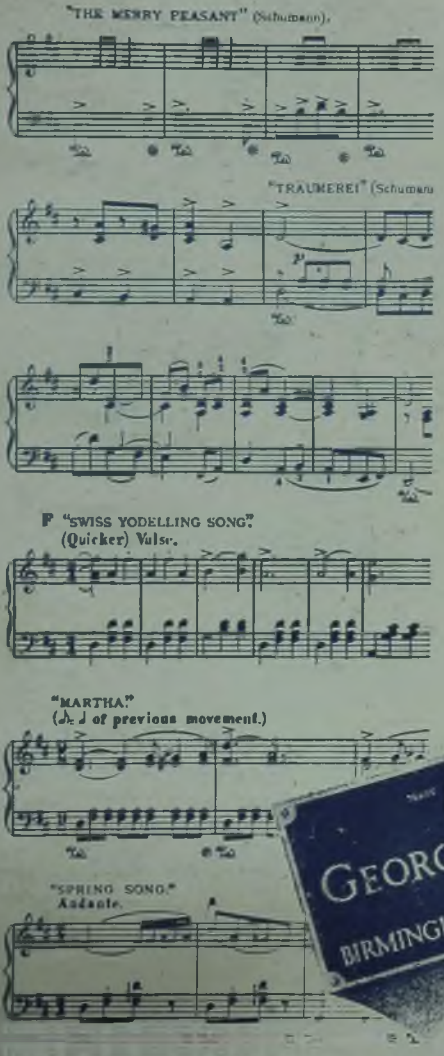
ELECTRICAL REVIEW

FOUNDED 1872

Vol. CXXXV. No. 3478 JULY 21, 1944 9d. WEEKLY



"Mrs. Harris," I says, "leave the bottle on the chimley-piece, and don't ask me to take none, but let me put my lips to it when I am so dis-poged."

SAIREY GAMP'S methods apply in principle to the consumer of electricity. The only trouble is that consumers tend to be 'dispoged' at one and the same time and unless your maximum demand limitation is to become a bottle-neck, off-peak load control is essential.

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. . . MOFFATS will anticipate fashion trends. . . . We shall plan to meet the demands for the All-Electric Kitchen. Moffat models will please the most exacting housewife who will demand the last word in efficiency. For instance, this Model Kitchen displays distinctive streamlined Model 164 Electric Cooker, modern stepped-in base equipped with four efficient boiling plates, large bake-oven, separate Warming and Utility Compartments—with our M.45. (medium-size) Electric Refrigerator to match. Both Units in De-luxe Porcelain Enamel Ivory Finish. And . . . We shall have the IDEAL Electric Cooker for *any* size of kitchen, *all* available in French Grey and White, Two-tone Ivory, Ivory and Green. Other Moffat features will be available on all Cookers:—"Cookquick" Semi-radiant Boiling Plates; "Even-heat" Oven; Patent Balanced Drop-down oven door; Therm-o-matic Oven Heat control.

We are busy now on war work and priority equipment for factory canteens, etc., but we have post-war Kitchen requirements always in mind.

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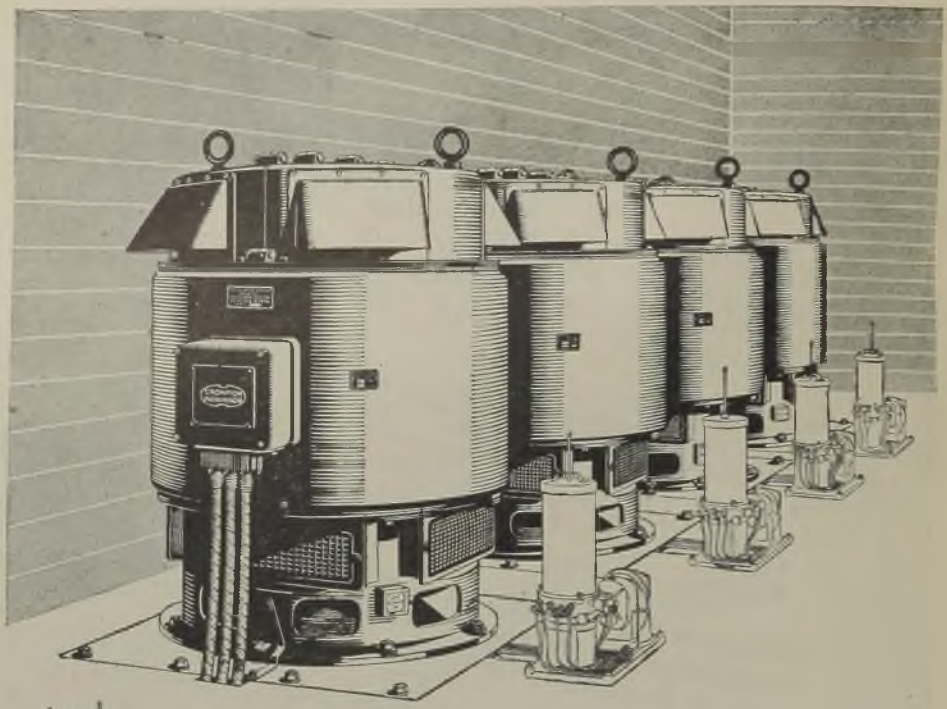

Keeping the pumps going.

A town's water supply depends on these Crompton Parkinson 315 h.p. vertical spindle slip-ring motors. Again and again Crompton Parkinson Motors are specified for duties of responsibility such as this.

CROMPTON PARKINSON
LIMITED
ELECTRA HOUSE · VICTORIA EMBANKMENT LONDON W.C.2 AND BRANCHES

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As to the argument it must remain a mystery along with the Marie Celeste and Mr. Gladstone's earlier remark. But even to-day our Managing Director is sometimes heard muttering " He *did* say it, all the same."

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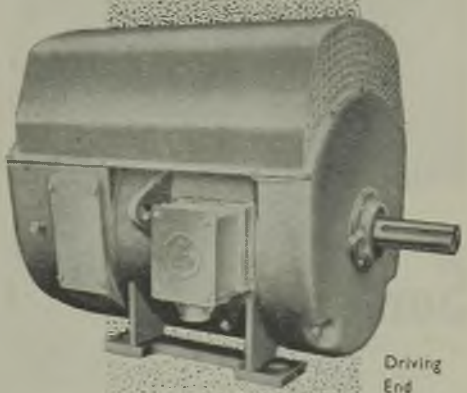

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THE ENGLISH ELECTRIC COMPANY LIMITED STAFFORD

Something NEW in Switchgear!

Sordoviso produce a new Plug-in Contactor

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

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Electronics has given us a new and revolutionary technique—another powerful string to our bow—with which to meet your requirements for still finer, more precise, fast acting control in industry.

War, unfortunately, demands our entire production and facilities in this new field of endeavour, but as soon as conditions permit we look forward to solving your problems *electronically*.

Our full technical facilities for service and attention to existing installations are always available—please communicate with us if we can be of assistance.

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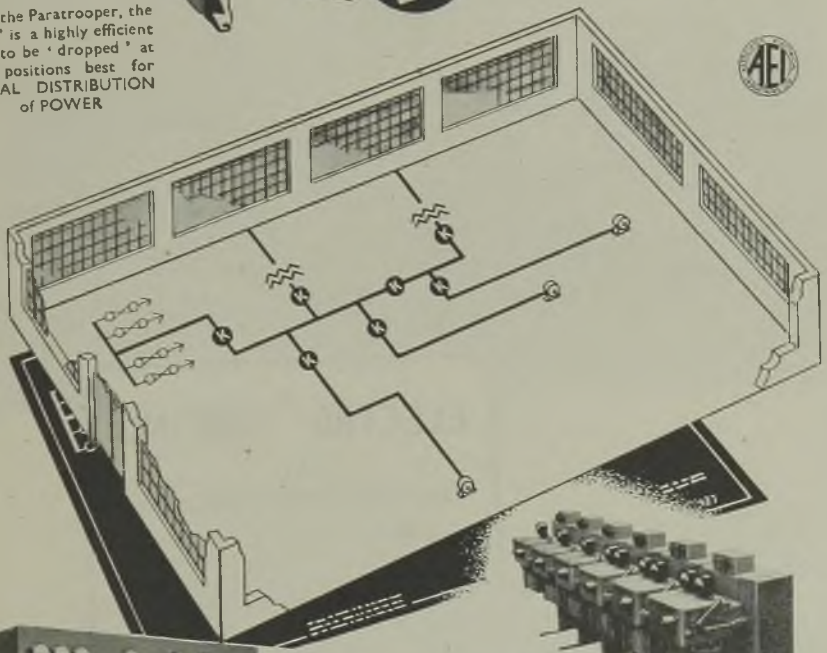
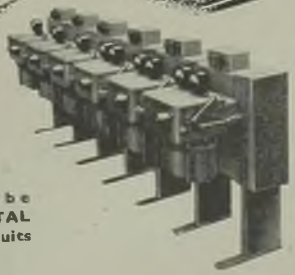
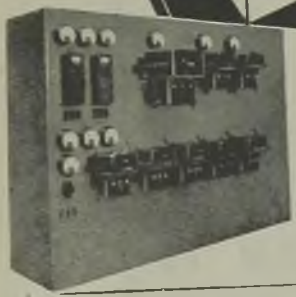
CONTROLLING AND RECORDING INSTRUMENTS

WHERE HE'S **K** NEEDED GEAR

Like the Paratrooper, the "K" is a highly efficient unit to be 'dropped' at key positions best for LOCAL DISTRIBUTION of POWER







"K" Gear may be CUBICLE or PEDESTAL MOUNTED for circuits up to 660 volts

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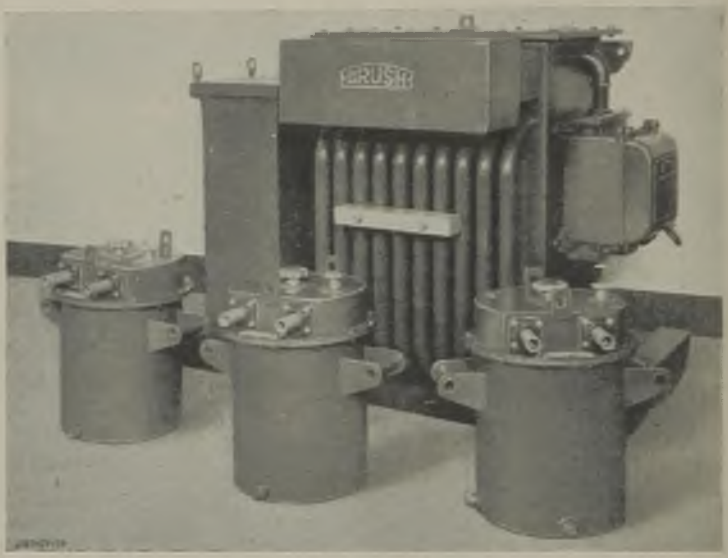
P.W.9


SAVE RUBBER — use
CROMPTON
THERMOPLASTIC
CABLES
Stocks available at all
Crompton Depots

BRUSH Welding EQUIPMENT



THIS equipment is constructed for heavy duty to withstand the most arduous service conditions and conform to British Standard Specification 1071-1943.

The illustration shows a Brush 90 kVA Transformer complete with incoming control switch and fuse, and condenser for power factor correction, the whole mounted on skids for ease of movement.

Three of six regulators are shown in the foreground. Each regulator has a capacity of 300 amperes per arc and is fitted with a robustly constructed switch having 36 positions to cover a current range from 35 to 300 amperes. The switch is arranged for positive location in all positions. An indicator plate shows the current ratings.

Brush Welding Equipment is built to cover four standard sizes, details as follows :—

kVA (continuous rating)	OPERATORS
54	**Three** at 300 amps per arc
90	**Six** at 300 amps or 3 at 600 amps per arc
122	**Nine** at 300 amps per arc
153	**Twelve** at 300 amps or 6 at 600 amps per arc

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BRUSH ELECTRICAL ENGINEERING LOUGHBOROUGH ENGLAND

ELECTRICAL REVIEW

July 21, 1944

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THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

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Electricity's Advance

No Surplus Generating Plant

THE Electrical Development Association claims in its advertisements that electricity is the life blood of a nation at war. The statement by Major Lloyd George last week that output had increased by over 51 per cent. since the war started is a confirmation of this claim. There has been little or no increase in domestic consumption as a whole so that industry has been responsible for this advance. It is not clear how Major Lloyd George arrived at his figure but it is probably fair to assume that he was dealing with the period between January, 1940, and December last—four years. If this is the case the increase of itself is not remarkable for the rapidly-expanding electricity supply industry ; its significance lies in the fact that it has been achieved in difficult wartime conditions.

Pre-War Progress

As a matter of comparison, it may be said that in the four-year period preceding 1938/39 the annual output showed a rise of 50 per cent. and in the four years before that 54 per cent. It is thus conceivable that the war so far from speeding up the progress of electricity may actually have retarded it : that the natural growth of the public demand, which the war has checked, is greater even than the requirements of the war machine.

Another assumption which seems justifiable is that the greater preponderance of the industrial load has resulted in a considerable improvement in the load factor which should mean that the increased output has not involved a proportionate increase in plant capacity. A corollary of this is that any fears of there being too much generating plant after the war are unfounded. In point of fact we have already been told that there is no danger of superfluity—rather the reverse. Again, the continued heavier loading, combined with the difficulty of ensuring adequate overhaul and maintenance must have had an effect upon the life of generating plant which is another reason for expecting a shortage of plant if anything.

Contemplated Extensions

Plans are already well advanced for the erection and extension of power stations on a considerable scale and the response to the Electricity Commissioners' request for details of authorised undertakers' post-war proposals has shown that a great deal of further extension is contemplated. It is unlikely that all the needs will be satisfied within a short period. The Commissioners will have a great deal of sorting out and co-ordination to do.

The satisfaction of the demand for "consumers'" goods (in a special sense) will be a somewhat gradual process, depending upon the release of the necessary material, and other factors, and this will help to guard against a possible shortage of electricity. What must be aimed at is a parallel growth in the volume of distribution and consuming apparatus and in the generating capacity to feed it, a process which should ensure steady prosperity for the electrical industry for a good many years.

Major Lloyd George referred in his speech to the future organisation of the

gas and electricity supply industries. He mentioned the Committee set up to consider the position of the gas industry and said that, as regards electricity, during the last few weeks he had been collecting the views of the industry itself from as many groups and points of view as possible. He need say no more than that " they were not lacking either in thought or variety."

Durham Dispute

A GREAT stir has been aroused by the proposal of the North Eastern Electric Supply Co. to erect a 150,000-kW station on the Wear above the city of Durham. One of the finest views in Europe—the cathedral and castle set upon a hill by the river—is said to be threatened by the project and if this is true only the most inflexible of Benthamites will be content to subordinate beauty to utility. But there is some doubt about it. Lieut.-Col. S. E. Monkhouse, on behalf of the company, denies that the amenities will suffer. The site is well over a mile from the city and the station will be a structure whose architectural appearance will be regarded by the company as at least of equal importance to its engineering design.

City Council's Approval

THE Durham City Council, which should be in a position to judge between the parties, has given qualified approval to the scheme; its first proviso is, that no alternative site is available and its second that the buildings shall be so constructed as to harmonise with the surrounding countryside. Similar action has been taken by the East Durham Joint Planning Committee. The Council for the Preservation of Rural England has suggested that such projects as this should be submitted to the Royal Fine Art Commission, quoting the example of the Central Electricity Board and the grid. There is an insistent demand for a public inquiry which appears likely to be acceded to.

Conforming to Specification

SPECIAL requirements by customers are frequently very troublesome to manufacturers when they mean interruption of their normal practice, even though the customers are willing to meet the extra cost. Government Departments, in the past, have been particular sinners in this respect; each of them had its own specifications and idiosyncracies. We believe that there has been some reform during the war, but apparently it is still occasionally necessary to administer a check. To save materials and labour the B.S.I. recently produced a War Emergency Specification for Service Departments covering motors and generators up to 300 HP, kW or kVA. The Government Departments generally have agreed to accept this Specification save in exceptional circumstances. All the same the manufacturers have been asked to refer to the Director of Industrial Electrical Equipment any cases in which departures from the Specification are demanded " unless these are clearly necessary and have been agreed with the Government Department concerned."

Widened Scope

FURTHER recognition by the Institution of Electrical Engineers of the immense possibilities which lie before electronic engineering is afforded by the decision to change the name of the Wireless Section to " Radio Section " and to extend its range to include the whole of the high-frequency and electronic engineering field. Already the Centres have begun the formation of Wireless Groups; this presumably will be continued and the groups will similarly expand their activities. During the formative years of the great electrical industry the Institution's original concern, " light current " engineering, has tended towards taking a secondary place. It seems likely that through the Radio Section the " non-heavy " applications of electricity will in future play a much more prominent part in the Institution's proceedings.

Overseas Trade

LITTLE has been heard of the Department of Overseas Trade during the last four years or so. Many people had come to believe that it no longer existed for it had no voice in the chorus of public relations officers who hymn the activities of other Government Departments. In times of peace it rendered a good deal of useful service to exporters in the way of information and guidance, although as a link between the Board of Trade and the Foreign Office it has sometimes appeared to be a little stretched. Nevertheless the principles of its constitution are good ones and the Department could be of considerable value after the war with a revision of its practice. This appears to be the task

of the Export Trade Consultative Committee which has a strong electrical representation—Messrs. V. Watlington (B.E.A.M.A.), L. H. Short (English Electric) and F. B. Duncan (Electric and Musical Industries).

Scottish Board's Tariff

AN idea of what its charges to domestic consumers are likely to be has been given by the North of Scotland Hydro Electric Board. The principal interest lies in the proposed adoption of a block tariff. The initial step is 30 kWh per room at about 5d. per kWh, but reports which we have had are not clear about the following step. If, as some say, it is to be 4d. per kWh for the next 1,000 to 1,200 kWh and thereafter ½d. per kWh it will practically preclude the use of electricity for anything but lighting and other small uses. On the other hand, if the second block is charged for at ¾d. per kWh, as other accounts state, cooking and heating will be possible.

Silk Insulation

OUT of evil good. The cutting off of supplies of silk from Japan stimulated development of rayon yarns. Supplies of viscose rayon, to which Mr. G. H. Fletcher referred in his chairman's address to the I.E.E. Sheffield Sub-Centre as at least equal to natural silk as a wire covering, and in some respects better, are at present restricted and can be applied only to the finer gauges. However, it seems to promise independence of the natural product in the future. Where a slight increase in insulation thickness and reduced resistance to abrasion are permissible, the more plentiful cellulose-acetate rayon offers a suitable alternative for simple coil windings.

Socket-outlets

THE Electrical Installations Committee of the Directorate of Post-war Building (Ministry of Works) is not alone in its view that the present situation with regard to socket-outlets for domestic electrical appliances is not by any means entirely satisfactory. Its opinion that inconvenience is being caused to users and that domestic electrification is being hampered is shared by some sections of the electrical industry and by the public in general. The cessation of building during the war period has created an opportunity, which may never occur again, to do something better for the very large post-war programme and it is felt that, if a change is to be made, it should be made now. There is a feeling in many circles, including some of the largest purchasers, that an effort should be made to standardise one type and size of socket-outlet for plugging-in all portable lamps and appliances used in the smaller classes of dwelling house. A questionnaire on the subject recently circulated to electricity supply authorities seems to have resulted in a large majority in favour of a 3-kW size for 230 V which shall *not* be interchangeable with any of those hitherto installed.

Civilian Needs

FROM time to time in recent weeks there have been reports that the United States authorities are relaxing the restrictions upon the production of goods for civilian requirements. The War Production Board has been pressed by manufacturers to ease the restrictions, but on the other hand the Service Departments have objected to such a step. It is reported from New York that Mr. Donald Nelson, chairman of the Board, had plans for a very gradual "reconversion" including the release of surplus aluminium and magnesium for civil needs; permission to manufacturers to order machine tools; and the empowering of regional directors to release individual manufacturers from war restrictions. *The Times* says that the last proposal was particularly opposed by industrialists as tending to favour newcomers to industry to the prejudice of the older concerns. Deferment, not settlement, has been decided upon; the application of orders giving effect to the proposals has been postponed for a short period.

Slackers, Beware !

OUR attention has been drawn to an unexpected new use for electrical measuring instruments. Following complaints of voltage fluctuations at a small factory, a supply company decided to check up by means of a recording voltmeter. Although the allegations regarding pressure were found to be without foundation, the tests brought to light the fact that from midnight until 4 a.m., when work was supposed to be still going at full swing, there was an almost complete shutdown of plant. It is not surprising to learn that a number of changes have been made.

Rubber Reclamation

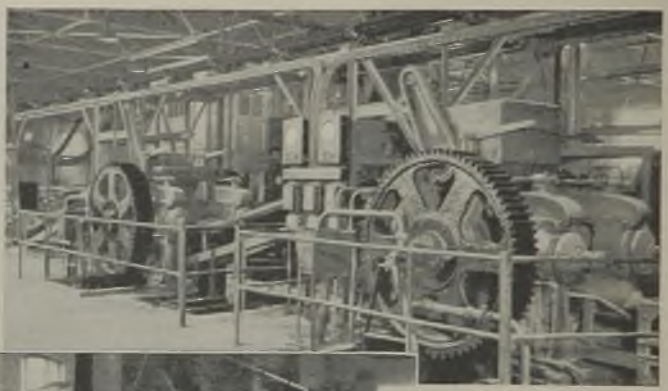
Heavy-Duty Drives in New Installation

BY the courtesy of the North British Rubber Co., Ltd., we have been able to obtain the following description of the electrical applications to a new industry of outstanding national importance at the moment. The details relate to the company's factory at Edinburgh where it has recently installed a complete installation for reclaiming rubber, mainly from disused automobile tyres.

