Electrical Engineering and allied subjects, to commence as soon as possible. Work will include part-time day and evening classes up to Higher National Certificate and Final City and Guilds of London Institute standard, and some teaching in the secondary (technical) school.

Salary in accordance with Burnham Scale, together with London allowance and additions for qualifications and training as applicable. Application form T.1/40, obtainable from the Education Officer (T.1), County Hall, S.E.1 (stamped addressed envelope necessary), returnable by 8th October, 1945. 2856

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

NOTICE

Bath Corporation—Appointment of City Electrical Engineer

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

W. ARTHUR JONES, A.M.I.E.E.,
Secretary,
Standing Joint Committee,
A.M.E.E.—E.P.E.A. 2814

A large electrical organisation requires experienced Draughtsmen for development work in the London area on control gear, electrical machine and traction equipment. Exceptional prospects for keen men. Applicants, who should be Class A ex-Servicemen or excepted from the provisions of the Control of Engagements Order, 1945, reply stating qualifications and experience and salary required to—Box 2908, c/o The Electrical Review.

ARMATURE Winders required, experienced in A.C. and D.C. work. Class A release or over 51.—The Midland Electric Installation Co. Ltd., Cyprus Works, Upper Villiers Street, Wolverhampton. 2897

ASSISTANT Draughtsman (Class A ex-Serviceman or over 51) required in London capable of producing lighting lay-out plans from survey engineers' sketches. General knowledge of sheet metal practice with ability to produce manufacturing drawings for lighting units an advantage. Apply in writing to—Chief Personnel Officer, Crompton Parkinson Ltd., Electra House, Victoria Embankment, W.C.2. 2919

ASSISTANT Mains Engineer. Applicants must have sound knowledge of and experience in overhead line construction and wayleave work in extensive rural area. Salary £400 per annum including war bonus. Applications with full details of education, training, experience, qualifications and position under National Service Acts to be sent to Buckrose Light & Power Co. Ltd., Central House, Kingsway, London, by Oct. 8th. 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. 2889

ASSISTANT, male (Class A ex-Serviceman or over 51) or female for retail electrical shop in London, must be willing and reliable, state experience and wages expected. Reply—Box 73, c/o The Electrical Review.

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

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

CONTRACTORS require qualified Engineer experienced cable and overhead line work, preferably aged about 30. Applications invited from Class A ex-Servicemen.—Box 2903, c/o The Electrical Review.

CONTRACTORS require young Class A ex-Serviceman to train as Assistant Engineer, cable overhead and installation work.—Box 2902, c/o The Electrical Review.

CONTROL Commission for Germany, Fuel, Power and Public Utilities Branch. A limited number of qualified electrical engineers is required for service in Germany. Experience in electricity supply undertakings essential. Salaries range from £600 to £1,200, plus war bonus of £60, with allowances on going abroad of 25% for married men and 12½% for single men. There is also a Foreign Service allowance of £90 a year tax free for married men and £25 for single men, with free messing and accommodation. Applicant must be under 60 years of age and should preferably be under 55. Write quoting D. 1458A 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 15th October, 1945. 2900

CONTROL Gear Designer. A large electrical manufacturer in the South of England requires the services of an Engineer-Designer (preferably traction) to prepare a new range of designs of heavy direct current electric control gear, principally contactors and controllers. Sound mechanical design experience is essential. The selected applicant will have placed at his disposal full details of several present designs of similar gear, and may be given an opportunity of study visits in the United States and on the Continent of Europe to get a complete background of current practice before his new production designs are finalised for production. Previous experience in the design of electrical control gear is desirable, but not so essential as the ability, from mechanical engineering knowledge and experience, to produce designs of apparatus of sound engineering and simple production involving mainly assembly processes. Consideration will be given to applications from engineers experienced in aircraft, automobile and commercial motor vehicle design. The applicants should preferably be competent draughtsmen and not unwilling to produce general arrangement drawings of equipment themselves. Age preferably 28-40, of good general education, practical experience and technical education to Higher National or degree standard; ability to work on own initiative is important. Five-day week, contributory superannuation scheme, commencing salary £750 per annum, with excellent opportunities of advancement, but a higher initial salary would be paid if the ability of the selected candidate justified. Write, quoting D.1451XA, to Ministry of Labour and National Service (A.9), Technical and Scientific Register, Room 670, York House, Kingsway, London, W.C.2, for application form, which must be returned completed by Oct. 31, 1945. 2858

