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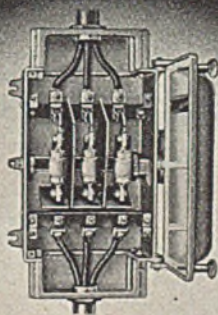
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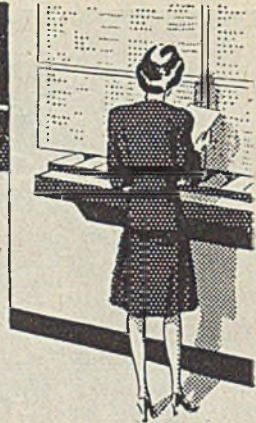
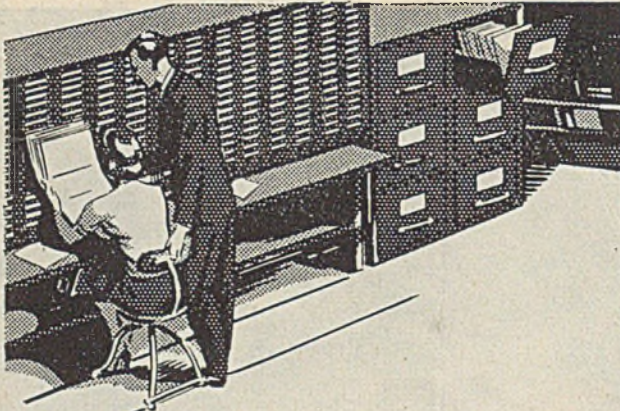
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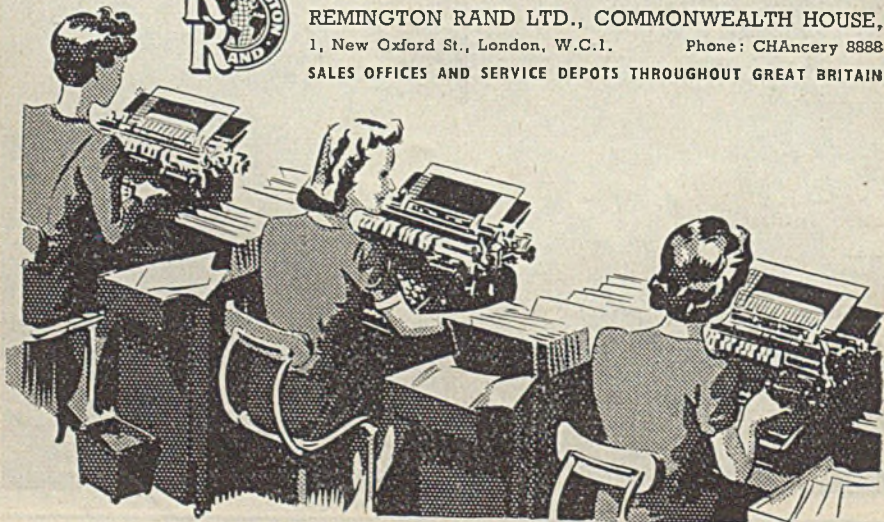
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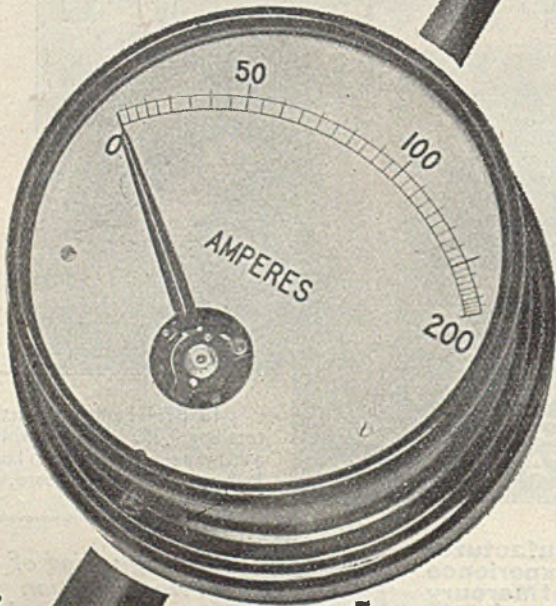
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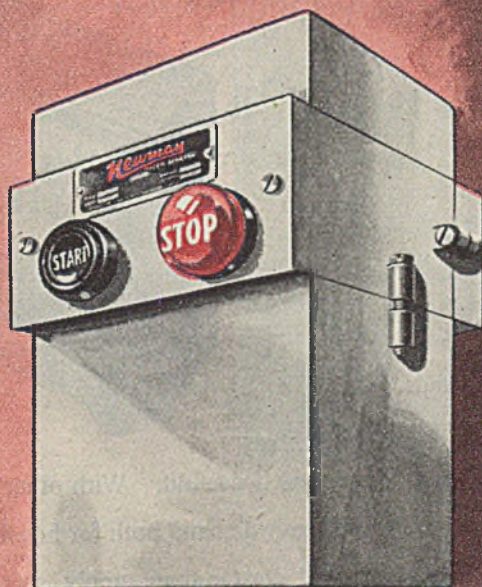