In many respects the machinery used for rubber reclamation is similar to that employed for normal commercial rubber production, some of which at the same works we dealt with in the *Electrical Review* of September 4th, 1942. But there are several new processes involved and the installation embraces some particularly outstanding examples of heavy-duty drives.

In an annexe to the main plant room the material is obtained from the tyres and prepared into a suitable form for handling by the main process plant. The first machine in the preparation plant is a de-beading equipment in which the first bead is removed from the tyre casing. The tyre is held in a circular vice while it revolves and a knife is applied by a hand lever from a stand just in front of the machine. This de-beader is driven by a 5-HP, 945-RPM motor with belt transmission through a countershaft, giving an overall speed reduction ratio of approximately 12 to 1.

Another machine removes the second bead and cuts the tyre into strips. The tyre is held by hand and passed between two revolving toothed cutters. This machine has a 5-HP, 950-RPM squirrel-cage motor which is incorporated in the machine structure complete with the transmission gearing. The third and last process in this preparation plant is chopping the tyre strips into small pieces, and this is done in a machine with a series of rotating knives, rather like a lawn mower, which are fed from a tray by means of a horizontal cylindrical feeder with cogs on its surface. This machine is served by a 20-HP, 1,000-RPM motor with a 6 to 1 belt transmission to the cutter shaft and secondary transmission to the feeder.



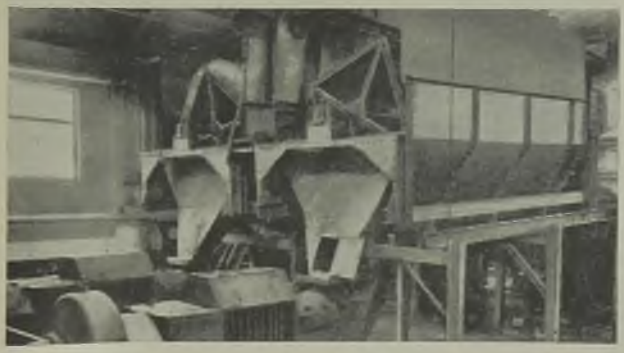
In the cracking machines, fluted rolls loosen the material; note central control station for crackers and screen at centre

Equipment for the initial preparation of the material, *i.e.* de-beading and chopping machines, is installed in an annexe to the main plant room

From the preparation plant the chopped material is conveyed to the first of two cracking mills in which it is passed through heavy fluted rolls which loosen the material but do not separate it. This process is repeated in a second cracking mill, thus bringing the material nearer to a state of

disintegration. From the second cracker the broken-down material is passed to a sifting machine in which the screen is agitated by means of an eccentric at one end served by a 1½-HP motor through a V-belt, and the material which passes through the screen consists of small particles of rubber and fibre, the latter, of course, coming from the canvas lining of the tyre. Rejects from the screen are automatically returned to the second cracker for further treatment. Each of the two cracking mills is driven by a 150-HP, 730-RPM pipe-ventilated motor partly welded in the shop floor, and transmission is by enclosed heavy gearing with a ratio of about 10 to 1. Each motor is also equipped with an electro - mechanical brake. The starting equipment for each of these large motors embraces three adjustable magnetic overload releases, a t.p. stator contactor with powerful magnetic blow-outs and easily renewable butt contacts, four accelerating contactors, each of which closes under the control of an adjustable pneumatic timer, a brake relay, a control relay and two h.r.c. control circuit fuses, an interlocked isolator which serves to reverse the motor in an emergency and a grid type rustless unbreakable rotor starting resistance. With the exception of the last-mentioned item, which is mounted separately above the starter, all the above equipment is housed in an iron-clad floor-mounted cabinet with a hinged door on an impregnated and bushed slate base with the connecting terminals. An 8-in. dial ammeter and a "start" and "stop" push-button are mounted on the from of the cabinet.

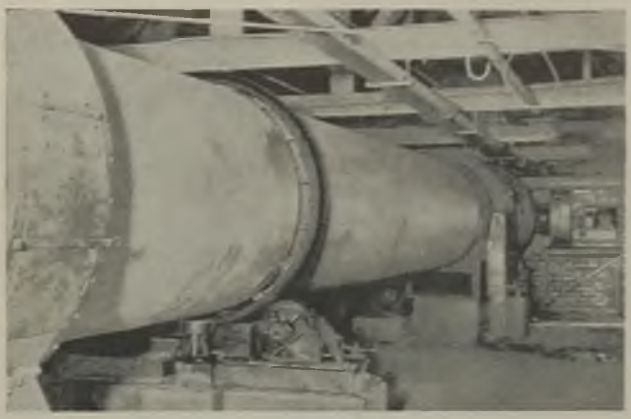
Above: Each cracking mill is driven by a 150-HP pipe-ventilated motor; all the starting equipment for this motor is housed in an iron-clad cabinet with hinged doors
Right: A motor-driven travelling hopper (above) discharges the mixture into steam-heated revolving spherical digestors below



From the rotating washers (right) the material is passed on to presses (left) which remove the excess water

The two cracking mills, the screen and the sifter, together with the several short interconnecting conveyors, are all centrally controlled as a group to give, in effect, sequence control, although the group is not automatically controlled for sequence operation. At the central control station there are a combined 8-in. ammeter and

lock for each of the cracker motors, and a hand-operated reversing switch and a start and stop push-button unit for each of the three motors. Each lock is "Castell" key operated and by means of this the operator can open the control circuit at will and thereby render the whole of the starting equipment normally inoperative.



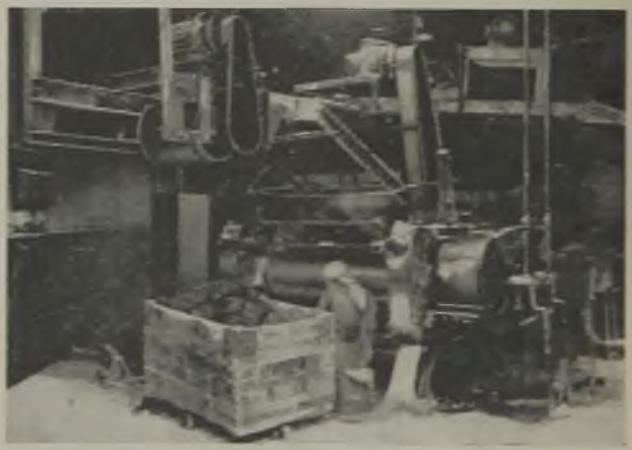
The rotary dryer is driven by an 8-HP motor (below drum), and the dryer fan is driven by a 12-HP motor at the far end

On the journey from the screen for further processing the material passes over a magnetic separator which removes such metal parts as nails and pieces of wire from the rubber "crumb," as the screened material is called. The separator is of the studded continuous-belt type, with an "internal" magnetising solenoid, and it is supplied with DC by a small metal rectifier. From the conveyor on which the separator is housed the crumb falls into a collecting bin from which a 1½-HP motor-driven travelling hopper is loaded with specific weights of this material and of oil and resin. The oil acts as a plasticiser and the resin as a binder.

The travelling hopper runs on rails mounted above a double line of spherical digestors into which the crumb, oil and resin mixture is unloaded, and in which caustic soda is also applied to dissolve the fabric fibre as a means of removing the original canvas lining of the disintegrated tyres.

During the digesting process the mixture in each spherical container is heated by steam under pressure, and the container is revolved by means of a 12-HP motor with reducing gear transmission. After a predetermined time each digestor is brought to a "stand" and coupled up to blow-down pipes, and the steam pressure is increased, so that material is forced out to a condenser. This is partially filled with water to start with, so that the caustic soda is diluted and the pressure is partly relieved. The contents of the condenser are next passed on to one of a pair of rotary washers in which rotates a horizontal rectangular frame faced with wire gauze. The crumb mixture passes down inside the rotating member while water jets play on to this externally; thus the crumb is gradually washed as it passes through the machine. The rotating member is driven by a 5-HP, 1,430-RPM motor and transmission is *via* a wide-ratio reduction gearing to give a frame speed of about 12 RPM.

The crumb still contains a high proportion of water, most of which is removed by presses into which the material is passed from the washers. Each press is driven by a 40-HP motor through chain transmission gearing. To complete the drying the material is conveyed from the presses to one of the two rotary dryers. These are of the horizontal cylindrical type, after the style of a cement kiln, and each is equipped at one end with a steam heating battery. A fan blows air through the dryer from the heater end, *i.e.*, through the heater first and against the



The batching machine produces the material in sheet form

direction of the crumb as this travels down the slightly inclined revolving dryer, its passage being intermittently arrested by baffles inside the drum.

The dryer fan is driven by a 12-HP motor to which it is directly coupled, and the dryer itself is rotated on trunnion bearings by an 8-HP, 970-RPM motor which transmits its power through a reduction gear to a rack around the periphery of the drum, so as to impart to the drum a final speed of 4 RPM.

From the dryer the material is conveyed to a batching mill in which it passes through a series of heavy steam-heated rolls which finally produce the material in sheet form. This batching machine is driven by a 100-HP, 485-RPM slip-ring pipe-ventilated motor, the transmission being through a double helical gearing with a speed reducing ratio of about 6 to 1. The control equipment for this

The refining machines are group driven by a 275-HP motor for each battery of three machines

is fitted with forward, reverse and stop push-buttons, and a combined ammeter and lock. A separate electric bell sounds an alarm in the event of the load on the motor exceeding the predetermined figure.

Finally, the material is dealt with by refining machines, in each of which there are two slightly cambered rolls running at different speeds. The coarse material is either rejected by the camber or it is worked into the material as a homogeneous whole. The material is rolled on to a drum from which it is removed as the works product in the form of slabs. The refining machines are group driven in batteries of three machines, each battery being served by a 275-HP, 732-RPM s.r. pipe-ventilated motor *via* a double helical gearing which imparts to the common shaft a speed of 100 RPM. The control arrangements for the refiner motors are similar to those to the cracker and batcher motors, except that there are five rotor contactors and the control is from "start" and "stop" push-buttons on the door of the starting cabinet only. There is, however, a remotely indicating ammeter at each machine, so that the operator can see the loading of the motor at any time.

A particular feature of this installation is the numerous conveyors which link up the

In the straining machine the material is forced by a worm through a mesh

motor is very similar to that for the cracking mills already described. The next process of straining is accomplished in a machine in which a worm forces the material through a wire mesh to remove minute pieces of foreign matter. Each straining machine is driven by a 150-HP s.r. motor with double helical gear transmission, and the control arrangements are similar to those for the cracking and batching machines, except that, instead of a hand-operated reversing switch, mechanically interlocked reversing stator contactors

are provided, so that reversing is effected by the push-buttons on the starting cabinet door, or from the remote control desk which

many machines; indeed, the plant as a whole can at most be regarded as one huge conveyor system, interspersed with various processing equipments. There is little point in detailing the drives of all these conveyors, the motors for which are usually quite small and are all s.c. units. They are all served by direct-on-line starters of the contactor type, each of which is equipped with three magnetic overload devices and start and stop push-buttons in the starter cover. In some cases emergency stop-buttons are fitted at convenient points along the conveyor routes. Most of the motors to which we have referred, including all the large ones for the cracking and batching mills, the strainer and the refiners, were supplied by the English Electric Co., Ltd., and practically all the starting and control equipment, including that for all the large motors and the direct-on-line starters for the conveyors, were supplied by Igranic Electric Co., Ltd. We are indebted to the North British Rubber Co., Ltd., for permission to view the installation, and for facilities to collect the information and to take photographs.

The whole plant may be visualised as one huge conveyor system; a large tray conveyor takes the material to the refiners

Coal and Electricity

Increasing Need for Economy

PRESENTING a Vote for the Ministry of Fuel and Power in the House of Commons on July 13th, Major Lloyd George reviewed the present coal situation. He said that during the war an increasing burden had been imposed upon the gas and electricity supply industries and the plant in both of them had been working at a very great strain. Since the war started the output of gas had risen by over 10 per cent. and that of electricity by over 51 per cent.

Fuel economy was more than ever necessary. Many domestic consumers had been a good deal less careful with gas and electricity than with solid fuel. In industry very substantial cuts had been made without any appreciable effect upon production. Similar economies should and could be made by domestic consumers without undue hardship.

The Ministry was considering the long-term needs of the gas and electricity supply industries. He had recently appointed a Committee to consider the future development of the gas industry and the Government also had under consideration the future organisation of the electricity supply industry. During the last few weeks he had been collecting the views of the industry itself from as many groups and points of view as possible. Referring to coal stocks, Major Lloyd George said that we had barely got through last winter; 4,500,000 tons had to be taken out of the distributed stock. There had been two mild winters but two very cold summers, which had had an amazing effect upon the consumption of electricity and on stock-building.

The Minister went on to deal with a number of aspects of the mining industry and referred, among other things, to the increasing mechanisation of coal-cutting and conveying and the training of miners in new methods. The most important step, he said, was the establishment at Sheffield by the Ministry of Labour of a mechanisation training centre. (An article on this centre was published in the *Electrical Review* of May 26th, p. 747.)

Radio on Railways

OFFICIALS of the Sante Fé Railroad described as entirely satisfactory the operation of a freight train by radio communication between engine and guard's van, for 2,200 miles from Bakersfield, California, to Chicago. At no time was communication between the front and rear ends of the train broken. The equipment used was an experimental installation of ultra-high frequency, two-way radio-telephony. It was installed by the radio division of Bendix Aviation Corpn. and was operated under an experimental licence granted by the Federal Communications Commission. The vice-president of the Sante Fé system said that further installations of equipment would depend upon allocation of wavelengths and the availability of materials.—*Reuter's Trade Service.*

Organisations of the Industry—V

Electrical Research Association

By E. B. Wedmore, C.B.E., M.I.E.E., F.Inst.P.

WHEN the Electrical Research Association was in its preliminary stages of formation in 1917 as an Electrical Research Committee, no adequately organised body existed to investigate problems of common interest that were so rapidly growing in number and urgency with the growing industry. The British Electrical and Allied Industries Research Association (to give it its full title) became incorporated in 1920 with memorandum and articles based on the Government model for industrial associations of this type. There is no need to recapitulate here the story of its origins, which will be familiar to most of our readers; enough to say that it did not spring into existence fully armed and equipped, but was born of the spirit of co-operation developed during the 1914-18 war. This led the I.E.E. and manufacturers to establish joint technical committees in order to deal with certain pressing problems, and to apply for financial aid from the Government.

Viscount Falmouth, President of the Association

The financial support so liberally given in the early days of the E.R.A. by the B.E.A.M.A., the C.M.A., and the I.E.E., with Government assistance, enabled the Association to establish itself as an integral part of the industry. Later on, having regard to the direct benefits of the work done accruing to the electricity supply industry, very substantial support was obtained from the authorised undertakers, supplemented later by the C.E.B. Financial and technical co-operation with the Dominions and Colonies has also been developed in recent years, particularly with electricity supply undertakings in Australia, India and Africa.

Capt. J. M. Donaldson, Chairman of the Executive Committee

The beginnings were on a very small scale and duplication of available research facilities was avoided. Special facilities were given to the E.R.A. staff by power companies and others when required, but the rapid expansion of the industry and its research activities made it necessary to centralise the E.R.A. staff work. In 1935 the E.R.A. Laboratory at Perivale was opened by H.R.H. the Duke of Kent. Since then an increasing proportion of the work has proceeded there, and a highly skilled staff has gradually been built up.

Mr. E. B. Wedmore, Director and Secretary

So rapid, however, has been the growth in the applications of electricity, so extended the scope of research called for by members of the Association, and so great, therefore, the pressure upon the resources of the Association, that the work undertaken and constantly accumulating could no longer be dealt with satisfactorily with the facilities available at Perivale. Something had to be done, for the call of the industry cannot be disregarded.

Several research associations were hampered by similar lack of accommodation. After many inquiries, it was found that a suitable site close to Leatherhead railway station was coming into the market. The E.R.A. Council decided, in co-operation with the other associations interested, to take advantage of this opportunity, and it is probable that eventually an important group of industrial laboratories will be situated in this convenient area. Plans for the new buildings are being prepared, but owing to war conditions some delay will obviously be inevitable. Meanwhile, however, certain Government huts have been purchased in order to relieve the serious strain and overcrowding at Perivale caused by the influx of urgent problems since the beginning of the war.

Mr. R. Lee, Chairman of the Finance Committee

In one respect the electrical industry is unique: its ramifications extend to practically

every other industry, and it is the mainstay of many. When on the outbreak of hostilities the whole of the country's manufacturing and technical resources concentrated upon the war effort, the Association was able and ready, with full support from the Department of Scientific and Industrial Research, to continue those services which were essential to the national cause, and to strengthen the hands of industry in every possible direction.

Revision of Programme

A certain amount of adjustment naturally had to take place. Programmes of work in hand were reviewed and revised from the priority standpoint: the less urgent tasks were postponed and prompt attention was given to new and more pressing matters. A letter, gratifying in its implications, received from the Department of Scientific and Industrial Research stated that its Advisory Council not only deprecated any reduction in the activities of the Association but expressed the hope that it would carry on "with even greater vigour than before."

That hope has been realised. During the inter-war years the work of the E.R.A. helped in no small measure to establish a strong industrial position in this country; and when once again the storm broke, the foresight of the Government in recognising research associations as essential enabled the E.R.A. to co-operate also with the Fighting Services and the Government Departments directly connected with the war.

It took some time for the Departments to realise the quality of the assistance the E.R.A. could give, based, as it is, on its unique liaison with all sections of the industry and research activities both at home and abroad, its special knowledge of many of the most urgent problems of common interest and facilities for dealing with them in a practical manner. The staff has solved promptly and effectively a very large proportion of the problems presented to it. About one-third of the Laboratory staff and occasionally the entire workshop has been engaged on confidential matters. A point to be noted is that, although much of this work is likely to remain secret, a good proportion of it will prove of permanent value to industry.

Normal Work Goes On

Normal activities took on fresh aspects as shortages in certain materials began to be felt and the demand for substitutes arose. It is well known that the Association has expert knowledge both from the scientific and engineering standpoint, of dielectric phenomena, surge phenomena, phenomena of arcing and circuit-breaking and interference with communication circuits, and it has established many working arrangements with the universities, technical colleges, the N.P.L. and members' own laboratories. This knowledge and those arrangements have been utilised to the full in essential work for all the sections of the electrical industry.

One matter of importance which might not at first sight appear to fall within the province of the E.R.A. is that of food production in wartime. Certain programmes of research have a direct bearing upon this. The full service thus rendered to the Services and to industry in general, all coming under the head of war activities, was made possible only by the existence of the organisation as a whole, and depended for its success upon the maintenance as a unit of certain groups possessing unique facilities and experience in team work.

Post-War Plans

Into the category of post-war plans we must, of course, place the new laboratory at Leatherhead, which will not be in full operation until after hostilities have ceased. It may be said definitely, however, that much of the normal programme is concerned with matters that fall under the general heading of post-war reconstruction. The applications of electricity to food production—already mentioned as part of the war effort; the study of rural electrification problems, and of soil sterilisation; these, with many other sections of the ordinary work, will have special interest after the war. Bearing these things in mind, the Association is enlarging its contacts with all concerned in the future of agriculture.

For the results of research to be fully effective they must be available in time. Post-war plans of all kinds require considerable research to establish a sound scientific and economical basis for their commercial development. It is of the utmost importance, therefore that facilities for research be provided sufficiently in advance so that the actual investigations may be completed and results obtained before the corresponding developments are too far advanced. Thus research facilities, both buildings and staff, represent the highest post-war priority.

The E.R.A. is now actively engaged in preparing plans for future development and has been promised an extension of its present working arrangement with the D.S.I.R. to give time for the formulation of the future requirements of the industry. This will be made in consultation with its supporters, with a view to presenting a case to the Government for the affording of substantially increased financial support. Already the Association has obtained a token of the goodwill of the Government.

Welding Tuition

Centre for Training Charge-hands and Foremen

THE twenty thousand additional welders needed for the war effort have been trained at Ministry of Labour instructional centres as well as in technical colleges, schools conducted by manufacturers of welding materials and in the engineering works in which the men were employed. Both men and women have been trained in a few days, or weeks, to carry out simple welding operations, but the proportion of really skilled welders has steadily declined.

Consequently, to preserve the requisite standards of quality, proper supervision has become more than ever necessary. The need thus created for a considerable number of charge-hand and foreman welders has been met by collaboration between the Admiralty and the Ministry of Supply in setting up a special training scheme at Portobello, near Edinburgh, where men selected by their firms are given a three weeks' course of instruction in the elements of welding practice.

The "theoretical" side: a lecture in progress

The course includes lectures on welding technique, metallurgy and welding shop practice, costing, the reading of drawings, assembly and welding sequences for avoiding distortion, together with practical demonstrations of modern welding technique. During the demonstrations the use of deep penetration electrodes, heavy gauge electrodes for fillet welding, vertical welding with 6-gauge electrodes, and recent developments are shown and the students are given an opportunity for practice if not already familiar with them.

Because much of the benefit of the course arises from the opportunity given to meet and talk to men who are doing similar work in other yards and other industries, the social side of the course has been developed so that when not at lectures the students still associate together and continue to discuss their problems, the less experienced gaining from those who have been long on the job.

The lectures last about an hour and are followed by discussion, which has been found to help the instruction. Men are encouraged to take notes, and time is allowed for them to consult the lecturing staff for information they require beyond what is given in the lectures. A library of technical books is provided for the use of the students.

Reports from firms who have sent men indicate that the courses are effective and that the men return to their works better equipped and with more confidence. The courses have been full, but there are vacancies now. Billets are found near the centre by the Ministry of Labour and National Service. Wages and subsistence allowance during the course and railway fares to and from Portobello are paid by the firms from which the men are drawn for the course.