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

DESIGN and Development Engineers (over 51, or Class A ex-Servicemen) required for Electrical Machines, Electrical Traction Equipment and Control Gear, by a leading engineering company in the Midlands. Production Engineers are also required with experience of workshop administration and production control in all branches. Please state details of training, experience and salary required to—Box 217, 8, Serle Street, London, W.C.2. 2887

DESIGN Draughtsmen: Applications are invited from men with drawing office experience and an intimate knowledge of the mechanical design of all types of A.C. and D.C. electrical rotating machines. Salary commensurate with qualifications and experience. Applicants, who should be Class A ex-Servicemen or excepted from the provisions of the Control of Engagements Order, 1945, write stating full details—Box 2909, c/o The Electrical Review.

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

DRAUGHTSMAN used to automatic control gear, over 51 or Class A ex-Serviceman. Please state age, full previous experience and salary required. Near London. —Box 2911, c/o The Electrical Review.

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

ELECTRICAL Contractors (old established firm) require Foreman with first-class experience on industrial and domestic installations, maintenance and repairs. Also in the planning of work, general supervision and keeping records.—Box 2883, c/o The Electrical Review.

ELECTRICAL engineers and contractors require Grade A ex-Serviceman to act as Assistant Manager and Estimator, London district. Applicant should be used to contracting and supervising. State experience and wages required.—Box 2865, c/o The Electrical Review.

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

ELECTRICAL Trade. Required by well-known London wholesale house, keen, intelligent man for the Sale of Electrical Equipment and Accessories. Opportunity for an electrical engineer with personality and ability to create sales. Apply—Box 2855, c/o The Electrical Review.

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

ELECTRICIAN-Wiremen, Class A ex-Servicemen or over 51 years of age. Three experienced men required by our electrical dept. for all branches of A.C. and D.C. factory installation. Fault location ability an advantage. Permanency to suitable men. Week-end overtime, occasional night work. District rates paid.—Box 2868, c/o The Electrical Review.

ELECTRICIAN-Wiremen for general electrical work; permanencies to suitable applicants, who should be Class "A" ex-Servicemen or otherwise exempt from Ministry of Labour control.—J. W. Russell Ltd., Electrical Contractors, 18, Queens Road, Watford. 2917

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

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

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

ELECTRICIANS required (London area), Class A ex-Servicemen only or over 51. Apply in writing, giving full details of experience, to—Box 2863, c/o The Electrical Review.

ELECTRICIANS wanted by London electrical contractors. Class "A" ex-Servicemen. Permanency to suitable applicant. Apply, giving full particulars and age to—Box 2894, c/o The Electrical Review.

ELECTRICIANS wanted by old established electrical Contractors in South Lancashire. Experienced in industrial and domestic installations and repairs. Class A ex-Servicemen or over 51.—Box 2882, c/o The Electrical Review.

ENGINEERS: 2 experienced men required for Plant Engineer's Office to prepare and lay out on drawing board arrangements of boilers, turbines, auxiliary plant, pipe work and similar power plant work. Remuneration dependent on experience and ability. Please state age, education and experience. Address—"0693," Wm. Porteous & Co., Glasgow. 7690

EXPERIENCED Lighting Engineer (Class "A" ex-Serviceman, or over 51), capable of planning industrial and commercial schemes required for work in London and Home Counties. Apply, in writing, to—Chief Personnel Officer, Crompton Parkinson Ltd., Electra House, Victoria Embankment, W.C.2. 2920

FERGUSON Pailin have immediate vacancy on inside sales staff for Assistant Switchgear Sales Engineer. Applicant should preferably have had regular electrical training to Higher National Certificate standard and be conversant with modern power station and substation switching requirements. Salary according to age and experience. This advertisement is inserted by permission of Ministry of Labour.—Higher Openshaw, Manchester 11. 2888

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

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

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

INSULATING Varnish.—Technical Representative with sound knowledge of Electrical Insulation, required as Assistant in Sales Dept. to operate mainly in the North and Midlands. Please state age, experience and salary required.—Box 2877, c/o The Electrical Review.

JUNIOR Engineer with technical training to degree standard required by an Electric Supply Authority. Experience in the design, installation and maintenance of protective gear an advantage. Preference given to ex-servicemen. Commencing salary £385 per annum, including bonus. 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.—Box 2913, c/o The Electrical Review.