The Ministry of Supply has been in touch with the employers' federations and the trade unions concerned, and recommends that employers participating in this scheme should pay a sum of £6 per week as wages, plus £1 15s. per week representing subsistence allowance to each man who attends the course. It is, of course, open to employers to make larger payments when they are considered justified. Actual board and lodgings in Portobello average from 50s. to 55s. per week.

At the end of each training period of three weeks the Ministry of Supply pays to employers the sum of £9 for each man who completes the course to the satisfaction of the Superintendent. This sum is at the rate of £2 per week towards wages and £1 per week towards subsistence. The sum is paid direct to employers after men have returned from the training centre.

Applications for enrolment and all inquiries concerning this scheme should be sent to the Superintendent, Ministry of Supply Welding Training Centre, Marine Gardens, Portobello, Midlothian.

The Durham Station

Views of Opponents and the Company

WE reported last week that the Dean of Durham had protested in a speech against the proposal of the North Eastern Electric Supply Co. to erect a new power station at Kepier Haughs (Durham) at a cost of £3,500,000. This protest was followed last week by a letter in *The Times* signed by the Dean, the Bishop of Durham and the Warden of the Durham Colleges. In this it was maintained that the view of the cathedral and castle was one of the finest in Europe and that "under plans now lodged with the Ministry of Town and Country Planning the foreground of this view will be occupied by a gigantic electrical plant; its two chimneys (350 ft. high) would rise higher than the central tower of the cathedral on its hill; they would be flanked by three cooling towers (260 ft. high) and other buildings in proportion."

Several other letters on the same lines have appeared in the newspapers. The matter was to be raised in both Houses of Parliament yesterday (Thursday) and it was expected that the Government would accede to a request for a public inquiry into the proposal. The Council for the Preservation of Rural England has suggested that all such projects should first be referred to the Royal Fine Art Commission before a final choice of site is made. It says that this procedure was adopted by the Central Electricity Board when the grid was being erected.

Company's Reply

On behalf of the company, Lieut.-Col. S. E. Monkhouse (managing director) agreed last week that the objectors were right in saying that the magnificent view of the cathedral and castle from the railway had hardly a rival in Europe. But in proceeding to condemn the proposal for the establishment of a modern power station in the vicinity of Durham City by suggesting that it would occupy the foreground of this view, they left a false impression on the mind of the reader which it was necessary to correct. The picture familiar to the thousands who passed through Durham day by day was that of the cathedral and castle from the railway viaduct, with the houses of the old city in the foreground, which could not be spoilt by the proposed new power station, as this would be a mile or more to the northward, on the outskirts of the city.

He went on to say:—"Those responsible for the project yield to none in their admiration for Durham's noble and historic setting in such picturesque surroundings, and they are satisfied that, far from being what is described as a 'monstrous edifice,' their new power station, which the demands of the community require, would be a structure of notable architecture, placed in a situation which will give no offence either to residents or travellers. In case it might be thought that this intrusion by us into the precincts of Durham has a profit motive behind the project, I can give my assurance that no such ulterior motive has attracted our attention to the environment of the city of Durham. Only two considerations have caused us to proceed with this pressing industrial development—that another power station must be erected to meet the ever increasing demands, and that we have been unable to find any other suitable site."

City Council's Attitude

At an earlier meeting the Durham City Council had decided by a two to one majority that it would not formally object to the proposal provided that no alternative site was available; that the buildings were constructed in such a manner and of such materials as to blend harmoniously with the surroundings; that adequate control was exercised over the emissions from the power station; and that satisfactory coal storage arrangements were made.

The company has given assurances on these points. The station has been designed for a capacity of 150,000 kW and would consume weekly 1,500 or 2,000 tons of low-grade Durham coal for which new sidings would be constructed at Durham. It is intended to install precipitation plant to deal with smoke and waste gases, and there will be no appreciable pollution of the atmosphere or injury to the city or to vegetation.

The building of the new station would employ a large amount of local labour for four years and would be of great advantage to industry and to the public.

I.E.E. Radio Section

UPON the recommendation of the Wireless Section Committee the Council of the Institution of Electrical Engineers has decided to change the name of the Section to "Radio Section" and to modify Rule No. 1, which deals with the scope of the Section, to read as follows:—

> "The Section shall include within its scope all matters relating to the study, design, manufacture or operation of apparatus for communication by wave radiation, for high-frequency and electronic engineering, or for the electrical recording or electrical reproduction of sound."

CORRESPONDENCE

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

Scottish Water Power

MAY I be allowed to make a small correction in the paragraph of your leaderette of July 7th, relating to Scottish water power? It is mentioned that, as chairman of the I.E.E. Devon and Cornwall Sub-Centre, I used a unit cost of $150 as a rough guide to the economic potentialities of a water power project, provided the load factor was not less than 25 per cent., but the unit was peak H.P., and not kW as might be inferred from your reference.

Exeter. SELWYN GRANT.

Irish Power Supply

THE note on page 2 of your issue of July 7th, reporting a lack of water in the River Shannon (which occurs each summer, as shown in Inst.C.E., London, *Proceedings*, February 10th, 1925) while the River Liffey's power is not yet available, and the preparation of plans for another steam station, leads me to refer to Siemens-Schuckert's "The Electrification of the Irish Free State" (published in Dublin). This states on page 1 that the plans "permit the gradual development of the (Shannon) power, to meet the increasing needs of the country without calling in the assistance of heat power plant."

It will be remembered that at a convenient time the Pigeon House power plant was shut down and Ardnacrusha supplied Shannon water power, but almost in the same breath a quarter of a million sterling was spent on extensions to Pigeon House and before the following summer "the assistance of heat power plant" was needed and it remains in service.

Herne Bay. THEODORE STEVENS.

Plugs and Sockets

IN his letter in your issue of July 14th, Mr. P. Good, of the British Standards Institution, takes exception to our describing a new development of ours as the "domestic standard fused plug and socket," on the ground that it might be thought by some that this appellation implies that it is included in a British Standard Specification.

We do not think that anybody who has followed the Press correspondence could possibly have formed any such impression, because the only justification for our new plug is the fact that no such thing existed either in a B.S.S. or elsewhere. B.S.S. 546 contains three different sizes for domestic work, not one of which by itself is suitable for all the needs of the average household, and we hope in due course to receive a pat on the back from Mr. Good for our achievement.

The word "domestic" is surely not claimed as an appanage of the B.S.I, neither can the word "standard" be claimed as a monopoly by anybody. It would be interesting to know if, in fact, anyone has been misled into thinking that we are using the term "domestic standard" as an implication that our plug is included in any existing British Standard Specification. Certainly no one who has had a copy of our booklet and seen the diagram on page 18 could possibly have such a hallucination.

London, E.C.4 DORMAN & SMITH, LTD.
R. AMBERTON, *director*.

Correction.—In the letter from Mr. P. Good (British Standards Institution) published in our last issue the opening of the second paragraph should have read:—"It should be clearly realised that until the current B.S. Specifications for plugs and sockets are revised or replaced by a new specification, no new design of plug and socket can be regarded as having received the approval of this Institution."—Editors, *Electrical Review*.

Fatalities

Three Men Killed on Farm.—A farmer, Mr. W. H. Griffiths (54) and two farm workers, Mr. E. J. Thomas (23) and Mr. P. T. A. Williams (28) were killed while erecting a pole in a hayfield near Milford Haven for the purpose of operating a mechanical pitcher. One of the supporting wires came in contact with an electric overhead line and the men all received fatal shocks. At the inquest, when verdicts of "Accidental death" were recorded, Mr. W. H. Morgan, a farmer, described how he together with a number of farmers and workers went to assist Mrs. Davies at Slade Hill Farm to get in her hay. The pitcher pole was pulled up by a tractor and when it was erect Williams went to release the wire from the tractor. In doing so he lifted it upwards, causing it to make contact with the overhead line.

Shock from Electric Drill.—An inquest was held at Tiverton on July 10th on Mr. H. S. Hole (59) who received a fatal shock while operating an electric drill at the works of the Tiverton Motor Co. Another workman, Mr. L. H. Morgan, said that he was holding the drill and Hole was leaning over it. Witness became paralysed and could not move, and Hole screamed. An apprentice, Anthony Morrell, promptly took the plug out from the socket, disconnecting the drill. The foreman at the works expressed the opinion that a bit of metal found in the switch caused sudden electrification of the drill. The coroner, recording a verdict of "Death from misadventure," added that the apprentice's action probably saved Morgan's life.

PERSONAL and SOCIAL

News of Men and Women of the Industry

AS from the beginning of August **Mr. J. D. Peattie**, B.Sc., M.I.E.E., takes up the position of deputy chief engineer of the Central Electricity Board and is succeeded as operation engineer, head office, by **Mr. A. R. Cooper**, A.M.I.E.E., M.Inst.F. Brief details of their careers were given in our last issue, and we now reproduce their portraits.

Mr. J. D. Peattie

Mr. A. R. Cooper

Flt.-Sgt. Denis Walker, who before the war was with the Mid-Cumberland Electricity Co., Ltd., at Cockermouth, has been awarded the D.F.M. for conspicuous gallantry when on air operations over enemy territory.

The Stretford and District Electricity Board is advertising for a deputy chief engineer in succession to **Mr. Emil Braathen**, who has been appointed chief engineer and general manager of the Gloucester Corporation Electricity Department. The salary offered for the Stretford appointment is £800 rising to £950 per annum.

Major G. Lloyd George, the Minister of Fuel and Power, is suffering from an attack of laryngitis and was obliged to cancel his engagements for this week.

At a recent meeting of the Dover Corporation Electricity Committee, **Mr. W. J. Broad**, secretary, said that next year would be the undertaking's jubilee, and incidentally his own. The electricity supply in the town was inaugurated by a company in April, 1895, and the system was taken over by the Corporation in May, 1904.

Mr. H. Cohen has been elected chairman of the Electrolytic Zinc Co. of Australasia, Ltd., consequent upon the death of Sir Colin Fraser.

Mr. W. Sandford Poole has resigned the chairmanship of the Atlas Electric & General Trust for health reasons, but remains on the board. He is succeeded as chairman by **Mr. D. M. Touche.**

On Friday last week to mark the occasion of his completion of twenty-five years as managing director of Hoover, Ltd.—since the company's incorporation, in fact—**Mr. C. B. Colston** was presented with an oil painting of his home at Penn, Bucks, by members of the organisation. Mr. Colston has been the Ministry of Production's Regional Controller, London and South-East Region since 1942.

We extend our congratulations to **Mr. and Mrs. George Ellison** who are celebrating their golden wedding to-day. Mr. Ellison is the founder and governing director of George Ellison, Ltd., and of Tufnol, Ltd.

Prof. P. Kapitza, the distinguished Russian scientist who for some years carried out research work at Cambridge, has been awarded the Order of Lenin.

Capt. A. R. S. Nutting has been appointed chairman of the Westinghouse Brake & Signal Co., Ltd., in succession to the late Lord Herbert Scott.

Mr. J. Morgan has been elected chairman and **Messrs. J. B. J. Higham** and **R. W. Biles** vice-chairmen of the Western Centre of the Institution of Electrical Engineers for next session. For the West Wales (Swansea) Sub-Centre, **Prof. R. O. Kapp** is to be chairman and **Messrs. G. D. Arden** and **J. Lamond** vice-chairmen, and for the Devon and Cornwall Sub-Centre the chairman is to be **Mr. F. E. Pitt** and vice-chairman **Mr. P. S. Grant**. The new chairman of the Bristol Students' Section is **Mr. D. Garnett** and the vice-chairman **Mr. K. H. Hope**.

Two appointments are announced by the Metropolitan-Vickers Electrical Export Co., Ltd. **Mr J. F. Perry**, sales manager of the plant department, has been elected to the board and **Mr. F. J. E. Tearle** has been appointed principal representative of the company at the Trafford Park Works of the parent company.

After the last war Mr. Perry rendered valuable service to the French Reconstruction Committee in replanning the devastated collieries in the north of France. He has travelled extensively in Australia, Africa and Europe in connection with Metropolitan-Vickers mining interests. In 1933 Mr. J. F. Perry and Dr. D. M. Smith won the premier award of the Institution of Mechanical Engineers—the Thomas Hawksley Premium—for their paper on "Mechanical Braking and its Influence on Winding Equipment."

Mr. J. F Perry

Mr. F. J. E. Tearle

Mr. Tearle was educated at the R.N. Colleges at Osborne and Dartmouth and served in the Royal Navy in 1919 and 1920. On leaving the service he joined the Metropolitan-Vickers Co. and was engaged in erection work in the U.S.S.R. during 1925 and 1926. He joined the

Export Company in 1926 and continued his work in Russia until 1933, except for a break in 1928. He was manager of the company's Leningrad office from 1930 to 1933. Mr. Tearle has seen naval service in the present war as lieut. R.N.V.R., and was recalled from the Middle East at the end of 1942 to take charge of certain special contracts being executed by the Met.-Vick. Co.

The *Western Mail* reports that **Mr. R. V. Pugh,** generation engineer with the South Wales Power Co., is to take up an important appointment with the Manchester Corporation. This position is apparently that of deputy chief engineer of the Electricity Department rendered vacant by the appointment of Mr. R. A. S. Thwaites as "chief." We understand that the transfer of Mr. Pugh from South Wales to Manchester is subject to the approval of the Ministry of Labour and National Service.

Mr. W. Haynes, director and secretary of Ruston & Hornsby, Ltd., has resigned the secretaryship. He has been with the company for fifty-two years.

Mr. I. R. Robinson, B.E., M.I.E.E., deputy chief electrical engineer to the New Zealand Public Works Department has arrived in this country, having travelled by air, on urgent business in connection with the manufacture of hydro-electricmachinery for his Department.

Mr. H. E. Humphries

Mr. H. E. Humphries, head of the telecommunications department of Siemens Brothers & Co., Ltd., has been appointed a director of Siemens Electric Lamps & Supplies, Ltd.

Mr. J. W. White has been elected president and general manager of the Westinghouse Electric International Co., a subsidiary of the Westinghouse Electric & Manufacturing Co. **Mr. W. E. Knox,** formerly assistant general manager, has been elected vice-president.

The *Electrical World* states that **Mr. J. A. Krug,** director of the Office of War Utilities, has joined the United States Navy with the rank of lieut.-commander. He is succeeded as director by his deputy, **Mr. Edward Falck,** who before entering Government service was assistant to the vice-president of the Consolidated Edison Co. of New York.

Mr. D. P. Welman, A.M.I.E.E., is being released at his own request from the position of Director of Aero Engine Construction at the Ministry of Aircraft Production to resume his duties as managing director of Foster Yates & Thom, Ltd.

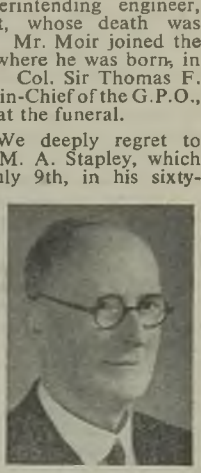
Obituary

Mr. I. de Wynter and Mr. J. L. Roberts.—We regret to announce the deaths through enemy action on June 30th, of Mr. I. de Wynter and Mr. J. L. Roberts, both sales engineers attached to the London office staff of British Insulated Cables, Ltd.

Mr. A. Vaughan.—The death occurred on July 7th of Mr. Alfred Vaughan, Weybridge, a director of the Revo Electric Co., Ltd.

Mr. A. Moir.—The burial took place on Thursday of last week at Wandsworth Cemetery of the late Mr. Alexander Moir, O.B.E., M.I.E.E., formerly superintending engineer, G.P.O., London District, whose death was reported in our last issue. Mr. Moir joined the Post Office at Aberdeen, where he was born, in 1874 and retired in 1921. Col. Sir Thomas F. Purves, formerly Engineer-in-Chief of the G.P.O., was among those present at the funeral.

Mr. M. A. Stapley.—We deeply regret to record the death of Mr. M. A. Stapley, which occurred suddenly on July 9th, in his sixty-seventh year. Mr. Stapley, who was head of the commercial side of the telephone cable, line and battery sections of Siemens Brothers & Co., Ltd., and a director of Siemens Electric Lamps & Supplies, Ltd., had completed fifty-one years' service with Siemens and was in full harness at the time of his death. He was educated at the Roan School, Woolwich Polytechnic and the City and Guilds Technical College, and commencing work with Siemens in April, 1893, he was, throughout the greater part of his career, closely identified with the company's business in relation to Government Departments, particularly the Post Office.



The late Mr. M. A. Stapley

An untiring worker in the cause of youth education, he held among other offices those of a governor of the Woolwich Polytechnic and of the Shooters Hill County Secondary School, and he was a member of the L.C.C. Advisory Committee for Commercial Education. As chairman of the Siemens Sports Club since 1922, of the Employees Hospitals and Charities Fund Committee, and of the Employees' Pension Fund (Non-Contributory) Committee, he rendered much valuable service.

Will.—Mr. J. W. Turner, a former borough electrical engineer of Huddersfield, left £9,265.

Flameproof Apparatus

THE customary quarterly schedule of electrical equipment, both mining and industrial, for which certificates of flameproof enclosure have been granted by the Ministry of Fuel and Power (Coal Division) during the three months ended June 30th, 1944, has been issued. At the request of B.E.A.M.A. a few copies can be purchased for 1s. 2½d., post free, from the Library, Ministry of Fuel and Power, King's Buildings, Dean Stanley Street, London, S.W.1.

I.E.E. Students' Dance.—We are informed by the London Students' Section of the Institution of Electrical Engineers that the summer dance which had been arranged for Saturday, July 29th, has been cancelled.

Electrical Contractors

President's Review of Past Year

THIS year the annual meeting of the Electrical Contractors' Association and its allied bodies N.E.C.T.A., Ltd., and the National Federated Electrical Association was held (last Wednesday) in Birmingham. A lengthy report on the year's work was given by the president, Mr. Walter Riggs, M.B.E., M.I.E.E., who reminded the meeting that this was his sixth successive report.

After a general survey of recent events, Mr. Riggs spoke of the great contribution which the electrical industry was making to the successful prosecution of the war and said that the contracting industry, both employers and employees, had met satisfactorily the unprecedented demands made upon their resources. In its negotiations with Government Departments, its guidance to the membership and, indeed, the vast majority of its activities the Association had aimed at securing the largest measure of order and regulation to ensure that the industry could not be charged with having neglected any of its many responsibilities.

Preparing for the Future

It was impossible briefly to summarise or express opinions upon the statements of policy as to post-war planning but he would point out that the Association was very extensively represented wherever the industry was concerned. The Council with its intimate knowledge of the problems of the electrical contracting industry was doing its best to enhance and protect the interests of the members. But all the time it was fully conscious of the fact that any measure designed to protect the interests of the few at the expense of the many was in the long run a policy which could not succeed.

There were unmistakable signs that " war " requirements from the electrical contracting industry were lessening. This " breathing space " provided an opportunity so to organise themselves as to be ready to undertake whatever was required of them in the tremendous task of rehousing and rebuilding generally—partly in respect of the restoration caused by war devastation and partly to overtake the tremendous arrears which had accumulated during the past five years.

Freedom from Unnecessary Control

One section of the community desired to maintain and extend the system of legislative control which had been built up during the war. But the fundamental desire of the British people was to enjoy the fullest measure of freedom and the least possible measure of control. Control in a variety of directions there must be to ensure that the freedom of the majority was not jeopardised by the exercise of unreasonable freedom by the few. Similarly world shortages of a variety of merchandise would necessitate some measure of temporary control for the immediate post-war period; but they must ensure by united effort that the fundamental desire of the British people for reasonable freedom was not denied to them by the apathetic acceptance of control for the sake of control.

The supremacy of British industry had been largely due to the inherent freedom of private enterprise. The progressive improvement in industrial conditions which still remained to be accomplished was no justification for the harsh remedies which the would-be controllers sought to impose.

A Delayed Report

After a reference to the number and importance of the committees upon which the Association was represented, Mr. Riggs said that it was unfortunate that the Ministry of Works Post-War Building Publication No. 11, " Electrical Installations," had not yet been published by the Ministry. This report was the result of a great deal of consideration by the Committee in question—upon which the Association was adequately represented—and was intended to reflect the considered opinion of the industry as to electrical installation practice and facilities in the small houses covered by the Government's building programme. Delay in its issue was regrettable in that various local authorities up and down the country appeared to have reached finality in respect of installation practice in these post-war houses, without any regard to the unknown contents of the report.

There was, he said, no question that all the blessings of electricity could be enjoyed by the occupier of such houses in a more efficient and economic manner as a result of standardisation of practice and design, and it was regrettable that the delay in issuing the publication would tend towards a varying practice and a lack of standardisation district by district.

He regretted to report that the agreement to which he referred in his last address with the Ministry of Works as to war damage emergency repairs had not been the forerunner of similar arrangements in respect of other classes of work. Negotiations on this matter were still proceeding, however.

The Federation of Associations of Specialists and Sub-Contractors was continuing its work on behalf of all specialist trades

associated with the building industry. As with so much of the work undertaken by associations, its progress could not be regarded as spectacular, but he was none the less convinced as to the sound policy which it was following.

During the past year there had been several reports on the reorganisation of the electricity supply industry, the main problem being the question of ownership. This was a controversy in which members of the Association must necessarily be interested. Representations had already been made to the Minister of Fuel and Power and at the appropriate time every possible effort would be made by the Council to demonstrate to the Minister the desirability, in the public interest, of a reasonable degree of security being afforded to the installation and retail sections of the industry.

Fair Trading

Progress was still being made in a variety of directions with the electrical industry's Fair Trading Policy. Active negotiations had ensued with the E.L.M.A. in respect of the post-war distribution of lamps and during the year negotiations with the C.M.A. in respect of mains cable had reached a satisfactory conclusion.