LONDON Sales Representative for Electrical Wholesalers. Thorough knowledge of electrical trade essential and connection in London area an advantage. Reply by letter only to—Manager, Electrical Dept., Samuel Gratrix Ltd., 3/4 University Street, W.C.1, marking envelope "Private." 2880

MAINS Foreman required for Campbeltown, Argyllshire; expert E.H.T. Jointer with first-class experience of 11 kV overhead transmission. Salary £234 per annum, plus a temporary war bonus which is at present £62 8s. 0d. per annum. A small flat is available, and the successful applicant will be required to participate in the Company's Superannuation Scheme. Reply, stating age, and giving full details of experience, to the Resident Engineer, Campbeltown & Mid-Argyll Electric Supply Co. Ltd., 17, Reform Square, Campbeltown. This advertisement is published by permission of the Ministry of Labour and National Service under The Control of Engagement Order, 1945. 2898

MANUFACTURERS of electrical conduits and fittings require Agent for Midlands. Reply—Box 2869, c/o The Electrical Review.

PLANNING Engineer, to take charge of planning department and jig and tool drawing office. Must be first-class jig and tool designer having good all-round experience with mass production particularly on small mechanisms utilising press work, auto parts and bakelite mouldings. Class A ex-Servicemen accepted until present restrictions removed. Good salary offered for right man. Write giving age, salary expected, experience, etc. to—Box 2878, c/o The Electrical Review.

REFRIGERATION Service Engineer required by old-established firm N.W. London area, capable of dealing with both commercial and domestic equipment. Permanency to suitable applicant. Class "A" ex-Serviceman. Write, giving full details of experience and salary required, to—Box 439, Blower's Advertising, Sutton Road, Watford. 2918

RUBBER Cable Sales Representative required for Yorkshire area by well-known C.M.A. cable manufacturers. State experience and salary required.—Box 2896, c/o The Electrical Review.

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

STOREKEEPER. Class "A" ex-Serviceman. Previous experience with electricity supply undertaking essential. Wages, D.J.I.C. (No. 11 District, Zone 2), at present 22.18d. per hour.—West Hampshire Electricity Company, Limited, Electricity House, High Street, Lyndhurst. 2893

STOREKEEPER required by firm of electrical contractors. Experience preferred but not essential. Class A ex-Servicemen only or over 51. Apply in writing, giving full details of experience and salary required, to—Box 2864, c/o The Electrical Review.

STOREMAN wanted by electrical contractor, London. Class "A" ex-Serviceman. Write, stating age, full particulars, and salary required.—Box 2895, c/o The Electrical Review.

WANTED, Armature Winder, over 51 or Class A ex-Serviceman, to take charge of small shop. Position permanent. State experience and wages required.—Box 2871, c/o The Electrical Review.

WANTED, Costing Engineer and Buyer for electrical contractor, over 51 or Class A ex-Serviceman, for estimates and buying of materials.—Box 2872, c/o The Electrical Review.

WANTED, experienced Refrigerator Engineer, over 51 or Class A ex-Serviceman, for servicing and refrigerator installations, and to build up maintenance contracts. Opportunity for progressive man. Position Leicestershire and Midlands.—Box 2870, c/o The Electrical Review.

WANTED: Traveller with best connections for electrical goods, and lines for builders' merchants, by old-established first-class Company for Midlands, South Coast and the North. Commission basis. References required.—Box 2899, c/o The Electrical Review.

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

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

SITUATIONS WANTED

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

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

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

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

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

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

ARMY officer, release 21, seeks position with well-established firm, 10 yrs.' experience wholesale and retail, domestic appliances and installations. Capable of designing electric appliances.—Box 7692, c/o The Electrical Review.

B.Sc.(Lond.), A.M.I.E.E., Higher Nat. Dip. I. Mech. E. Electrical, Lt.-Cmdr. R.N.V.R., age 33, six years' war service, six years' experience sound recording, desires administrative post in light electrical industry. Available now.—Box No. 4, W. H. Smith, 11 Kingsway, W.C.2. 2860

BUYER and Stores Supervisor seeks position with concern manufacturing Engineering and Electrical equipment. Fully experienced in buying, modern stock control methods, and stores routine, etc.—Box 7702, c/o The Electrical Review.