Once again he reported continuous negotiations with the Electrical Trades Union, the bringing into operation of various agreements covering contingencies which had arisen as a result of the war, and also adjustments to pre-war practices which would be beneficial to all concerned in the post-war era. Negotiations were still going forward in a variety of directions, and he hoped that the long-term policy which many of the items at present under consideration represented, would reflect to the credit of both sides of the National Joint Industrial Council.

Compulsory Registration

Considerable activity had been displayed on the subject of compulsory registration of electrical contractors and operatives. The comprehensive constitution of the National Committee established beyond dispute that a large majority of the industry was satisfied as to the necessity for the required legislation. Certain dissentients certainly existed, but he had never yet heard one valid argument by way of opposition. Members of the public were becoming fully awake to the potential dangers and were definitely entitled to the protection which legislation could provide. The time was at hand when a concentrated drive would be required to convert the almost unanimous wish of the industry into an accomplished fact.

Mr. Riggs said that he did not want to decry the findings of the Council of the Institution of Electrical Engineers on this subject, but he suggested to the Institution that upon any committee considering registration, the section of the industry primarily interested, and in a position to speak with life-long experience, should be adequately represented, or at least fully consulted.

The Association not only found itself totally opposed to the I.E.E. upon the need or otherwise for basic regulations, but was without any evidence as to its justification or the expressed wish of any section of the electrical industry to have such basic regulations. The I.E.E. existed primarily to serve the industry and not, without apparent justification, to seek to impose doctrines or dogmas upon any section or to hamper any progress which the industry demanded for the safety of the public.

Those who expected a dissertation from him upon plugs and sockets would be disappointed. The Association in this matter, as with others, had sifted all available evidence, both technical and practical, and had given its verdict.

Good progress was being made by the Council inaugurated by the Ministry of Works to consider the entry and training of apprentices into the building and allied industries. At the present moment the Report of the Council was under active consideration by the Association. While conditions in the building industry were not entirely analogous to those in their own industry, a brief examination served to indicate the possibility, with suitable adjustment, of a scheme for the electrical contracting industry falling into the general framework of the Report.

Call to Members

In view of the many-sided activities of the Association in these historic days, it was of paramount importance that the membership as a whole should have adequate knowledge and appreciation of all the matters with which it was concerned. For that reason he implored members to attend their branch meetings, to study all communications which were addressed to them by the Association, and to be ever vigilant and zealous in the interests of the Association's ideals and objectives.

Mr. Riggs expressed the general regret at the passing of Messrs. Howard Marryat and H. Willoughby Ellis, two past presidents, since the last annual meeting and he tendered the members' thanks to Mr. W. H. Walton, chairman of the Executive Committee, the Sectional Board and branch officials, and to Mr. L. C. Penwill and his staff at the Association's headquarters.

He concluded by saying that while he had been willing to accept repeated nomination as president, he would welcome very much indeed the time when he could lay down the burdens and responsibilities which had rested on his shoulders for so long a time.

COMMERCE and INDUSTRY

Electrical Machine Specification. Companies Leave Association.

Export Trade Committee

IN the House of Commons on July 13th Mr. Ellis Smith asked the Secretary to the Department of Overseas Trade if he would state the names and business connections of the Export Trade Consultative Committee, its terms of reference, and when it was expected to report.

Mr. Harcourt Johnstone said the purpose of the Committee, which had no formal terms of reference, was to review with the senior officials of the Department its practice and procedure in order to improve the services available to exporters. It would meet frequently and would complete its work as soon as possible. Two meetings had already taken place.

He gave the names of the Committee; among them are Mr. F. B. Duncan (Electric and Musical Industries, Ltd.), Mr. L. H. Short (English Electric Co., Ltd.), and Mr. V. Watlington, M.B.E., director of the British Electrical and Allied Manufacturers' Association. The chairman of the Committee is Mr. A. Mullins, C.M.G., C.B.E., Comptroller-General of the D.O.T.

Electrical Machines for Government Departments

The Director of Industrial Electrical Equipment, Ministry of Supply, has drawn attention of electrical manufacturers to the new War Emergency Specification, B.S. 1156/1944, issued recently for Service Departments by the British Standards Institution. This applies to AC and DC motors and generators up to 300 HP, kW or kVA, excluding fractional-horsepower machines and machines for use in ships or aircraft, and it is the desire of Government Departments to apply this Specification to all future demands except where there are special conditions of duty or service which make additional requirements unavoidable.

The Specification may only be applied to existing contracts by arrangements with the Government Department concerned, but in all future contracts it will be the rule that B.S. 1156 applies unless there is a definite statement to the contrary. Manufacturers have been asked to refer to the D.I.E.E. any demands calling for departures from the Specification unless these are clearly necessary and have been agreed with the Government Department concerned.

The general adoption of the specification will result in substantial saving in labour and materials.

Timber Economy

The Ministry of Works has issued " Wartime Timber Economy No. 5 " (Stationery Office, 1s. 3d.) which points to many ways in which timber can be replaced by other materials or more economically used. Most of it, of course, deals with building construction and equipment and there are but one or two items of interest to the electrical contracting industry. One is the prohibition of electric wiring battens and capping and casing. Another is a note on portable buildings in which reference is made to designs for contractors' huts, sectionally constructed of exterior type plywood on light timber framing. These huts, two designs of which are illustrated, cover a range of sizes from 8 ft. by 6 ft. up to 24 ft. 2½ in. by 10 ft. 1½ in. and include buildings suitable for foremen, clerks of works, etc., on building sites.

Australian Import Restrictions

Further restrictions upon imports from sterling areas into Australia are notified in the *Board of Trade Journal.* Among the classes of goods now brought under administrative control are magnetos and heating elements, enclosed type, for use with electric stoves. Quota restrictions do not apply to these but they can only be imported under a licence granted after consideration of each individaul case. The licensing period is of six months' duration from July 1st.

Resignations from P.E.S.A.

We are informed that the following companies have recently resigned membership of the Provincial Electric Supply Association:—Bedfordshire, Cambridgeshire & Huntingdonshire Electricity Co.; Brentford Electric Supply Co.; Cambridge E. S. Co.; Cornwall Electric Power Co.; East Anglian E.S. Co.; Gorseinon Electric Light Co.; Ilfracombe E. L. & P. Co.; Isle of Wight E. L. & P. Co.; Llanelly & District E. S. Co.; Melton Mowbray E. L. Co.; Newmarket E. L. Co.; Salisbury E. L. & S. Co.; Shropshire, Worcestershire & Staffordshire E. P. Co.; South Wales E. P. Co.; Strathclyde E. S. Co.; Stroud E. S. Co.; Urban E. S. Co.; Wessex Electricity Co.; Wilton E. S. Co.; and Wisbech E. L. & P. Co.

Accident at Factory

At Bromley Police Court recently the Viscose Development Co., Ltd., was fined £50 with costs for failing to take adequate precautions to prevent any metal at the company's factory from becoming electrically charged. It was stated that on March 7th a workman, Mr. S. G. Nicholson, received a fatal shock while carrying out a wet test on a pump which he had overhauled. For the defence it was stated that for nine years deceased had done all the company's simple electrical work. On the occasion in question an incredibly freakish accident occurred. If Mr. Nicholson had looked at the earth wire first he would not have met his death. At the inquest the jury found that no blame attached to anyone. The chairman of the bench, imposing the fine, said it was accepted that the company had a clean record.

Air-blast Switches

Unconventional circuit-breakers of Swiss manufacture, depending upon compressed air both for high-speed operation and extinction of the arc, were first marketed in 1935, an outdoor type becoming available three years

later. According to the *Brown Boveri Review* the order for the four-thousandth switch of this kind was booked towards the end of 1942. Of that number 3,500 are of the indoor design for from 6 to 87 kV with rupturing capacities ranging from 100 to 1,500 MVA and ratings from 400 to 5,000 A. The remaining 500 are of the outdoor type for from 20 to 220 kV and have been erected under extremely varied climatic conditions ; they can be fitted, either initially or subsequent to installation, with high-speed reclosing gear.

Canteen Equipment Materials

Iron, steel and timber required for equipment for industrial, staff and office canteens the cost of which is met without Government assistance are now authorised solely by the Ministry of Works. Individual licences for kitchen machines, hitherto issued by the Board of Trade in the case of non-industrial canteens, need no longer be obtained when authorisation is given by the Ministry of Works.

The new procedure covers iron and steel for heavy equipment and kitchen machinery (including gas-fired apparatus, hitherto authorised by the Ministry of Fuel and Power), light equipment and cutlery (the latter for industrial canteens only).

The forms of application to the Ministry of Works are C.22 (in duplicate) for heavy equipment and kitchen machinery, and C.23 for light equipment and cutlery. Copies of the forms are obtainable from either H.M. Inspectors of Factories or from the Ministry of Works' Canteen Section, Abell House, John Islip Street, S.W.1. Applications should be sent to the Regional Canteen Equipment Officer of the Ministry of Works.

Employees' Investments in Board

At a meeting of the Dukinfield Town Council it was asked whether officials of the Stalybridge, Hyde, Mossley and Dukinfield Joint Electricity & Transport Board were allowed a concession of one-half per cent. interest above any other investors with the Board. Councillor F. Denby Ashton (chairman of the Electricity Committee) replied that it had been the custom since the Board was formed to encourage officials and workpeople to invest their savings with the Board by allowing them a little more than the current average percentage. This was quite a common practice with many corporations and also with banks. Councillor Bown replied that the corporations, who were co-partners in the joint undertaking, did not give preferential treatment to their staffs. It was not right that Joint Board employees should have a preference over the ratepayers in the areas of the four constituent authorities.

Lighting in a Hosiery Factory

There are a number of operations in the hosiery industry that demand not only manual dexterity and good eyesight, but also the best possible working conditions. "Linking," "mock-seaming," "welting" and "toe-finishing" are some that fall into this "fine-work" category. For work on "linking" machines, for example, not only is adequate lighting necessary, but the illumination must be as free from deep shadows as possible, and because of the high reflectivity of the materials being worked and the possibility of specular reflections from the polished surfaces of the machines, a light source with a low surface brightness is essential. This is provided in a large establishment of Wolsey, Ltd., by "Osram" fluorescent tubes. The shadowless lighting has an intensity of 50 ft.-candles at the working point. In this installation, which was carried out by the Electrical Equipment Co., Ltd., Leicester, the "Osram" tubes lighting the linking machines are mounted slightly behind the operatives, in close formation running parallel to the work benches, so that both the vertical and the horizontal planes are evenly illuminated. In other sections, where work is mostly on the horizontal plane, the tubes are mounted centrally over the machine tables.

Cable Company's Rate Relief

At a meeting of the Enfield Rating Committee it was reported that the Sterling Cable Co. had not returned a de-rating form in time to benefit by the rate relief, and had since asked for the reconsideration of the matter. The rating officer stated that the Council was unable to allow any relief from rates in these circumstances, and the Committee decided to inform the company of the position.

Post-war Housing

Two publications issued by the Ministry of Health and published by the Stationery Office, each priced 1s., relate to post-war housing. "Design of Dwellings" contains a report of the Design of Dwellings Sub-Committee of the Central Advisory Committee appointed by the Minister of Health and under the chairmanship of the Earl of Dudley. Recommending local authorities (which, it is expected, will be called upon to construct up to two million houses during the first decade after the war) to concentrate mainly on the provision of three-bedroom houses for families of five, the Committee emphasises the need for large kitchens and/or sculleries. With a living room of 160 sq. ft., it is recommended that there should be a kitchen of 110 sq. ft., including space for meals, together with a utility room for laundry, etc., of 35 sq. ft. Alternatively, there should be a living room of 210 sq. ft. with a recess for meals, and a kitchen for cooking and laundry of 100 sq. ft. The minimum overall floor area necessary to give effect to these recommendations is 900 sq. ft.

Among improvements for which the evidence submitted to the Committee provides a strong case are better heating arrangements, constant hot water, better cooking facilities, better arrangements for washing and drying clothes, and more connections for light and power. Sufficient points should be provided, it is stated, to enable the tenant to make full use of labour-saving appliances. These appliances should be selected for maximum efficiency and minimum consumption of fuel, and it is suggested that all appliances consuming fuel or power should be fully tested to standards of performance to be established. Existing types of cooker, it is asserted, whether for coal, gas or electricity, are all capable of improvement, particularly from the point of view of conserving heat and reducing the consumption of fuel. The Committee hopes that mass-production may bring refrigerators within the reach of the great bulk of the population, but it does not consider it at present practicable to provide them in municipal

dwellings. The advantage of dish-washing machines for small houses is also doubted. Greater standardisation of equipment is advocated, and attention is drawn to the need for improvements in both sound and thermal insulation.

"Private Enterprise Housing," the other publication, is a report of the Private Enterprise Sub-committee of the Central Housing Committee of the Ministry of Health, of which Sir Felix J. C. Pole is chairman. It suggests the part private enterprise can best play in post-war housing, the conditions in which it can most effectively operate and the methods of finance and organisation required.

Sickness at Rotherham

When the minutes of the Transport Committee came before the last meeting of Rotherham Council Alderman G. E. Caine commented on the effect of the Corporation's scheme for the payment of wages to employees during sickness. He thought that the amount of sickness which had developed in the two months (April and May) that the scheme had been operating was simply alarming, considering that there were no epidemics. Ald. E. Cruikshanks, chairman of the Finance Committee (which recommended the appointment of medical referees) gave comparative figures showing that in the two months 512 and 1,133 days were lost, compared with 427 and 530 in the corresponding months of last year.

French Developments

Among manufacturing concerns, the French Thomson-Houston Company's gross profits amounted to 72·3 millions, a fall of less than one million over 1942–43. Net profit also decreased by a very slight margin.

The Compagnie Electro-Mécanique, a concern affiliated with Brown Boveri showed a profit of 10·42 million fr. of which 3·68 million was set aside to cover 1943 losses.

Battery Manufacture in Canada

Sales of electric storage batteries and parts by the principal Canadian producers were valued at $2,478,000 during the first quarter of 1944 as compared with $1,959,000 in the first quarter of 1943. Of the total $1,504,000 was for batteries for internal-combustion engine ignition and $108,000 represented batteries for farm lighting plants.

Dissolution of Partnership

J. Holmes and F. O. Browne, carrying on business as electrical fittings manufacturers at Vicarage Passage, Bath Street, Walsall, under the style of the Universal Electrical Service, have dissolved partnership. Mr. Holmes will attend to debts and will continue to carry on the business.

Hardness Testers

Brinell hardness testing machines which are being manufactured in Britain under licence from the Tinius Olsen Testing Machine Co., U.S.A., are described in an illustrated bulletin (B.150) issued by Edward G. Herbert, Ltd., Atlas Works, Levenshulme, Manchester, 19. Apart from the hand-operated model there are two sizes that are actuated by hydraulic power, furnished by a rotary pump directly driven by a vertical flange-mounted motor, so applying the load uniformly, free from pulsations. The load is indicated on a pressure gauge and is imposed in less than two seconds, or removed instantly, by slight movement of the operating lever. All running parts are completely enclosed, running in oil, the machines being intended for production testing.

Trade Announcements

Newman Industries, Ltd., state that their works will be closed from August 5th to 15th for the annual holidays.

Alliance & Surrey Wholesale, Ltd., have opened a depot at London Road, Kingston-on-Thames, which is a wholly-owned branch operating under the title of Sergeant's Wholesale Electrical Co.

Standard Telephones & Cables, Ltd., announce that their offices at Connaught House, Aldwych, have now been transferred to Oakleigh Road, New Southgate, N.11, and all correspondence should be sent to this address.

Change of Name

Court Bros. (Builders' Merchants), Ltd., 39, St. Margaret's Street, Canterbury, have changed their name to Court Bros. (Electrical Contractors), Ltd.

TRADE MARK APPLICATIONS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered within one month of July 12th:—

JUNCTION (in design). Class 9, No. 628,275. Electric vacuum cleaners and carpet cleaners; electrical apparatus (not included in other classes) for domestic and household use. Class 11, No. 628,059. Torches, cycle lamps, radiators, hotplates, grilling plates and kitchen stoves.—G. P. Chamberlain & Co., Ltd., Junction Works, Carmichael Road, South Norwood, S.E.25, merchants.

CLANG. Class 11, No. 627,274. Electric lighting fittings, electric lamps and electric torches.—Clang, Ltd., Crown Yard, Cricklewood, N.W.2.

INFORMATION DEPARTMENT

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

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

STAY-PUT fittings, complete with switch holders and shades.

Machine for removing scale from wooden drums.

Post-War Water Heaters

Three Santon Models

THREE designs for post-war water heating equipment, two for self-contained units and one for a small-sized immersion heater, have been prepared by Santon, Ltd., Somerton Works, Newport, Mon.

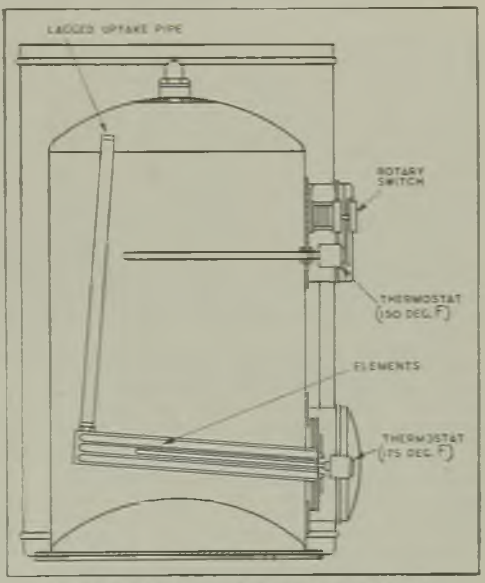
Conforming to the agreement reached between water-heater manufacturers relating to thermal storage units, the " PW2 " model will be available for capacities of either 15 or 20 gal., the overall diameters being respectively 18 and 20 in., with a height of 34 in. It has a flat end cover to render it suitable for fitting under a draining board. Fitted horizontally at the front of the casing are two heating units, both thermostatically controlled, one loaded at 500 W and fitted near the top, designed to maintain approximately 7 gal. of water at about 150 deg. F., and the second loaded at 2,500 W fitted near the base of the heater and designed to maintain the whole contents of the cylinder at about 170 deg. F.

With the efficient lagging provided, two inches of granulated cork round the sides and three inches on the top, the top heating unit is intended to be left permanently in circuit, controlled by a thermostat, to give the housewife an immediate supply of 7 gal. of hot water. By means of a rotary switch fitting flush in the casing, the bottom unit also can be connected to provide the full capacity of the cylinder for bath purposes.

As an alternative to the above, especially for soft water districts, the " PW1 " type is precisely similar in dimensions, shape, external appearance, etc., but has one heating unit only, fitted horizontally at the base of the cylinder. This heating unit is enclosed in a horizontal tube fitted with a heat insulated uptake pipe leading to the top of the cylinder. The low-loaded heating unit fitted in the " PW2 " is replaced by a thermostat and a rotary switch, this switch being labelled " Off," " Sink," " Bath."

With the switch in the " Sink " position all the elements are connected in series, giving a low loading of approximately 750 W, and at the same time the top thermostat is connected in series with the heating elements. This not only makes available approximately 7 gal. of hot water at 150 deg. F., but also provides quick replacement of hot water from cold, as immediately the heater is switched on, the hot water circulates to the top of the cylinder where it can be drawn off.

With the switch in the " Bath " position the heating elements are connected in series/parallel, giving a loading of 3 kW. Here again, hot water is taken from the bottom of the heater and circulated to the top. The essential difference between the two models is that in the case of " PW1 " the heated water is conveyed to the top of the cylinder, and hence small quantities of hot water can be quickly withdrawn, while in the case of the " PW2 " the heated water rises from the bottom upwards by convection currents only which means that a considerable time must



The " PW1 " thermal storage water heater

elapse before hot water is available at the top. In both cases the switch mentioned above may be arranged either flush in the heater casing or separately mounted in a control unit with or without pilot lamp.

Comparative tests show that the time taken to provide 7 gal. of water at 150 deg. F. from cold (" Bath " position) is 50 minutes for the " PW1 " and 1 hr. 45 min. for the " PW2." This quick recovery feature is of particular importance in houses with children where fairly large quantities of water are often required at short notice. The standard finish of these heaters is mottled grey cellulose enamel, but special finishes will be available at an extra cost. Flow and return unions can be supplied as required for fire-back

boiler connections. All the cylinders are tested at 50 lb. per sq. in.

The third new product, the "Santube" immersion heater has been designed to meet the post-war demand for a small, reliable, general purpose immersion heater at a competitive price. Built up on a hot brass pressed hexagon head with a 1¼ in. B.S.P. thread, the heating element is housed in two concentric tubes, the outer having a diameter of approximately 1¼ in. and the inner ⅝ in. This construction, besides increasing the wetted area of the heating element per unit length, introduces cold water to the centre of the heating element which is normally its hottest part.

These heaters are made in 12-in. or 16-in. lengths with loadings up to 2 kW. The wetted area is as high as 80 sq. in. per foot length, and even with a loading of 2 kW the watts density of a 16-in. heater is only 21 W per sq. in. The low watts density and simple descaling features render this unit equally suitable for hard or soft water applications. It can be fitted into the tank either vertically or in an inverted position as a circulator, or horizontally as a normal immersion heater.

Apprentice Training

Midland Group's Scheme

IN introducing a new apprenticeship scheme, Birmid Industries, Ltd., stresses that it is important that workshop practice shall go hand-in-hand with technical training; but that neither shall interfere with the other, and that the apprentice shall have sufficient time available for normal social and cultural activities. It is essential that the apprentice shall have the opportunity to receive an education suitable to his capacity, and that he shall not be prevented by his financial circumstances from reaching the highest level of which he is capable. The training must be flexible enough to provide the industry with the highly skilled (specialist) craftsman, the technician and the research worker, and also to provide the basic education for administrative officers.

The scheme promoted by Birmid Industries, Ltd., for its component companies—who are all associated with metallurgical enterprises in the Midlands—was devised with the object of satisfying the foregoing conditions. A well illustrated, practical brochure which has been issued forms a useful guide for intending apprentices and their parents or guardians. The scheme covers a period of five years. The first stage includes the ages of 16 to 19 years during which time the apprentice will be given a general knowledge of his craft and a working knowledge of the basic technical background to enable him and the companies to decide upon the branch of the business that he should pursue with best advantage. The three-year period will be followed by two years which may be devoted to craft specialisation in the works or, if on the technical side, in further combined works and college courses.

During the three-year period each year will be divided into three terms of four months' duration. Two of these terms will be employed in works departments, while the third will be spent at the technical college.

At the end of the three-year period those who choose the craft side will be given a further two years of specialisation in one or more of the skilled trades of their choice. They will not spend any further day time at the technical college, but will be encouraged to attend evening classes. Those who choose a technical or commercial career will also have specialised training in the factory; but they will, in addition, attend the technical college for two further periods during which time they will work for the Higher National Diploma.

At the end of the five-year period the company will arrange for certain of the apprentices who have particular aptitude to be given a course at other works in or outside the Birmid group. A course at the Foundry School may also be arranged, and in certain cases a course at the University of Birmingham or London may be made available. No premiums are demanded and no fees are payable by the apprentice who, on the contrary, is accorded a number of privileges including payment at day-scale rates during the period spent at the technical college and payment of all fees for continuation classes and technical college. Financial assistance may be granted in such deserving cases as may be necessary.

Belgium's Industries

COMPILED by Walter Ford and published for the Belgian Information Office, 25, Eaton Place, S.W.1, by Evans Bros., Ltd., "Belgian Handbook" is largely concerned with the country's industries and foreign trade, which in many ways are similar to those of Great Britain. The handbook shows, however, that Belgium imports materials in an absolutely raw state and exports them still unfinished, so that what may be an export of manufactured goods from the Belgian point of view may be an import of raw material for England. Data are given showing that by value (although not by weight) Belgium's exports to Great Britain in 1939 amounted to 14 per cent. of the total, being second only to those of Holland. On the other hand only 8 per cent. by value of her imports came from Great Britain. The raw metal industries provide the country's industrial backbone, but electrical engineering, including the manufacture of plant, cable, and telegraph and telephone apparatus, figures among other leading industries. As regards electricity supply, it is stated that Belgium was the first country to adopt the grid system. The annual output per head of the population in 1938 was 630 kWh, closely approximating to that of Great Britain. The handbook also gives details of the country's constitution and social services, her part in the 1940 campaign, the Government in exile and the vital war supplies from the Congo.

ELECTRICITY SUPPLY

Further Rural Extensions. *Large Hull Contracts.*

Bristol.—BRIGHTER LIGHTING POSSIBILITY.—At a meeting of the Public Works Committee the city engineer (Mr. H. M. Webb) said that unless something unforeseen happened he hoped that there would be improved lighting when the street lamps were switched on in about six weeks' time. The lighting would not be up to the pre-war standard, but it would be appreciable.

Broadstairs.—QUESTION OF PURCHASE.—The Finance Committee recently received a report that a meeting of the Margate and Broadstairs Joint Committee for Electricity Supply had been held at which preliminary consideration was given to the question of purchasing the undertaking of the Isle of Thanet Electric Supply Co., Ltd. The Joint Committee asked for certain financial particulars to be obtained and submitted at a later meeting.

Bury St. Edmunds.—RURAL SUPPLY PLANS.—According to a report in the *Bury Free Press*, plans for the extension of the existing services of the East Anglian Electric Supply Co., Ltd., south of Bury St. Edmunds have now been completed in detail and it is understood that the work will be put in hand as soon as possible after the war. The area to be served will include the parishes of Sicklesmere, Nowton, Hawstead, Whepstead, Little and Great Welnetham, Bradfield Combust, Stanningfield and Cockfield.

Dumfriesshire.—FARM ELECTRIFICATION.—Reporting recently on the progress of the electricity undertaking, the convener of the Electricity Committee said they had increased transmission lines and had added to the number of farm consumers. They had now a very impressive demonstration of a hammer mill which was completely automatic and driven by a 3-HP motor. Farmers would also be able to see sterilising plant that could be made ready for operation in ten minutes. The steriliser was made locally, and had been designed by one of the Department's staff. There were now 118 farmers in the county using electricity for sterilising. The convener thanked Mr. Pickles and his staff who were working hard to make the undertaking a success.

In his budget statement Colonel Crabbe pointed out that since the undertaking was started 13 years ago £535,000 had been spent on capital works and to-day 47½ per cent. has been repaid.

Eye.—STREET LIGHTING.—The Town Council has agreed to meet a representative of the East Anglian Electric Supply Co. to discuss street lighting.

Gravesend.—RATE RELIEF.—A sum of £3,286 is to be contributed by the electricity undertaking as rate relief.

Hull.—LARGE SUPPLY CONTRACTS.—At a meeting of the Electricity Committee, the general manager (Mr. D. Bellamy) Electricity Department reported that G. & T. Earle, Ltd., had commenced to make use of the Corporation supply instead of generating their own electricity. The company's plant consists of three 1,500-kW, 500-V 3-phase turbo-alternators and the agreement provides for this plant to be kept in good working order and available for running by the Corporation during its peak-load and any other emergency periods.

The justification for the change-over to the Corporation supply during the war period was on the grounds of fuel economy. The annual consumption is of the order of 13 million kWh with a maximum demand of 3,000 kVA.

Mr. Bellamy also reported that the East Hull Gas Co. had accepted the terms offered for a bulk supply of electricity to be afforded to its works to replace the company's generation.

LIGHTING IN BEVERLEY.—The Beverley Corporation has accepted Mr. Bellamy's proposals for post-war street lighting in Beverley. This will be a conversion from gas to electricity for public lighting purposes, and is of particular interest in view of the fact that the local gas undertaking is owned by the Corporation. The existing gas-lighting standards will be used with such modifications as may be necessary.

Lichfield.—ESTIMATE APPROVED.—The Electricity Committee has approved an estimate of £1,522 for affording supplies to the sewage works.

Morley.—INSTALLATIONS IN COUNCIL HOUSES.—In a report to the Housing Committee the borough electrical engineer (Mr. N. Hunter) sets out detailed recommendations for electrical installations in the Council's houses. Among the matters referred to is the provision of an adequate number of power points, with all plugs of one standard size and the sockets fixed at a suggested standard height of nine inches from the floor. Equipment should include cooker, refrigerator, 10-gal. cabinet type wash-boiler, inset radiator in one bedroom and reflector fitting over the bathroom door. Under the existing domestic tariff at Morley, with a running charge of ¼d., the average cost over the year, Mr. Hunter says, would work out at 3s. per week.

North Wales.—RATE BURDEN ON HYDRO-ELECTRIC SCHEMES.—The North Wales and South Cheshire Joint Electricity Authority was informed at its meeting last week that no fewer than seven schemes of hydro-electric development in North Wales were under consideration. Mr. J. Rankin (North Wales Power Co.) said that a disquieting feature was the indication by those investigating the proposals that unless the existing methods of rating and valuation were modified some of the schemes would be uneconomic. In a recent White Paper on the rating and valuation of hydro-electric undertakings in Scotland, substantial relief from the heavy rating burden was recommended. Mr. G. Wright (Cheshire County Council), suggested representations to the Minister of Fuel and Power and the Electricity Commissioners, pointing out the threat to industrial prospects in North Wales. The Authority decided to support the views put forward in the White Paper, and to request Welsh M.P.'s to draw attention to the effects of rating inequalities on electrical and industrial interests in Wales.

Ruthin.—LOWER CHARGES.—In April, 1940, the Council made an all-round increase of 10 per cent. in electricity charges, and a further 10 per cent. was added six months later. Last year the

20 per cent. addition was halved, except in respect of heating, power, excess kWh under the domestic tariff, and certain special tariffs. At the Council's last meeting Councillor J. M. Edwards, chairman of the Electricity Committee, announced that, with the exceptions already referred to, the remaining 10 per cent. addition would be abolished as from the June quarter meter readings. He added that further reductions were now under consideration.

Sunderland. — REPORT OPPOSED. — The Electricity Committee has requested the Ministry of Fuel and Power to take no action upon the report entitled "Memorandum on Electricity Distribution with Recommendations relating to Future Policy and Practice" which the I.M.E.A. and other parties in the industry are submitting to the Ministry as the joint views of those concerned.

Overseas

South Africa.—COMMISSION'S REPORT.—Dealing with plant extensions, the 1943 report of the Electricity Supply Commission states that an additional 25,000-kW turbo-alternator at Colenso started commercial operation in July, 1943, and another similar set is now being ordered. The loss at sea of essential equipment has delayed the planned start of the Vaal power station from the end of 1943 to probably the end of the current year. The Congella station extension, commenced early in 1939, is still delayed pending replacement of the 40,000-kW turbine also sunk in 1943. An order for a duplicate turbo-generator for further extension is being placed. Power sales in 1943 totalled 4,276 million kWh, 45 million less than in 1942, due to a decline of mine requirements and curtailed train services.

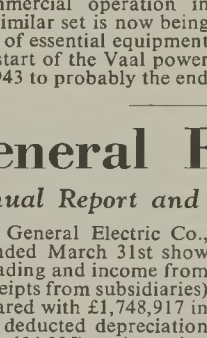
Sweden.—NEW POWER STATION.—The Government-owned Midskogsälven hydro-electric power station of 90,000 kW capacity has just started generation. The station has been completed in the record time of 35 months at a construction cost of about 43 million kr. Power produced by the eight power stations on the Indalsälven River now totals 480,000 kW.

Proposals for the large-scale exploitation of the power resources of the River Ljusnan during the next ten years are at present under discussion. The Orebro Elektriska Kraft AB. has acquired all the rapids between Kolsätt and Ytterhogdal. Stockholm's Superfosfatfabriks AB., owner of the biggest waterfall, the Lanforsen, is soon to harness its power, and also proposes to build plants on the Ojeforsen and Storäfallet rapids. A Central Swedish combine has recently bought the rapids in the river south of the Lanforsen to Hovrahällan and is to construct a large dam.—*Reuter.*

General Electric Co.

Annual Report and Chairman's Statement

THE accounts of the General Electric Co., Ltd., for the year ended March 31st show that the profit on trading and income from investments (including receipts from subsidiaries) was £1,812,409, as compared with £1,748,917 in 1942-43. From this are deducted depreciation (£460,699), directors' fees (£4,335) and pension fund contribution (£106,645), leaving a net profit of £1,240,730 (against £1,195,741). The addition of £817,762 brought forward gives an available balance of £2,058,492. After transferring £700,000 (same) to income tax reserve and paying the dividends (including 10 per cent. plus a bonus of 7½ per cent. on the ordinary stock) £865,134 is carried forward.



Sir Harry Railing

The balance sheet shows a general reserve of £4,700,000 against an issued capital of £7,798,372; interests in other companies £5,220,393; and property and plant valued at £4,807,545. Goodwill and patents stand at £1.

In his statement prepared for the annual meeting on July 27th, Sir Harry Railing, the chairman, refers to the deaths during the year of Mr. E. G. Byng and Sir William Noble. After reviewing the accounts he says that the company's energies and resources are still concentrated on winning the war and planning for after the war has had to take second place.

Sir Harry Railing mentions with approval the Government's White Paper on Employment and the last Budget Speech as they both propose to break away from artificial restrictions imposed by yearly budgeting which sets narrow limits to a nation's and a company's planning.

Our dependence for certain raw materials and food upon other countries makes it of vital interest that we should raise the standard of living to approach our own where the standard is lower and thereby foster an expansion of world demand. Then it is vital for us to produce the right kinds of goods at the right price to raise our exports to the degree necessary for us to obtain necessities in return.

In the production of goods at competitive prices the co-operation of labour is as essential as that of management. All our hopes for improvement depend on our ability to create this expansion whether the State or so-called private enterprise supplies capital and management. While State direction of policy at the highest level may be necessary for some time, the State should not be the operating mechanism of productive industry. The necessary imagination, initiative, pioneer spirit, and courage to run risks and make quick decisions are more likely to be obtained from specialists operating in industrial units of manageable size than from the State.

In conclusion Sir Harry Railing refers to the long tradition of research in the company, and to the company's pensions fund which has now reached a figure of £3,150,000. He expresses appreciation of the staff and workers and of the company's employees (5,025) who have joined the forces.

Safety in Workshops

Employers' Liability for Accidents

By F. E. Sugden,
A.C.I.S., Barrister-at-Law

IN any factory or workshop it is common practice for apprentices and others to leave lying about tools and parts of machinery which may be a source of danger to other workmen who are passing to and fro. It has been decided that employers are liable for any injuries to workmen who trip over these parts left lying on the floor.

In the recent case of Callaghan v. Fred Kidd & Son (Engineers), Ltd., it was stated that part of the work of a factory required girls to take about eight or nine iron bars at a time to a grindstone. Usually the girl took the bars to the grindstone and proceeded at once with the grinding, but on the occasion of the accident forming the subject of this case the girl, instead of proceeding at once to grind the bars, went away and left them lying on the floor in front of the machine. There was a clear space of some 18 ft. in front of the machine. The appellant, being intent on his work, did not notice the bars on the floor, tripped over them and was injured by the revolving grindstone.

It was contended that in these circumstances the employers had failed to observe the statutory duty imposed upon them by the Factories Act, 1937, Section 26 (1), which requires that, so far as is reasonably practicable, safe means of access to every place where any person has to work shall be provided and maintained. The Court held that there had been a breach of their statutory duty by the employers and the appellant was entitled to recover damages for his injuries.

Maintenance of Access

In this connection the statute lays down that safe means of access shall not only be provided but shall also be maintained. This, which is a provision first introduced in 1937, means that the system of working in the factory must be such that means of access is at all times safe. If the management knows that obstacles are from time to time placed in a way to prevent safe access to a working place, then their duty is to make a regulation forbidding that practice and to see that the regulation is carried out. The Act allows a way of escape where it is not reasonably practicable to provide a safe access, but that did not arise here.

In a small repair shop particular care is necessary. If a machine is being overhauled certain parts may be removed for adjustment or replacement. The repairer should be sure that any spare parts or the remainder of the machine are placed in such a position as not to be an obstruction to any other workmen in the shop.

In the case of a large firm the manager should see the shop steward or foreman to make sure that the employers' instructions are rigidly carried out. Otherwise the employer will be laid open to damages for injuries to his workmen through the carelessness of apprentices or any other workmen, who are not so mindful about their fellows' safety. A prominent notice should be displayed in the shop enjoining the employees to strictly obey the rules to avoid accidents.

Under the Workmen's Compensation Act such warning will not affect liability, but if an action for negligence is taken against the employer, such warning will, in my submission, affect that liability because he has to prove that he has taken reasonable steps to prevent the accident. If he has taken such steps, and assuming that degrees of negligence are recognised by the Court, he will have reduced his liability.

It will be appreciated that an employer might be held liable by an employee from two points of view, namely, under the Workmen's Compensation Act and at Common Law. Naturally the employer will ask: What is the difference in financial liability? Under the Workmen's Compensation Act the claim may go into a few hundred pounds in accordance with the fixed scale, as to the length of service. The amount of damages will be the actual loss of wages, and even on the death of the employee his dependants could only claim a few hundred pounds. In the case of Common Law liability the amount might go into thousands of pounds for a similar accident. Hence the importance of the employer's taking measures to safeguard himself against the carelessness of his employees.

Human Relationships in Industry

MORE and more attention is being given in modern industry to the handling of the men and women involved, in order to secure the harmony which is necessary to smooth and continuous production. This subject, "The Personnel Function in British Industry," is dealt with in a booklet produced by Personnel Administration, 130, Mount Street, W.1. In it the policy and duties of all those concerned are set out and notes on the operation of various departments are given by the firm, which has developed methods of training operators and supervisory staffs.

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.

J. L. BAIRD.—"Colour television apparatus." 14256. October 10th, 1942. (562334.) "Cathode-ray tubes for television." 180/44. July 23rd, 1943. (Divided out of 562168.) (562433.)

F. E. Bancroft and Metropolitan-Vickers Electrical Co., Ltd.—"Rotary pumps." 1195. January 23rd, 1943. (562409.)

C. A. Barron and H. D. Barron.—"Wire-drawing machines." 3573. March 4th, 1943. (562421.)

F. J. G. Van Den Bosch and Vacuum-Science Products, Ltd.—"Electron multipliers." 12620/1. September 5th, 1940. (562299/0.)

British Insulated Cables, Ltd., and R. Blackburn.—"Device for heating a spindle or socket." 3778. March 9th, 1943. (562424.)

British Thomson-Houston Co., Ltd.—"Resinous condensation products." 11802/42. August 30th, 1941. (562332.) "Apparatus for measuring lengths and correcting skew and bow in woven materials." 4314/43. March 24th, 1942. (562450.) "Washing machines." 10256/42. July 24th, 1941. (562372.) "Resinous condensation products." 11718/42. August 30th, 1941. (562373.) "Electric selective controlling apparatus." 16641/42. November 28th, 1941. (562381.) "Electron-discharge amplifiers." 18389/42. December 31st, 1941. (562396.) "Electric circuit-breakers having arc-extinguishing means." 4181/43. March 20th, 1942. (562429.) "Frequency modulation system." 6244/43. April 23rd, 1942. (562432.)

British Thomson-Houston Co., Ltd., and F. W. Carter.—"Ignition systems for internal-combustion engines." 2749. February 18th, 1943. (562354.)

M. L. B. J. Caspersz.—"Radiographic unit for correcting radiographic distortion and a method for obtaining radiographically true measurements, especially of the heart, relative to the chest." 14633/42. September 15th, 1941. (562378.)

A. C. Cossor, Ltd., L. Jofeh, and B. C. Fleming-Williams.—"Electron beam deflection valves and circuits therefor." 6195/42. May 7th, 1941. (Divided out of 560689.) (562306.)

Duratube & Wire, Ltd., and J. Veit.—"Electrical conductors and cables." Cognate applications 3287/43 and 3579/43. March 1st, 1943. (562360.)

E. R. Goldfield, R. C. Schiring and R. J. Stava.—"Mobile röntgen-ray apparatus with foreign-body localiser." 3068. March 9th, 1942. (562303.)

Landis & Gyr Soc. Anon.—"Small electric motors, more especially synchronous motors." 8792. July 14th, 1941. (562307.) "Fusible metal thermal cut-outs for electric switches." 4498/43. March 21st, 1942. (Addition to 553862.) (562460.)

Londex, Ltd., and W. S. F. Brown.—"Electric control equipment for liquid-level regulation." 1508. January 29th, 1943. (562322.)

Mavor & Coulson, Ltd., and J. B. Mavor.—"Apparatus for mining." 4399. March 18th, 1943. (562457.)

M. & C. Switchgear, Ltd., and S. Pfob.—"Electric switchgear for the control of electric motors." 610. January 13th, 1943. (562319.)

Marconi's Wireless Telegraph Co., Ltd.—"Frequency and phase modulation receivers." 18222/42. December 22nd, 1941. (562315.) "Frequency modulated pulse signalling." 3596/43. March 5th, 1942. (562422.)

G. A. Moller.—"Production of electrolytic coatings of aluminium and aluminium alloys on metals." 4089. March 12th, 1943. (Convention date not granted.) (562428.)

A. G. Frazer-Nash and A. Whitaker.—"Thermionic oscillation generators." 11860. July 18th, 1940. (562298.)

Neonelectric Co., Ltd., and O. P. Scarff.—"Means for the production of ultra-violet light rays." 12802. September 10th, 1942. (562374.)

Plessey Co., Ltd.—"Electro-magnetic relays." 4520/43. March 19th, 1942. (562461.)

H. F. Rost and P. H. E. Claesson.—"Frequency indicating and measuring means suitable for measuring distances and directions of invisible objects." 4892. April 14th, 1942. (Addition to 542634.) (562305.)

Siemens Bros. & Co., Ltd., M. Reed and S. H. Moss.—"Generation of high-frequency currents." 2555. February 16th, 1943. (562329.)

P. A. Sporing, C. P. Johnson and Telegraph Condenser Co., Ltd.—"Electrical condensers." 3292. March 1st, 1943. (Addition to 534507.) (562361.)

Standard Telephones & Cables, Ltd.—"Cathodes for electron-discharge tubes." 772/43. February 6th, 1942. (562398.)

Standard Telephones & Cables, Ltd. (International Standard Electric Corporation).—"Velocity modulated electron-discharge devices." 15102. November 24th, 1941. (562302.)

Standard Telephones & Cables, Ltd., and A. W. Ewen.—"Thermionic valve circuits." 18228. December 23rd, 1942. (562340.)

Standard Telephones & Cables, Ltd., and S. H. Towner.—"Electro-magnetic relays." 18291. December 23rd, 1942. (562342.)

Standard Telephones & Cables, Ltd., F. H. Bray and F. E. Newton.—"Circuits for generating electric impulses." 18229. December 23rd, 1942. (562341.)

Standard Telephones & Cables, Ltd., C. M. Le G. Eyre and J. O. Gilderdale.—"Thermionic valve circuits." 1636. February 1st, 1943. (562325.)

Standard Telephones & Cables, Ltd., A. H. Roche and T. W. Elliott.—"Negative feed-back amplifiers." 18319. December 24th, 1942. (562392.)

Standard Telephones & Cables, Ltd., S. H. Towner and P. A. Childs.—"Electro-magnetic relays." 18227. December 23rd, 1942. (562339.)