CHARGEHAND Electrician, 38, seeks opportunity to manage electrical business, wide experience. Wife could assist. Ex. refs.—Box 7703, c/o The Electrical Review.

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

CHIEF Electrical Engineer, age 33, presently responsible for layout, installation, maintenance of E.H.T., H.T. and L.T. distributions, works capacity 4,600 kVA. experienced costing, estimating; desires position home or abroad.—Box 7707, c/o The Electrical Review.

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

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

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

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

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

ELECTRICAL Engineer (35). 20 years' contracting and maintenance, seeks position in Brighton area.—Box 7705, c/o The Electrical Review.

ELECTRICAL Foreman (40), accustomed to all installation and maintenance work, large factory and mill equipment, cable layout, L.T. and H.T. switchgear and associated services, contracting and estimating, available one month, London or South preferred.—Box 7684, c/o The Electrical Review.

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

ELECT. Mech. Engineer, 29, 13 yrs.' experience works, D.O. and design, Elect. Higher Nat. Cert., used to control of staff, is seeking a position of responsibility.—Box 7700, c/o The Electrical Review.

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

ELECTRICIAN, Maintenance, Installations. Handy Fitter, drive car, 47, seeks permanent position—A. 7, St. Luke's Avenue, Clapham, S.W.4. 7698

ENGINEER (31) seeks progressive position. Ordinary and Higher National Certificates (Elec. Eng.). Free to take up immediate employment. Six years with well-known firm of industrial instrument manufacturers. Would consider sales or laboratory work. London area only.—Pitt-Bayly, 59a, Oxford Gardens, W.10. 7691

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

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

FOREMAN Armature Winder desires change, 30 years' exp., A.C. and D.C. fractional to 60,000 kW. manufacture and repairs, mixed labour, own ratefixing.—Box 7706, c/o The Electrical Review.

FULLY qualified Elect. Eng. requires post, preferably West Mid. Ten years' practical and over four years' full-time technical college teaching experience. Can control labour, etc.—Box 7711, c/o The Electrical Review.

GRAD. I.E.E. (27), seeks position as Manager, Sales or General in Electrical trade. Wide experience in the Electrical Wholesale trade. Full knowledge of C.M.A., E.L.M.A. and A.S.C.M., factory, contractors and Public Supply Companies requirements. Corporate Member Illuminating Engineers. Experience in lighting design and layout. South East England or South Midland area or Overseas. Please reply to—Box 7708, c/o The Electrical Review.

LIFT Engineer (31), A.M.I.E.E., seeks responsible position. 10 years in lift industry. Sound knowledge of controller design and operation. Recently discharged H.M. Forces after holding important technical commissioned rank.—Box 7699, c/o The Electrical Review.

LIGHTING Fittings, Domestic Appliances and Radio. Advertiser, 15 years' experience, London showrooms, ex-officer, just released, seeks appointment London area as Showroom Manager, Buyer, Sales.—Box 7687, c/o The Electrical Review.

MAINS Foreman (Electrical), 10 years' experience with large supply undertaking. Wide experience in H.T. and L.T. overhead and underground mains services.—Box 7695, c/o The Electrical Review.

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

PLUMBER Jointer (42), 20 years' exp., supply, contracting, E.H.T., 22 kV, L.T., wants work anywhere, South preferred.—T. Millar, 27 Barncroft Gardens, Benchill, Manchester. 7704

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

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

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

SUPERVISOR (38), requires settled post, anywhere. experienced, O/H lines, U/G, and installations.—Box 7701, c/o The Electrical Review.

WORKS Superintendent desires change, 20 years' experience, radio and light mechanical production, knowledge of time study, etc. Go anywhere.—Box 7693, c/o The Electrical Review.

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

FOR SALE

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

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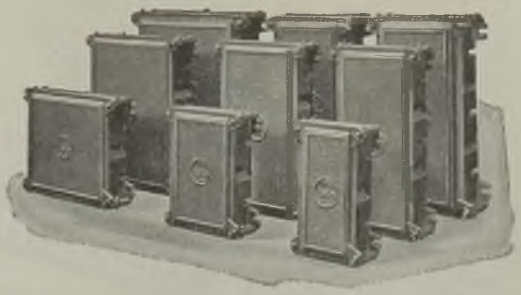

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