F. C. Stephan.—"Casings for electrical components such as condensers." 1791. February 3rd, 1943. (552413.)

Relay Adjustment

Fault Protection Time and Current Setting Chart

By G. W. Lee, A.M.I.E.E.

THE accurate setting up of operating current and time delay for relays at various points on a distribution network, to afford reliable discrimination in the operation of the fault protection apparatus, must always be of the greatest importance to all concerned.

The question of speed in arriving at these settings has been raised by Mr. T. D. Oswald (*Electrical Review*, December 17th, 1943, p. 819) and it was the very general interest displayed on that occasion that decided me to describe a very simple device which in my experience has several distinct advantages over the special slide rule. A rule differing only in the arrangement of the special lines in relation to the other scales was used by me for some years with every satisfaction, but was eventually superseded by the present device which, being two dimensional, makes all calculations at one setting and is self recording.

The usual objection to chart calculators is that they tend to be large in relation to the degree of accuracy required, but for the present purpose the chart (Fig. 1) may be as small as a page of the *Electrical Review* and still be adequate. The most practical course would be to utilise a standard sheet of "double log." paper having two 5-in. log. scales on both axes. This sheet would form the master chart, giving times from 0·1 to 10 seconds and currents from 100 to 10,000 A. Should a larger chart seem desirable, or a more extended range be required, it can easily be obtained by suitably mounting a number of sheets of standard "double log." paper obtainable from the various drawing office suppliers.

The reason for the reduction of size permissible for such a calculator is that only standard current transformer ratios need be considered; the current settings of the relay are usually limited in number, and the permissible operation time encroachment is fixed by the inherent mechanical time delay in the switches being controlled by the relays.

Reliability being the first requirement, my practice has been to limit encroachment of the relay time curves to 0·4 second minimum at any point within the zone of available fault current. Without full tabulation of operating time for a very large number of points in the range, this cannot

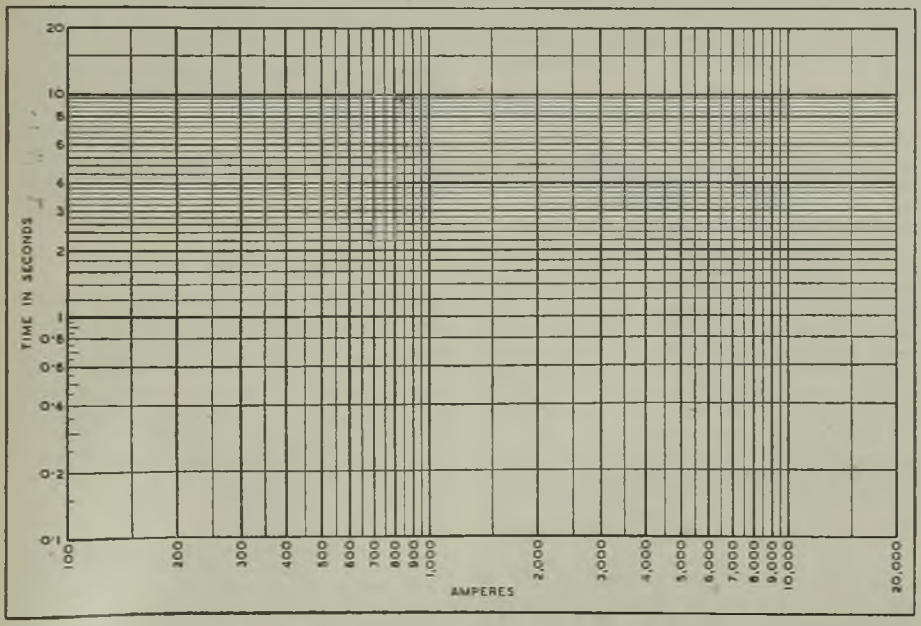


Fig. 1.—Master chart for co-ordinating relay maker's data curves

be guaranteed, especially when relays with differing characteristics are concerned and the direct comparison of the performance curves resulting from the settings employed for each relay is usually considered the only satisfactory procedure. The present calculator provides for the latter course, the plotting being to log. base co-ordinates, so that the curve shape for any particular relay is unaltered by variation of current and time settings, the position only being affected.

To facilitate employment of the device it is suggested that lines be ruled in at 0·2-second intervals and current lines for the various B.S.S. primary ratings of current transformers. The only moving part required is a suitable curve plotted and cut

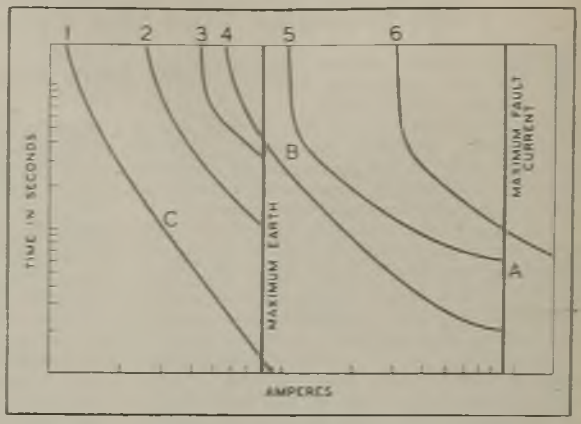


Fig. 3.—Representative final family of curves on tracing paper derived from master chart

1. Fuse, 100/5, 23 SWG. 2. Relay Type B, 600/5, 30 per cent., 0·1 sec. 3. Relay Type A, 800/5, 40 per cent., 0·4 sec. 4. Relay Type B, 600/5, 75 per cent., 0·1 sec. 5. Relay Type A, 800/5, 100 per cent., 0·25 sec. 6. Equivalent bulk supply setting

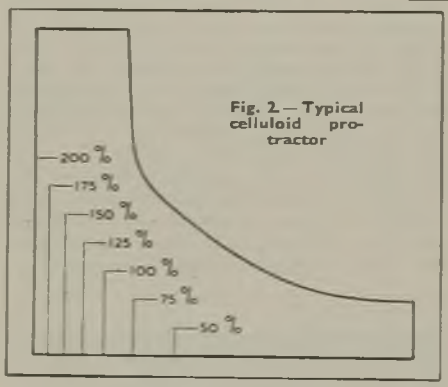


Fig. 2.—Typical celluloid protractor

out of card, or celluloid, for each type of relay employed and the same can be done for any time-limit fuses which may be employed on the less important tappings.

The respective curves (Fig. 2) are plotted from the makers' curves by means of the master chart as co-ordinates, the base of the card representing the unity time line. The unity current setting is marked off on this edge and the other available relay current settings are marked off by reversing the card on the chart, placing the unity (or 100 per cent.) setting on the 1,000-A line and marking off against the appropriate lines (200 per cent.–2,000 A, 75 per cent.–750 A, etc.).

It now only remains to mount the chart on some suitable card or light board and fix a sheet of tracing paper over it. The latter is marked at the limits of available fault and earth currents (Fig. 3) and the equivalent primary settings (bulk supply or generators) plotted by placing the appropriate curve over the chart with the base line against the time setting and the relay current setting against the current transformer primary full-load amperage, corrected if necessary for change of system voltage.

A pencil line run round the curve records the setting and is used for reference for the subsequent settings of the other points concerned.

Thus, Fig. 3 is a representative final result and illustrates at A the use of the fault limitation of, say, the bulk supply transformers to increase the available settings, while at B the necessary modification from 100 to 75 per cent. of the current setting of a relay with dissimilar characteristics to avoid encroachment is clearly shown, and at C the comparison of an overload time-limit fuse with the nearest feeder earth fault setting can be seen.

Spanish Power Schemes

AMONG the hydro-electric schemes recently recorded by *Metalurgia y Electricidad* are the following: The Compania Mengemor, of Madrid, has been authorised to proceed with the establishment of a power station on the river Guadalquivir near the town of Villafranca de Cordova. The plant will comprise two 3,100-HP Kaplan turbines coupled to 2,650-kVA alternators generating power at 5,000 V and a transforming station at which the power will be stepped up to 70,000 V for transmission. The Sociedad Fuerzas Electricas del Nordeste de España has had plans officially approved for the establishment of a station on the river Limia near Parroquia de Torno in the province of Orense. In this case the initial plant will comprise two 16,230-HP Francis vertical-shaft turbines coupled to 13,500-kVA alternators. Power will be generated at 6,600 V and stepped up for transmission to 66,000 V.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Revo Electric Co., Ltd.—This company's accounts were dealt with in our last issue. At last Wednesday's annual meeting the chairman (Mr. B. Silcock) pointed out that the decline in trading profits was not due to diminution of effort during the year but to lower output and sales owing to variations in contracts which had affected the even flow of production. Each change in contract necessitated reorganisation of plant and personnel. Owing to E.P.T., however, net profits were not affected.

Regarding the post-war period, Mr. Silcock contended that the future standard of living would depend on increased export trade, and a high level of efficient productivity, together with stabilisation of prices and wages. State control, with the discouragement of private enterprise should not be lightly advocated at the present time. The company had every reason to anticipate a healthy demand for its cookers and street-lighting equipment. Important developments had occurred in their switchgear and fan departments and other new lines were being developed.

Thomas Bolton & Sons, Ltd., show a profit for 1943-44 of £288,398, after providing for E.P.T. (against £299,043). The balance, after deducting depreciation, directors' remuneration and debenture interest, is £197,016 (against £197,848). The allocations include £131,072 to income tax reserve, £20,000 (against £30,000) to general reserve and £10,000 to war contingencies reserve. The final ordinary dividend is again 5 per cent., making 7½ per cent. for the year, with a cash bonus of 2½ per cent. The balance carried forward is £68,872 (against £65,428).

In his statement prepared for the annual meeting on Wednesday last, the chairman (Mr. P. V. Hunter) said that there had been a falling off in the demand for certain of the company's products but the effect had been largely offset by the lower requirements for E.P.T. Some measure of control of raw materials and capital expenditure was inevitable for the first few years after the war, but even so the directors considered that the company's products would continue to be in demand and that a reasonable trading prospect might be envisaged.

Pye, Ltd., report a net profit of £108,910 for the past year, as compared with £108,668 for 1942-43. A final dividend of 3 per cent. and a participating dividend of 2 per cent. are recommended on the participating preferred ordinary stock, again making 10 per cent. for the year. The deferred ordinary stock is again to receive 25 per cent.

The Telephone Manufacturing Co., Ltd., reports a total profit of £492,347 for 1943 (against £503,631). The net profit, after meeting expenses, depreciation, etc., and providing £72,979 (against nil) for adjustments on costed contracts for 1941 and 1942, is £274,083 (against £334,278). To this is added £9,099 brought forward and from the total are deducted income tax £43,081 (against £37,302) and E.P.T. £194,838 (against £266,254), and £17,873 (against £12,218) is put to general reserve. After paying a final dividend of 6½ per cent., again making 9 per cent. for the year, £10,065 is carried forward.

The Palestine Electric Corporation, Ltd., whose accounts were reviewed in our issue of July 7th is holding its meeting on July 28th. The chairman's statement, circulated with the report, says that the Court of Appeal has ruled that preference shareholders are entitled to 4½ per cent. dividend less only United Kingdom income tax. There will be no deduction of Palestinian income tax but shareholders will not be entitled to Dominion tax relief which may be obtained in respect of Palestinian tax.

Christy Bros., Ltd.—The trading profit for the past year was £91,136, as compared with £104,176 for 1942-43, and the net profit, after meeting taxation, £22,536 (against £15,178 for 1942-43 when £17,000 was transferred to reserve for future taxation). The ordinary dividend is raised from 12½ to 17½ per cent. and £5,000 (against £10,000) is transferred to reserve.

W. & T. Avery, Ltd., earned a net profit of £139,377 for 1943-44 (after providing for taxation), as compared with £138,150 for the preceding year. The allocations include £10,000 to general reserve, £45,000 to war contingency reserve and £10,000 to pensions fund reserve (all as last year). The ordinary dividend is again 15 per cent.

Newman & Watson, Ltd., report a net profit of £4,936 for 1943-44 (against £14,094) before meeting taxation which requires £2,681 (against £9,000). The preference dividend is paid but there is again no distribution on the ordinary shares.

Bennis Combustion, Ltd., is paying a final dividend of 5 per cent., again making 10 per cent. for the year.

George Kent, Ltd., announce a final dividend of 7 per cent., with a bonus of 2½ per cent., maintaining the year's distributon at 12½ per cent.

The Dublin United Transport Co. has again declared an interim dividend of 3 per cent.

New Companies

Keith (Electrical) Industries, Ltd.—Private company. Registered July 10th. Capital £1,000. Objects: To carry on the business of manufacturers of, and dealers in, electrical and mechanical apparatus, wireless sets, etc. Directors: L. B. Byron, Midland Hotel, Manchester, and N. Barlow-Graham, 53, Broom Lane, Broughton Park, Salford 7. Registered office: Thorburn Street, Manchester 13.

Anson (Accumulator) Co., Ltd.—Private company. Registered July 8th. Capital, £1,000. Objects: To carry on the business of electrical engineers and contractors, manufacturers of, and dealers in, accumulators and batteries, etc.

Subscribers: U. A. E. Swinton, 28, Markham Street, S.W.3; and V. S. McLeod, C.A., 82, Victoria Street, S.W.1. Secretary: U. A. E. Swinton.

A. W. Sanderson & Co. (Lamps), Ltd.—Private company. Registered June 28th. Capital, £1,000. Objects: To acquire the business of a lamp manufacturer carried on by M. A. Sanderson at Belmont Row, Birmingham, and to carry on the business of electricians, manufacturers of, and dealers in, lamps of all kinds, etc. Directors: M. A. Sanderson, 39, Southam Road, Hall Green, Birmingham; and E. D. Moore, 8, St. Augustine's Road, Edgbaston, Birmingham. Registered office: Belmont Works, Belmont Row, Birmingham.

F. Wilcox, Ltd.—Private company. Registered June 29th. Capital, £500. Objects: To carry on the business of manufacturers of, and dealers in, electrical, gas, oil and quartz lamps, reflectors, bells, stoves, washing machines, refrigerators, wireless sets and accessories, etc. Directors: F. Wilcox, 82, Stockport Road, Ashton-under-Lyne; and W. H. Kellett, 157, Old Street, Ashton-under-Lyne. Registered office: 295a, Katherine Street, Ashton-under-Lyne.

Reflex (Engineering & Electrical), Ltd.—Private company. Registered June 24th. Capital, £100. Objects: To carry on the business of mechanical, electrical and general engineers, etc. Subscribers: Helen Horowitz, 31, Vallance Road, E.1 and Jean Domnitz, 29, East Bank, N.16. Secretary: J. Domnitz. Registered office: 203, Regent Street, W.1.

Supersonic, Ltd.—Private company. Registered July 8th. Capital, £300. Objects: To carry on the business of radio, television, electrical, motor, mechanical and general engineers, manufacturers of, and dealers in, scientific instruments, etc. Directors: C. A. Usher, 15, Rosebank Grove, E.17; and D. G. Roots, 4, Belle Vue Road, E.17. Registered office: 11, Church Hill, Walthamstow, E.17.

Brite-Lite Electro Accessory Manufactures, Ltd.—Private company. Registered July 1st. Capital, £1,000. Objects: To carry on the business of electricians, and wireless service agents, etc. Subscribers: J. Pearson-Griffiths and C. E. McLay, both of Merthyr House, James Street, Cardiff. Registered office: Merthyr House, James Street, Cardiff.

C. A. MacVey (Dundee), Ltd.—Private company. Registered in Edinburgh June 28th. Capital, £500. Objects: To carry on the business of radio, electrical, motor, mechanical and general engineers, suppliers, etc. First directors: A. E. Macintosh, 281, Blackness Road, Dundee and C. H. Horswell, 10, Airlie Terrace, Dundee. Registered office: 21, Strathmartine Road, Dundee, Angus.

L. H. Sheldrick, Ltd.—Private company. Registered June 20th. Capital, £1,000. Objects: To carry on the business of electrical and mechanical engineers, etc. L. H. Sheldrick, of 19, Thurlestone Road, S.E.27, is first director. Registered office: 141, Streatham High Road, S.W.16.

Sound Rentals, Ltd.—Private company. Registered June 21st. Capital, £100. Objects: To carry on the business of manufacturers of and dealers in wireless, television, electrical, cinema apparatus, etc. Directors: G. R. Fountain, 112, College Road, S.E.21; and F. H. Wheeler, Hazel Cottage, Sutton Place, Abinger, Surrey. Solicitor: E. R. J. Leggett, 11, Bolt Court, E.C.4.

Companies' Returns

Statements of Capital

Adelaide Electric Supply Co., Ltd.—Capital, £3,625,000 in £2,250,000 preference stock, £750,000 preferred ordinary stock and £625,000 ordinary stock. Return dated December 1st, 1943 (filed March 21st, 1944). All stock taken up. £3,370,000 paid. £255,000 ordinary stock considered as paid. Mortgages and charges: £1,976,144.

E. W. Jones (Electrical), Ltd.—Capital, £1,000 in £1 shares. Return dated January 14th (filed March 13th). 903 shares taken up. £903 paid. Mortgages and charges: Nil.

Alton District Electricity Co., Ltd.—Capital, £35,000 in £1 shares. Return dated March 16th. All shares taken up. £35,000 paid. Mortgages and charges: Nil.

Mortgages and Charges

Davey, Paxman & Co., Ltd.—Further charge on 9, Stanwell Terrace and 15-23, St. Leonards Road, Colchester, dated June 24th, 1944, to secure £2,320 (including £2,000 secured by mortgage dated December 16th, 1942). Holders: Trustees of Colchester Permanent Benefit Building Society.

Cetba, Ltd.—Debenture dated June 23rd, 1944, to secure £600, charged on the company's undertaking and property, present and future, including uncalled capital. Holders: F. W. Sprott and others, all of Mayfield, near Tunbridge Wells.

Batwin Electric Motors, Ltd.—Satisfaction in full on June 19th, 1944, of debenture dated June 14th, 1933, and registered same date, securing £1,000.

Liquidations

Reliance Lift & Engineering Co., Ltd.—Winding up voluntarily. Liquidator, Mr. W. Rayner, 2, Darley Street, Bradford. At a recent meeting of creditors Mr. J. W. Grayston, Whitaker's Buildings, New Victoria Street, Bradford, was appointed to act as joint liquidator with Mr. Rayner.

R. Townsend & Co. (Engineers), Ltd.—Winding up voluntarily. Liquidator, Mr. J. Hancock, 57, Surrey Street, Sheffield.

Bankruptcies

E. F. Hunt, lately trading with another as Hunt's Radio Service at Cameron House, High Street, Ingatestone, Essex, as radio and electrical dealers.—Last day for receiving proofs July 25th. Trustee: Mr. A. H. Ward, 25, Haven Green, Ealing, London, W.5.

H. L. Smith and **A. T. Hockley,** motor agents and electrical engineers, trading as Woolbrook Services Co., Woolbrook, near Sidmouth, Devon.—Application of H. L. Smith for discharge heard at Exeter on June 8th. Discharge granted as from July 8th.

STOCKS AND SHARES

TUESDAY EVENING.

THE general trend of Stock Exchange markets and prices continues to be in favour of holders of securities. However, people with money to invest are by no means so satisfied, because they have to pay high prices and accept a correspondingly modest yield from shares in the industrial companies that are now popular. The demand for ordinary shares has widened to such an extent that it includes not only trust companies and other considerable employers of money, but a circle which until lately had confined its attentions to purely gilt-edged stocks, regarding the junior classes with disfavour, if not with actual suspicion.

Industrials Advance

The upward tendency in Home electricity supply shares is again noticeable in London Associated, at 25s. 6d., North Eastern at 35s., Electric Finance at 58s. 6d. and Edmundsons at 30s. 6d. Bournemouth & Poole have eased off to 61s. The industrial market shows again a fair number of advances. Enfield Cables are 3s. 6d. better at 62s. Tube Investments have achieved £5. Rises lifted Johnson & Phillips 1s. 6d. to 76s. and Siemens 6d. to 35s. Ever Ready at 45s. 3d. are 9d. up. Hall Telephones at 30s. have put on 1s. General Electrics at 98s. cum dividend showed a shilling rise. There may have been a shade of disappointment at the decision of the board to keep the dividend at 17½ per cent. instead of raising it, as some had hoped would be the case, to 20 per cent., but under present conditions, the maintenance of the previously-paid 17½ per cent. is not surprising.

Overseas

Calcutta Trams are again one of the outstanding features in the industrial market. Estimates of the final repayment value of the shares range up to £5 per share. The price has risen 5s. to 70s. Calcutta Electric Supply at 48s. are 1s. 6d. up; Madras Electrics at 33s. 6d. have put on 3s. 6d. Cawnpore Electrics at 38s. 9d. are 1s. 9d. higher. Part of the buying has come from India.

It seems rather ironical that the American success in the South Pacific should have led to a 2 point rise in Tokyo Electric sixes. Of the other overseas shares, Perak Hydro-Electrics at 13s. are a florin higher, following the " post-war " rises that have occurred in tin and rubber companies' shares.

Radio Activities

Philco Electric have been an active market at the improved price of 15s. The company has been drawing public attention to its plans for large scale production of radio and television receiving and transmitting apparatus, electric motors, etc., plans which await the signal of victory and the opportunities of peace. Pye Radio has once more declared a dividend of 25 per cent. on its deferred shares, this being the eighth successive year of a similar payment. The price of the shares has risen to 31s. 6d., at which the yield on the money is £3 19s. 4d. per cent. In the recent animation shown by radio shares Pye deferred have been singularly quiet, and this week's advance is a tardy acknowledgment of the company's prospects. Cossor are 6d. better at 26s. 6d. McMichael Radio 5s. ordinary have improved to 7s.; no dividend has been paid since March, 1934. Cinema Television deferred shares of 6d. each are 6d. better at 10s.

Electric Construction

The pressure of taxation comes out conspicuously in the results of the Electric Construction Co., whose net profit of £149,100 is £38,000 up on the year. Taxation, however, requires £100,000, against £55,000 last time, with the result that the net distributable balance is reduced. This has not affected the dividend, however, and 12½ per cent. for the year is again to be paid. In each of the three years, 1940-1942 inclusive, the annual dividend was 10 per cent. The price of the shares not more than two years ago fell to 25s. against to-day's 55s. At the latter price, the return on the money comes to £4 11s. per cent., which is not an unsatisfactory return, considered in relation to the financial strength of the company.

Revo Electric

The Revo Electric Co. reduced its output last year, in consequence of changes that were made in contracts. The effect was to lower the profit to £201,400, being £171,000 down as compared with the previous year, due to the smaller turnover. Net profits of £66,800 go against £72,600 in the year before. The dividend and bonus, as already announced, are 17½ per cent. for the third consecutive year. In 1941, the distribution was 20 per cent.; in 1940 5 per cent. The present price of the 10s. shares is 43s., at which the yield comes to £4 1s. 4d. per cent. In January last, the price was 38s. 9d.

Christy Brothers & Co.

One of the minor features of last week was a rise of £1 a share in the ordinary stock of Christy Bros. & Co., Ltd. The company is engaged in electrical engineering and contracting. The issued capital is £225,000, of which £150,000 is in ordinary £1 units, and £75,000 in 6 per cent. preference. The prices of the shares seldom move. For the greater part of last year, the ordinary remained at 48s. 9d. Last week, the price was 57s. 6d.

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ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend Previous	Dividend Last	Middle Price July 18	Rise or Fall	Yield p.c. £ s. d.
Home Electricity Companies					
Bournemouth and Poole	12½	12½	61/–	–6d.	4 2 0
British Power and Light	7	7	33/–	..	4 4 10
City of London	7	5½	29/6	..	3 14 7
Clyde Valley	8	8	41/6	..	3 17 0
County of London	8	8	42/–	..	3 16 0
Edmundsons:					
7% Pref.	7	7	34/6	..	4 1 4
Ord.	6	6	30/6	+6d.	3 18 8
Elec.Dis.Yorkshire	9	9	45/6	..	3 19 6
Elec. Fin. and Securities	12½	13½	58/6	+1/–	4 12 4
Elec. Supply Corporation	10	10	47/–	..	4 5 0
Isle of Thanet	Nil	Nil	18/–	..	—
Lancs. Light and Power	7½	7½	36/–	..	4 3 4
Llanelly Elec.	6	6	26/–	..	4 12 4
Lond.Assoc.Electric	3	4	25/6	+6d.	3 2 9
London Electric	6	6	28/6	..	4 4 3
LondonPowerRed. Deb.	5	5	104½	..	4 14 7
Metropolitan E.S.	8	8	41/6	..	3 17 0
Midland Counties	8	8	41/–	..	3 18 0
Mid. Elec. Power	9	9	44/–	..	4 1 9
Newcastle Elec.	7	7	31/–	..	4 10 4
North Eastern Elec.:					
Ordinary	7	7	35/–	+6d.	4 0 0
7% Pref.	7	7	35/–	..	4 0 0
Northampton	10	10	49/–	..	4 1 8
Notting Hill 6% Pref. (£10)	6	Nil	11	..	—
Northmet Power:					
Ordinary	7	7	39/6	..	3 11 0
6% Pref.	6	6	30/6	..	3 18 8
Richmond Elec.	6	6	25/6	..	4 14 1
Scottish Power	8	8	41/–	..	3 8 0
Southern Areas	5	5	23/–	..	4 7 0
South London	7	7	28/–	..	5 0 0
West Devon	5	5	23/6	..	4 5 1
West Glos.	4½	3½	24/6	..	2 17 4
Yorkshire Elec.	8	8	43/–	..	3 14 5
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	7/9	..	—
Calcutta Elec.	6*	6*	48/–	+1/6	2 10 0
Cawnpore Elec.	10	7	38/9	+1/9	3 12 1
East African Power	7	7	34/–	..	4 2 4
Jerusalem Elec.	7	5	29/6	+6d.	3 8 0
Kalgoorlie (10/–)	5	5	10/6	..	4 15 3
Madras Elec.	4*	Nil	33/6	+3/6	—
Montreal Power	1½	1½	23	..	6 7 8
Palestine Elec. "A"	4*	5*	41/6	..	2 8 2
Perak Hydro-elec.	6	7	13/–	+2/–	—
Shawinigan Power	83cts.	90cts.	15½	–¼	—
Tokyo Elec. 6%	6	6	22	+2	—
Victoria Falls Power	15	15	4½	..	3 12 7
Whitehall Inv. Pref.	—	6	24/6	..	4 18 0

Company	Dividend Previous	Dividend Last	Middle Price July 18	Rise or Fall	Yield p.c. £ s. d.
Public Boards					
Central Electricity:					
1955–60 (Civil Defence)	3	3	100	..	3 0 0
1955–75	5	5	115	..	4 7 0
1951–73	4½	4½	107	..	4 4 1
1963–93	3½	3½	103½	..	3 7 8
1974–94	3½	3½	100	..	3 5 0
London Elec. Trans. Ltd.	2½	2½	97½	..	2 11 3
London & Home Counties1955–75	4½	4½	111	–1	4 1 1
Lond.Pass.Trans.:					
A	4½	4½	121½	..	3 14 1
B	5	5	121½	..	4 2 4
C	3	3½	72	..	4 10 3
WestMidlandsJ.E.A. 1948–68	5	5	108½	..	4 12 4
Telegraph and Telephone					
Anglo-Am. Tel.:					
Pref.	6	6	120½	..	4 19 7
Def.	1½	1½	30	..	5 0 0
Anglo-Portuguese	8	8	27/–xd.	+6d.	3 18 6
Cable & Wireless:					
5½% Pref.	5½	5½	114½	..	4 16 1
Ord.	4	4	79½	–½	5 0 8
Canadian Marconi $1	Nil	4cts.	10/6	+3d.	—
Globe Tel. & Tel.:					
Ord.	8½*	5*	40/–xd	+5d.	2 10 0
Pref.	6	6	30/–xd	+6d.	4 0 0
Great.NorthernTel. (£10)	Nil	Nil	24½	..	—
Inter. Tel. & Tel.	Nil	Nil	22½	..	—
Marconi-Marine	7½	7½	35/–	+9d.	4 5 7
Oriental Tel. Ord.	16	10	49/–	–6d.	—
Telephone Props.	6	Nil	18/–	+6d.	—
Tele.Rentals (5/–)	10	10	12/–	..	4 3 4
Traction and Transport					
Anglo-Arg. Trans.:					
First Pref. (£5)	Nil	Nil	2/6	..	—
4% Inc.	Nil	Nil	5	–1	—
Brit.Elec.Traction:					
Def. Ord.	45	45	1275	–40	3 10 6
Pref. Ord.	8	8	180	..	4 9 0
Bristol Trams	10	10	56/6	..	3 10 10
Brazil Traction	$1	$1½	27	–½	6 9 8
Calcutta Trams	5½	6½	70/–	+5/–	1 17 2
Cape Elec. Trams	5	6	25/6	..	4 14 1
Lancs. Transport	10	10	45/6	..	4 8 0
Mexican Light:					
1st Bonds	5	5	104½	..	4 15 7
Rio 5% Bonds	5	5	105½	..	4 14 9
Southern Rly.:					
5% Prefd.	5	5	78	–1	6 8 2
5% Pref.	5	5	118½	..	4 4 9
T. Tilling	10	10	59/6	..	3 7 3
West Riding	10	10	45/6	+1/–	4 10 0

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend Previous	Dividend Last	Middle Price July 18	Rise or Fall	Yield p.c. £ s. d.
Equipment and Manufacturing					
Aron.Elec.Ord. ..	10	15	61/–	..	4 18 4
Assoc. Elec. :					
Ord.	10	10	55/6	+6d.	3 12 3
Pref.	8	8	40/6	..	3 19 0
AutomaticTel.&Tel.	12½	12½	64/–	–6/–	3 18 2
Babcock & Wilcox	11	11	54/6	+1/–	4 0 9
British Aluminium	10	10	50/–	+1/–	4 0 0
British Insul. Ord.	20	20	5 11/16	+ 1/16	3 10 5
British Thermostat (5/–)	18½	18½	21/–	..	4 8 1
British Vac. Cleaner (5/–)	15	30	30/–	..	5 0 0
Brush Ord. (5/–)	8	9	11/–	–3d.	4 1 10
Burco (5/–) ..	15	17½	16/–	..	5 9 5
Callender's ..	15	20	5 3/16	..	3 11 4
ChlorideElec.Storage	15	15	85/–	..	3 10 7
Cole, E. K. (5/–)	10	15	33/–	+1/–	2 5 6
ConsolidatedSignal	24	27½	6 9/16	+ 1/16	4 3 10
Cossor, A. C. (5/–)	7½*	10*	26/6	+6d.	1 17 6
Crabtree (10/–) ..	17½	17½	40/–	..	4 7 6
Crompton Parkinson Ord. (5/–) ..	20	22½	31/6	..	3 11 6
E.M.I. (10/–) ..	6	8	34/3	+6d.	2 6 9
Elec. Construction	10	12½	55/–	+1/–	4 11 0
Enfield Cable Ord.	12½	12½	62/–	+3/6	4 0 8
English Electric	10	10	53/3	..	3 15 2
Ensign Lamps (5/–)	25	15	21/3	..	3 10 8
Ericsson Tel. (5/–)	22*	20*	56/3	..	1 15 7
Ever Ready (5/–)	40	40	45/3	+9d.	4 8 6
Falk Stadelmann	7½	7½	35/–	+1/–	4 5 9
Ferranti Pref. ..	7	7	31/3	..	4 9 7
G.E.C. : Pref.	6½	6½	34/–	..	3 16 6
Ord.	17½	17½	98/–	+1/–	3 11 6
General Cable (5/–)	15	15	15/–xd	..	5 0 0
Greenwood&Batley	15	15	45/–	..	6 13 4
HallTelephone(10/–)	12½	12½	30/–	+1/–	4 3 4
Henley's (5/–) ..	20	20	27/6	+6d.	3 13 5
4½% Pref. ..	4½	4½	24/–	..	3 15 0
Hopkinsons ..	15	17½	70/–	+ 1/4	5 0 0
India Rubber Pref.	5½	5½	23/6	..	4 13 9
Intl. Combustion	30	30	6½	..	4 10 8
Johnson & Phillips	15	15	76/–	+1/6	3 19 0
LancashireDynamo	22½	22½	98/9	..	4 11 2
Laurence,Scott(5/–)	12½	12½	13/3	..	4 14 2
London Elec. Wire	7½	7½	39/–	..	3 17 0
Mather & Platt..	10	10	53/9	..	3 14 4
Metal Industries(B)	5	8	50/6	+6d.	3 3 6
Met.-Elec.CablePref.	5½	5½	21/3	..	5 3 6
Murex	20	20	105/9	..	3 15 6
Pye Deferred (5/–)	25	25	31/6	+1/6	3 19 4
Revo (10/–) ..	17½	17½	43/–xd	+9d.	4 1 4
Reyrolle ..	12½	12½	70/–	–6d.	3 11 5
Siemens Ord. ..	7½	7½	35/–	+6d.	4 5 9
Strand Elec. (5/–)	7½	10	8/–	..	6 5 0
Switchgear & Conans (5/–) ..	20	20	18/6	..	5 8 1
T.C.C. (10/–) ..	5	7½	22/6	..	3 6 8
T.C. & M. ..	10	10	54/6xd	..	3 13 6
TelephoneMfg.(5/–)	9	9	11/9xd	..	3 16 8
Thorn Elec. (5/–)	20	20	26/–	..	3 17 0
Tube Investments	20	20	100/–	+2/–	4 0 0
Vactric (5/–) ..	Nil	Nil	17/–	+6d.	—
Veritys (5/–) ..	7½	7½	8/3	..	4 11 0
WalsallConduits(4/–)	55	55	49/6	..	4 9 0
Ward & Goldstone (5/–)	20	20	27/3	..	3 13 6
WestinghouseBrake	12½	14	75/–	..	3 14 9
West, Allen (5/–)	7½	7½	7/9	+6d.	4 16 9

* Dividends are paid free of Income Tax.

Stocks and Shares (*Continued from page* 103)

before it rose to 77s. 6d. on an increase of 5 per cent. in the dividend. This made the distribution 17½ per cent., against 12½ per cent. for 1942-43.

Miscellaneous Matters

The advance in the Christy Bros. dividend exercised a further strengthening effect upon prices of electrical equipment shares. The argument ran that if Christy's could do so well other companies engaged in the same branch of industry must also be having a prosperous time, although anticipation looks for dividends to be maintained by most of the leading companies at the current rates for the duration of the war. British Insulated, Callender's, Enfield Rolling Mills and Allen West were amongst others that improved, the buying being better than the selling, as the Stock Exchange says, and coming upon a market scantily supplied with stock. Consolidated Signals are 1/16 harder at 6 9/16.

Ultra Electric has declared a dividend of 10 per cent. for the year, the same as that of the preceding twelvemonth and the price of the shares went back a trifle to 9s. 9d., there having been some vague previous talk of a possible increase in the dividend. Franco Signs has returned to the dividend list with a 10 per cent. distribution, the same as that paid before the war. At the meeting last week the chairman dealt with the question of post-war considerations and possibilities.

Home Railway Doldrums

Approximate dates of declaration of interim dividends by the Home Railway companies have now been notified. The Southern Railway statement is expected on July 27th. The London Passenger Transport Board will probably announce its result at about the same time. Prices of Home Railway stocks have settled into a quiet and humdrum condition. Fluctuations are few and insignificant. What business passes consists mainly of sales for the executors of deceased holders and, on the other side, a little investment buying on behalf of people who want a good yield on their money and are content to take a business risk in order to get it. British Electric Traction deferred went back 40 points to 1275 ; possibly some of the sellers wanted the money for the purchase of to-day's popular favourites.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

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

Australia.—August 31st. Lead-covered cables. Spec. 370 (£2 2s. two copies, additional copies, 10s. 6d.). H. Baskerville, secretary, City Electric Light Co., Ltd., Boundary Street, Brisbane. (*Tenders*, Melbourne.)

Belfast.—July 27th. Corporation. Supply and delivery of (1) armature coils and (2) steel pinions for trams. Acting general manager, Transport Department, Sandy Row.

Cheadle and Gatley.—July 24th. U.D.C. Electricity Department. One 10 cwt. battery electric vehicle. Specifications from B. J. Russell, acting electrical engineer and manager, 37, High Street, Cheadle, Ches.; tenders to clerk to Council, Council Offices, High Street, Cheadle.

Inverness.—July 31st. Town Council. Various works (including electric lighting) in connection with the erection of 20 houses at Dalneigh. Schedules from borough surveyor; tenders to town clerk.

New Zealand.—September 14th. Auckland City Council. Two crematorium furnaces.

Orders Placed

Blackpool.—Transport Committee. Accepted. Two sets of experimental tramcar trucks (£2,300)—Maley & Taunton. Four tramcar sets of electrical equipment (£3,100).—Crompton Parkinson.

Cardiff.—Electricity Committee. Accepted. Paper-insulated cables for another twelve months. —Aberdare Cables.

Contracts in Prospect

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

Brighouse.—Works additions; Walker Bros. (Brighouse), Ltd., haulage contractors, Atlas Mill Road.

Cardiff. — Additions, Isolation Hospital (£3,000) and Llandough Hospital (£4,930); city architect.

Chesterfield.—Factory for pasteurisation of milk for Chesterfield Dairymen's Association; T. A. Lamb, secretary, 5, Vicar Lane.

Derbyshire.—School, Bakewell; J. Harrison, county architect, St. Mary's Gate, Derby.

Dunfermline.—Twenty houses, to cost £20,494, for Corporation; burgh surveyor.

Durham.—Training centre for the building industry, Bishop Auckland (£3,420); county architect, 34, Old Elvet, Durham.

Edinburgh.—Conversion of building to provide accommodation for mass miniature radiography; city architect.

Essex.—Adaptation of premises for remand home, Chelmsford (£1,250), dining hall, High School for Girls, Chelmsford (£2,185), and buildings for radiography unit, County Hospital, Wanstead (£5,755); county architect, Chelmsford.

Glasgow.—Block of 36 houses at Parkhead for Corporation (£28,000); city architect.

Hastings.—Reconstruction of 100-2, Norman Road and 19-20, Mercatoria; Callow & Callow, architects.

Holmfirth.—Houses (12); H. Parkinson, surveyor, Council Offices.

Hull.—New city hospital buildings at Skidby; A. Rankine, city architect, Guildhall.

Buildings at Risby for Victoria Hospital for Sick Children; secretary.

Lancaster.—Experimental houses; F. Hills, city surveyor, Town Hall.

Manchester.—Works extension; Austin Walters & Co., Ltd., Ayres Road, Old Trafford.

Nantwich.—Pump house, etc., for extensions to water supply scheme for R.D.C. (£26,000); H. Crabtree, engineer, Pillory Street.

Newcastle-on-Tyne.—Fitting shop, etc., for Walkers Parker & Co., Ltd., Elswick Lead Works.

Newcastle (Staffs).—Milk production factory; Adams & Edwards, architects, 3, Brooke Street, Stoke-on-Trent.

Northumberland.—New wing at the Mona Taylor Maternity Home, Morpeth, and maternity home at Berwick; county architect, County Hall, Newcastle-on-Tyne.

Oldham.—Additions to mill, Edenfield Road; Martins Mill, Ltd., cotton manufacturers, Norden, Rochdale.

Additions, Fox Mill; Lancashire Cotton Association, Ltd., Hopwood Hall, Middleton.

Renfrew.—Temporary extension at Thornhill Maternity Hospital (£4,750); county architect, Paisley.

Staffordshire.—Additions to County Technical College, Stafford (£2,700); A. C. H. Stillman, county architect (education), Education Offices, Stafford.

Stockton-on-Tees.—Jam factory for the C.W.S.; C.W.S. Architects' Department, 90, Westmorland Road, Newcastle-on-Tyne.

Training centre for the building industry, for Durham C.C. (£4,960); county architect, 34, Old Elvet, Durham.

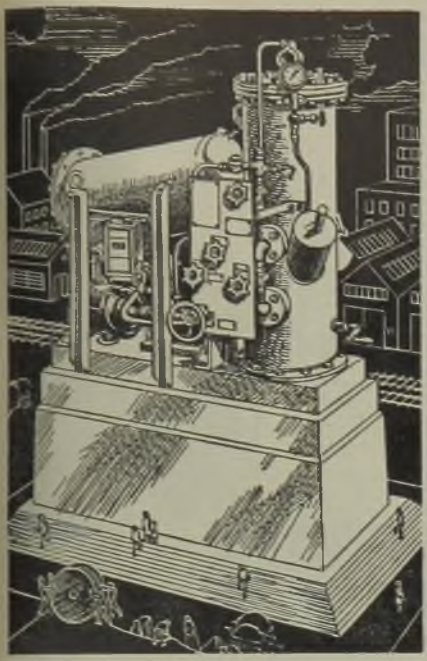
Surrey.—Extensions, Girls' School, Mitcham (£1,900) and additions, School for Boys, Raynes Park (£1,200); county architect, Kingston-on-Thames.

Swindon.—Maternity home annexe, Bath Road; borough engineer.

Walsall.—Houses (10), Coalpool estate; borough engineer.

Warrington.—Works laboratory; Peter Stubs, Ltd. (Files), Scotland Road.

Works extension, Eustace Street and Gladstone Street; James Harding & Co., wire works, Eustace Street.



A Monument to Efficiency

In a single passage through the Metafilter, transformer and heavily carbonised switch oils can be completely freed from all suspended impurities; and all traces of sludge and moisture removed—a monumental tribute to the efficiency of the Metafilter.

The Metafilter is economical and easy to operate; and can be used on switches and transformers while under load.

Metafiltration

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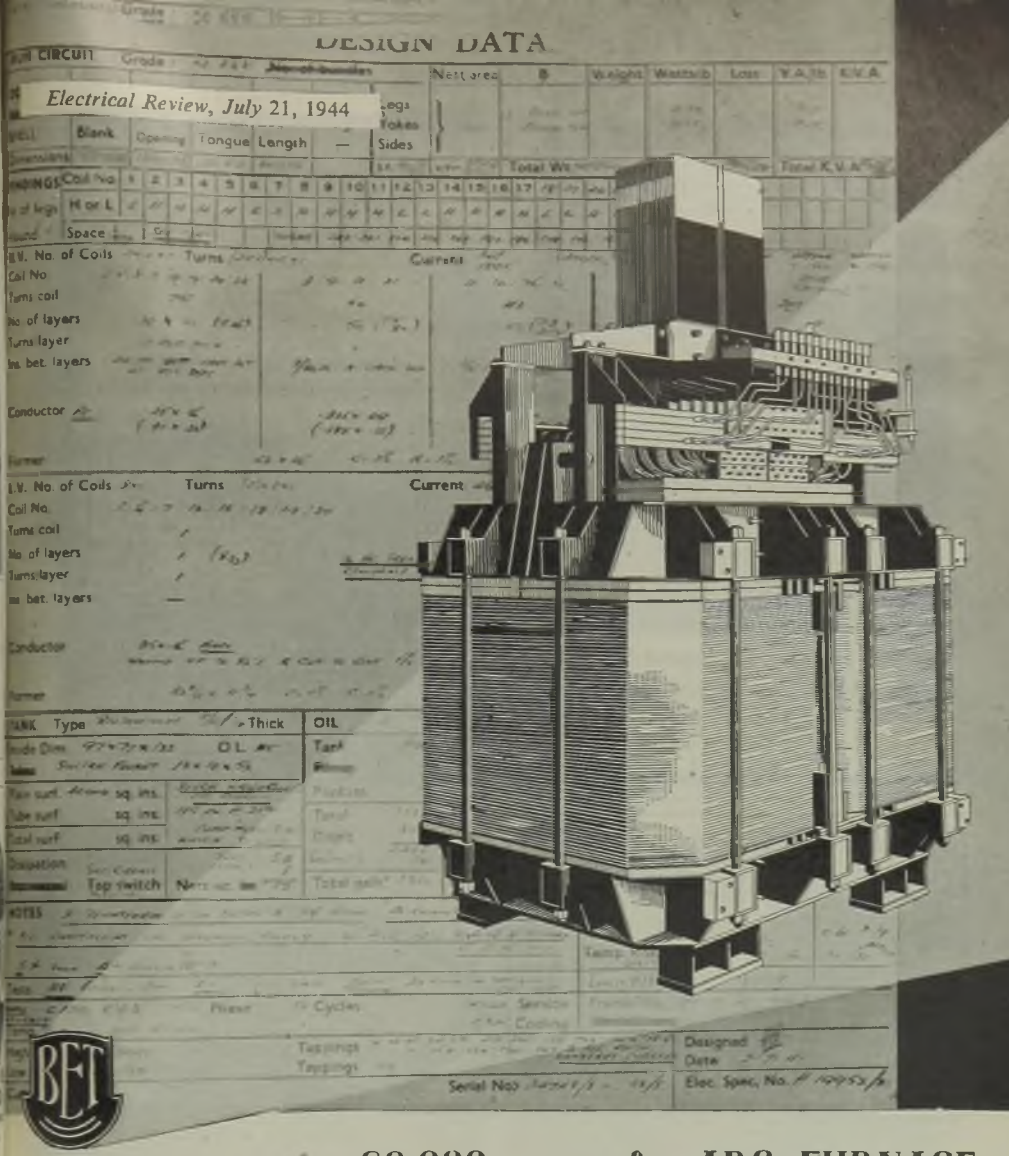
The Army needs Tanks...

and gets them!

thanks to our miners, our war factories, and

BRITISH GWR LMS  **RAILWAYS** LNER SR

Electrical Review, July 21, 1944



80,000 amps. for ARC FURNACE

Another example of B.E.T.'s technical resources. A 30,360 kVA 3-phase, 50 cycle, 33,000/220 volts O.F.W. cooled Furnace Transformer bank capable of an output of 80,000 ampères (one-phase shown). Three 3-phase banks have been supplied to one user.

The
British Electric Transformer
Company Limited
sociation with CROMPTON PARKINSON LIMITED
TRA HOUSE, LONDON, W.C.2 *and Branches*

H

CLASSIFIED ADVERTISEMENTS

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

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

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

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

Original testimonials should not be sent with applications for employment.

SITUATIONS VACANT

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

COUNTY BOROUGH OF BLACKBURN

Electricity Undertaking

Appointment of Assistant Station Engineer

APPLICATIONS are invited for the above position. Applicants must have had a sound technical and practical training in the operation of a modern Power Station, including high pressure water tube boiler units.

Salary and conditions of employment in accordance with the National Joint Board Schedule, Grade 5, Class H (present rate £554 per annum.)

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

Applications, stating age and giving full particulars as above, technical training and qualifications, accompanied by copies of not more than three recent testimonials, must be forwarded in envelopes addressed to:—

R. H. Harral, M.I.E.E.,
Engineer and Manager,
Electricity Offices,
Jubilee Street,
Blackburn,

endorsed "Assistant Station Engineer," and delivered not later than Thursday, 3rd August, 1944.

CHAS. H. ROBINSON,
Town Clerk.
421

STRETFORD AND DISTRICT ELECTRICITY BOARD

Appointment of Deputy Chief Engineer

APPLICATIONS are invited from candidates for the appointment of Deputy Chief Engineer, at a salary of £800 per annum, rising, subject to satisfactory service, by annual increments of £50 to a maximum of £950 per annum. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the selected candidate will be required to pass a medical examination. Candidates must be between the ages of thirty-five and forty-five, and preference will be given to members of the Institution of Electrical Engineers. Modern generating and transmission experience is essential. Applications endorsed "Deputy Chief Engineer," stating age, training, qualifications and previous experience, and accompanied by copies of three recent testimonials, must reach the undersigned not later than Monday, the 31st instant. Canvassing will disqualify.

C. TREWAVAS,
Clerk to the Board.
Town Hall,
Stretford, Lancs.
8th July, 1944.
395

DEPARTMENTAL Manager required by firm in N.W. England. Must have had experience in the design and manufacture of mercury tubes and switches. Write, giving full particulars, to—Box 399, c/o The Electrical Review.

COUNTY BOROUGH OF DONCASTER

Electricity Department

Appointment of Commercial Assistant

APPLICATIONS are invited for the above appointment from persons with suitable qualifications and experience in an Electricity Supply Undertaking.

The salary attached to the position is £550 per annum, plus War Bonus (at present £50 14s. per annum).

Particulars, with terms and conditions of the appointment and list of duties, can be obtained from the Borough Electrical Engineer, Grey Friars Road, Doncaster, by sending a stamped addressed envelope.

H. S. ESSENHIGH,
Town Clerk.
Town Clerk's Office,
Doncaster.
7th July, 1944.
400

A large manufacturing firm with works in Lancashire and elsewhere has vacancies for several Technical men who, after a period of training in the specialised processes involved, would be capable of filling positions of authority and responsibility in their factories. Candidates, who should not be less than 25 years of age, should have had a good general education, followed by a university degree or its equivalent in engineering or science, and experience of technical process work and factory administration. Commencing salary according to qualifications and experience. Apply—Box 396, c/o The Electrical Review.

APPLICATIONS are invited for the position of Junior Switchboard Attendant, at a modern power station. Applicants should be technically qualified and have had experience with power plant switchgear. Salary and conditions of appointment in accordance with N.J.B. Agreement, Class J, Grade 10a (present salary £290 per annum). Applications, stating present position, age, details of training and experience, together with copies of testimonials, to be addressed as below and received not later than August 5th. Envelopes should be endorsed "Junior Switchboard Attendant."—Director and Engineer, The Mersey Power Co. Ltd., Roche House, Runcorn, Ches. 419

APPLICATIONS are invited from Electrical Engineers for appointment to temporary commissions in the Royal Indian Naval Volunteer Reserve (Electrical Branch). The following qualifications are required: Candidates should possess a university degree in electrical engineering or be graduates, associates or corporate members of the Institute of Electrical Engineers, or should be able to produce documentary proof of having received a regular professional education in electrical engineering, such as a certificate of training at Faraday House or the City and Guilds Institute. Candidates should also have practical electrical experience of a general nature. Minimum age 20 years. Applicants should write, quoting D.861A, to the Ministry of Labour and National Service, Room 432, Alexandra House, Kingsway, London, W.C.2, for the necessary forms and particulars, which should be returned completed on or before 29th July, 1944. 397

ELECTRICAL Wholesaler in the West Country requires competent Storekeeper, must have knowledge of trade and exempt military service. State salary required.—Box 409, c/o The Electrical Review.

ELECTRICAL Wholesalers require a Clerical Assistant, conversant with trade and materials as handled.—London Electrical Co. (Blackfriars) Ltd., Blackfriars Road, S.E.1. 24

B.B.C. invites applications from men or women of British nationality only for the post of Assistant in the Engineering Section of the Buying Department. Applicants should possess some commercial experience and knowledge of engineering, and should be prepared to work in London or the provinces. Previous experience of ordering routine would be an advantage. The post will be on a wartime basis only. Salary £6 per week, plus 14s. per week cost of living bonus and family allowance. Applications, with details of age and experience, should be sent to Appointments Officer, Broadcasting House, London, W.1, and must be received not later than 7 days after the appearance of this advertisement. Envelopes must be marked "Engineering Buying Assistant." 407

FOREMAN Winder. Firm developing repair section, post-war, with extensive contacts among leading corporations, requires experienced Winder (fractional armature, stator, up to ½ h.p.), to organise shadow winding department. Must be in position to design windings where job has been stripped or burnt; train labour, strict disciplinarian. No breakdowns in existing windings since 1927. Only one confident to carry on similar reputation need apply. Directorship may be eventually offered to successful applicant. Essential Work Order.—Box 402, c/o The Electrical Review.

GIRL leaving school, interested in and good at figures, required to assist in the accounts department of electrical wholesale distributors. Applicants please write in the first instance giving particulars to—G. S. Peckham & Co. Ltd., 3, 4 and 5 New Compton St., W.C.2. 408

G. S. PECKHAM & CO. LTD. will require, after Aug. 1st, a Despatch Clerk—Parabar system. Knowledge of goods as handled by wholesale distributors essential. Permanent job for right person. Pension scheme. Write, in first instance, stating experience, salary required, etc., to—3, 4 & 5, New Compton Street, W.C.2. 416

OVERSEAS Employment: Electrician required in the Gold Coast Colony for the maintenance of power house plant and electrical equipment associated with a mineral bulk handling installation. Salary £50 per month. Free furnished quarters and medical attendance. Plant comprises heavy oil engines and alternators, each of 250-kW capacity, also motors and control gear associated with wagon tipplers, drag scrapers and overhead ropeway. Practical experience is essential both on A.C. and D.C. plant. Written applications (no interviews), giving full name, date of birth, identity and national service registration numbers, name of allocation office and medical grade (if known), industrial training and experience, name and address of present employers and details of present work, should be sent to The Secretary, Overseas Manpower Committee (Ref. 1384), Ministry of Labour and National Service, Alexandra House, Kingsway, London, W.C.2. Applications will NOT be formally acknowledged. 406

ROYAL Aircraft Establishment Technical School, Farnborough, Hants. Applications are invited for the following full-time permanent appointments in the above Day-School:—(*a*) Lecturer in Electrical Engineering; (*b*) Lecturer in Chemistry. Candidates should hold a University Degree (or equivalent), have had some industrial and teaching experience and be capable of training students for H.N.C. in Engineering and for the Associate Fellowship Examination of the Royal Aeronautical Society. Salary will be in accordance with the Burnham (Provincial) Scale for Technical Schools, but extra allowances may be granted to successful candidates with special qualifications. The appointments will be subject to the provisions of the Teachers' (Superannuation) Act, 1925. Applicants should write, quoting D.900A, to the Ministry of Labour and National Service, Room 432, Alexandra House, Kingsway, London, W.C.2, for the necessary forms, which should be returned completed on or before 31st July, 1944. 415

APPOINTMENTS FILLED

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

SITUATIONS WANTED

ADVERTISER, A.M.I.E.E., college/works trained, 25 years' practical experience, 17 years in Spain, fluent Spanish, fair French and Portuguese, seeks post abroad. Modest salary.—Box 6043, c/o The Electrical Review.

CHARTERED Electrical Engineer seeks position as Engineer and Manager. Experienced design, manufacture, sales small electric motors (industrial, domestic, aircraft). Competent to take full control.—Box 6026, c/o The Electrical Review.

CHARTERED Secretary (39), extensive supply authority experience, now assistant secretary to company manufacturing steel and light alloy products, desires position as secretary of company making electrical products. Salary £750.—Box 6042, c/o The Electrical Review.

CONSUMERS' Engineer (43), i/c. extensive London district, desires post-war change to country town, South or West Country, many years' experience pre-war development, excellent record and references.—Box 6033, c/o The Electrical Review.

ELECTRICAL Engineer, age 52, seeks supervising position or charge of factory plant, long experience with D.C. and A.C. layouts for power and lighting, highest testimonials.—Box 6044, c/o The Electrical Review.

ELECTRICAL Supervisor, 20 years' experience, requires progressive position, construction, planning, maintenance and organising labour.—Box 6048, c/o The Electrical Review.

ENGINEERING Executive (30), Int.A.M.I.P.E., G.I.E.E., with design, D.O., estimating and time study experience, desires position as chief engineer or works manager in progressive electrical company, Manchester area pref. Min. salary £600.—Box 6018, c/o The Electrical Review.

LEADING Manufacturers' Technical Sales Representative desires substantial progressive post. 10 years Eastern Counties and Midlands, genuine connection Government departments, traders and wholesalers, own car.—Box 6059, c/o The Electrical Review.

RUBBER Cables/Plastics: General Foreman requires post where valuable experience could be fully utilised; young, tactful.—Box 6045, c/o The Electrical Review.

SALES executive position desired with progressive concern by competent Electrical Engineer (36), fully conversant all types rotating electrical machinery, switchgear, transformers, rectifiers, but other industrial plant representation considered. Excellent education, practical training, 14 years' technical sales experience. Utmost integrity, tact and enthusiasm. Fair remuneration expected for specialised services. Qualifications and further details exchanged in confidence. Midlands or South preferred.—Box 6012, c/o The Electrical Review.

SUPERVISING Electrician, plant or manufacturing, over military age, permanency, post-war prospects.—Box 6024, c/o The Electrical Review.

SUPERVISOR seeks berth, disengaged, 30 years' experience, general installations, electrical equipment.—Box 6040, c/o The Electrical Review.

YOUNG Man (26) desires contact progressive firm for job after war or sooner. B.Sc. physics with maths., A.Inst.P., Grad.I.E.E., and 4 years' factory experience. Keen interest in application of science and development work on own initiative and with responsibility, or technical executive position. Might invest capital or travel. French and German good.—Box 6030, 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.

WATER TUBE BOILERS IN STOCK

Three 12,000 lbs. evaporation. 200 lbs. W.P.
One 12,000 .. .. 160 .. ..

We install complete, including brickwork. Economisers, Pumps, Piping Valves, Generating Sets and Motors in stock. Please send us your enquiries; we can give immediate delivery.

BURFORD, TAYLOR & CO. LTD.,

Boiler Specialists, Middlesbrough.

Telephone, Middlesbrough 2622.

32

18.5-kW, 230-volt Diesel-driven Generating Set, comprising 27½/30-h.p. NATIONAL 3-cylinder vertical cold start Diesel Engine, 1,000 r.p.m., direct coupled to 18.5-kW, 230-volt D.C. compound wound WESTINGHOUSE Generator.

29-kW, 460-volt Diesel-driven Generating Set, comprising 45-h.p. PETTER vertical, single-cylinder atomic Diesel Engine, 375 r.p.m., direct coupled to 29-kW, 460-volt D.C. compound wound "G.E.C." Generator.

NEWMAN INDUSTRIES LIMITED, YATE, BRISTOL

420

COX & DANKS LTD.

Plant & Machinery Department (London Area) offer the following Electric Motors from stock.

220 volts, 2-phase, 50 cycles.

Maker.	H.P.	Speed.	Type.	Brgs.
Higgs ...	20	725	S.R.	B.B.
Crompton ...	15	710	S.R.	B.B.
Brooks ...	10	750	Sq. Cage	B.B.
	Above with Starters.			
Crompton ...	25	705	S.R.	*B.B.
Mackie ...	6	1,000	S.R.	R.O.

*Totally enclosed.

D.C Motors.

Maker.	H.P.	Speed.	Wdg.	Volts.	Type.
Ind. Elec.	14	900	—	420	R.O.
Verity	[illegible]	650	Compound	500	B.B.
B.T.H.	7½	590/1,040	Compound	460	R.O.
Higgs	7	700/1,500	Shunt	480	B.B.
Newton	7	975	Compound	460	R.O.
Electro S.	5	700	—	500	B.B.
Electro	5	900	—	500	R.O.
Crompton	5	1,200	Compound	500	R.O.
Brooks	3	900	Compound	440	R.O.

Motor Generator Sets.

(2) 7-kW Motor Generator Sets by Newton, 70 volts, compound wound, direct coupled to 15-h.p., 400-v., 3-phase, 50-cycles, 950-r.p.m. Slip Ring, R.O. bearings.

Extraction Fan.

Sturtevant No. 3, 18", 5.5-h.p., 440-v., 3-phase, 50-cycles, 2,800-r.p.m. Sq. Cage, ball bearing.

Switchgear.

800-amp. Switch Fuse, 3-pole, neutral, fitted with H.R.C. Fuses by Lucey, as new.

For full details and prices of above items apply to

COX & DANKS LTD.,
Plant & Machinery Department (London Area),
Faggs Road, Feltham, Middlesex.
Tel.: Feltham 3471. 360

ALTERNATOR FROM MANUFACTURERS' STOCK

For Essential Work

100 kVA (70 kW at .8 P.F.), 440 volt, 3-phase, 50 cycles, 750 r.p.m. Direct coupled Exciter, two bearings, pulley 19" dia. x 12" face, slide rails, foundation bolts, shunt regulator, and automatic voltage regulator.

Full details from
BRUCE PEEBLES & CO. LTD., ENGINEERS, EDINBURGH, 5.
428

ELECTRIC MOTORS & DYNAMOS

WE hold one of the largest stocks of New and Second-hand Motors. Secondhand machines are thoroughly overhauled. Inspection and tests can be made at our Works.

For Sale or Hire. Send your enquiries to:—

BRITANNIA MANUFACTURING CO. LTD.,
22-23 BRITANNIA STREET,
CITY ROAD, LONDON, N.1.
Telephone: 5512-3 Clerkenwell. 13

ARC WELDING MACHINES FROM STOCK

WE offer our latest type No. 2 Max-Arc Welder for immediate delivery. 15/250 amperes. Operates off any A.C. supply voltage. Send for details.

MAX-ARC WELDERS LTD.,
190, THORNTON ROAD, CROYDON.
THOrnton Heath 4276-8.
35

GEORGE COHEN, SONS & CO., LTD.

for

GUARANTEED ELECTRICAL

PLANT,

MOTORS, GENERATORS,

SWITCHGEAR,

etc.

WOOD LANE, LONDON, W.12.
Telephone: Shepherds Bush 2070
and
STANNINGLEY, NEAR LEEDS
Telephone: Pudsey 2241.
Established 1834.
27

LICENCES IN PRACTICE

(No. 1) Order, 1943, Ministry of Supply Control of Industrial Elec. Equipm.

Our daily experience when selling

ELECTRIC MOTORS * GENERATORS
TRANSFORMERS * GENERAT.-SETS
etc.

makes us familiar with the ruling of this Order, thus enabling us to minimise inconvenience and delay for purchasers.

Ask:

J. GERBER & CO. LTD.,
Wembley, Middx.
Phone, Wembley 3691.
Grams. Powaguide (Phone), London.
411

ECONOMISERS IN STOCK

TWO Green's Economisers, 208 tubes, 250 lbs. W.P.
ONE Green's Economiser, 128 tubes, 185 lbs. W.P.

All guaranteed re-insurable and first-class condition only, low prices. Quotations per return. Installations delivered and erected complete.

BURFORD, TAYLOR & CO. LTD.,
7, Commercial Street, Middlesbrough. Telephone 2622.
65

SCREWED BRASS AND STEEL STUDDING

USERS unable to obtain the longer lengths of B.A. and Whit. Screws are advised to use Screwed Studding. Supplied in 12" lengths in 0, 2, 4, 6, 8 and 10 B.A. sizes, and 3/16", ¼", 5/16" and ⅜" Whit. Brass and Steel.

Ditto Nuts. Any Quantities. Immediate Delivery.

APEX SALES, 6, Leaside Road, London, E.5.
Sta. 7131. 6013

MODINSTAL ELECTRIC COMPANY LIMITED
INDUSTRIAL INFRA-RED APPARATUS FOR PAINT DRYING.
COMPLETE EQUIPMENTS OR SINGLE UNITS PROVIDED.
GUARANTEED HEAT GENERATORS.
OLDHAM WORKS, OLDHAM TERRACE, ACTON, W.3, LONDON.
Telephone: Acorn 3504/5.
M.E.C. APPARATUS, DULL EMITTER SYSTEM.
46

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

REBUILT MOTORS AND GENERATORS

LONG deliveries can often be avoided by purchasing rebuilt secondhand plant. We can redesign or replace surplus plant of any size.

SEND US YOUR ENQUIRIES.

OVER 1,000 RATINGS ACTUALLY IN STOCK HERE.

DYNAMO & MOTOR REPAIRS LTD.,
Wembley Park, Middlesex.
Telephone: Wembley 3121 (4 lines).

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

26

ELECTRIC MOTORS FROM MANUFACTURERS' STOCK

For Essential Work

H.P.	R.p.m.	Volts.	Phase.	Cyc.	Type.
3	1,420	400/440	3	50	Prot., Sq. Cage
7½	715	400/440	3	50	Prot., Sq. Cage
10	1,450	400/440	3	50	Prot., Sq. Cage
20	960	400/440	3	50	Scr. Prot., Sq. Cage
15	715	400/440	3	50	Slipring, vert. shaft
20	715	400/440	3	50	Slipring with flame-slipring cover, terminal boxes for armoured cable. Class B insulation

Full details from

BRUCE PEEBLES & CO. LTD., ENGINEERS, EDINBURGH, 5.

427

A large stock of surplus Fibre, Carbon Rods, Ebonite, A.I.D. Turnbuckles, etc., also Searchlights (sale or hire), Mirrors, Lenses; also Winches of our well-known self-sustaining types. Hundreds of thousands supplied during the last 40 years to Govt. depts., corporations and traders.—London Electric Firm, Croydon. 79

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

A.C.-driven Plating Dynamo, 1,000 amps., 16 volt, 570 r.p.m., direct coupl. on bedplate, reconditioned.—J. Gerber & Co. Ltd., Wembley, Middx. 413

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ALTERNATING Sets for frequency conversion, 440-3-50 to 120-3-190; various sizes, from stock.—"Gerber Power Units," Wembley, Middx. 412

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