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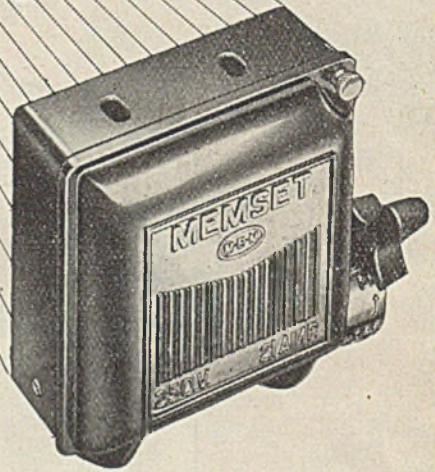
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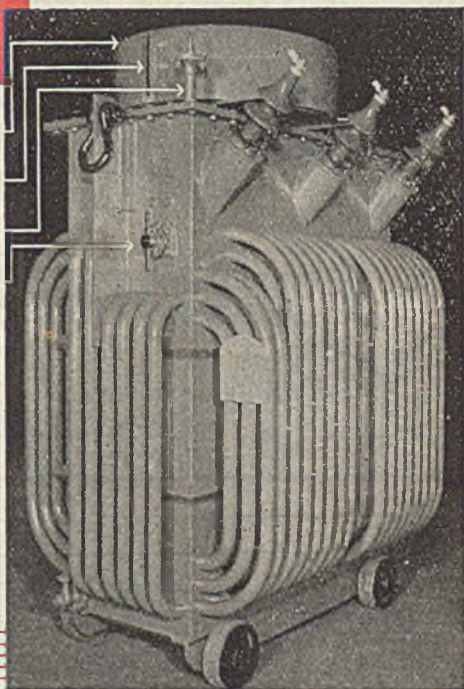
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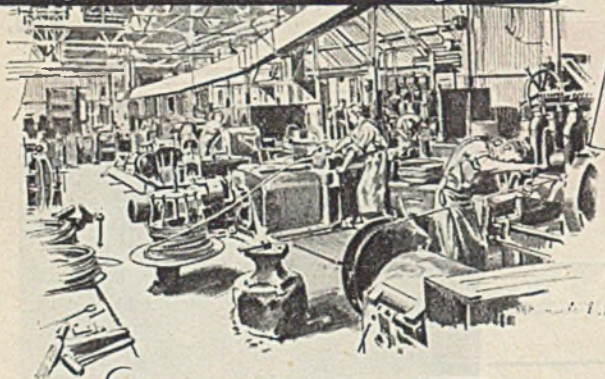
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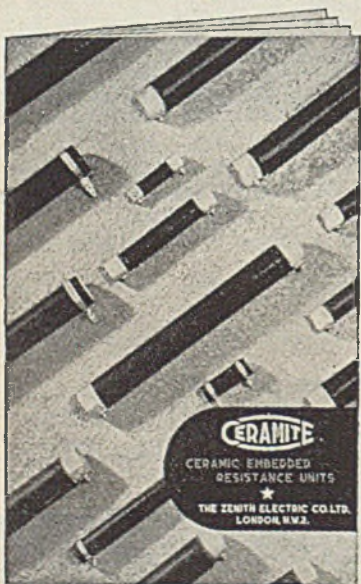
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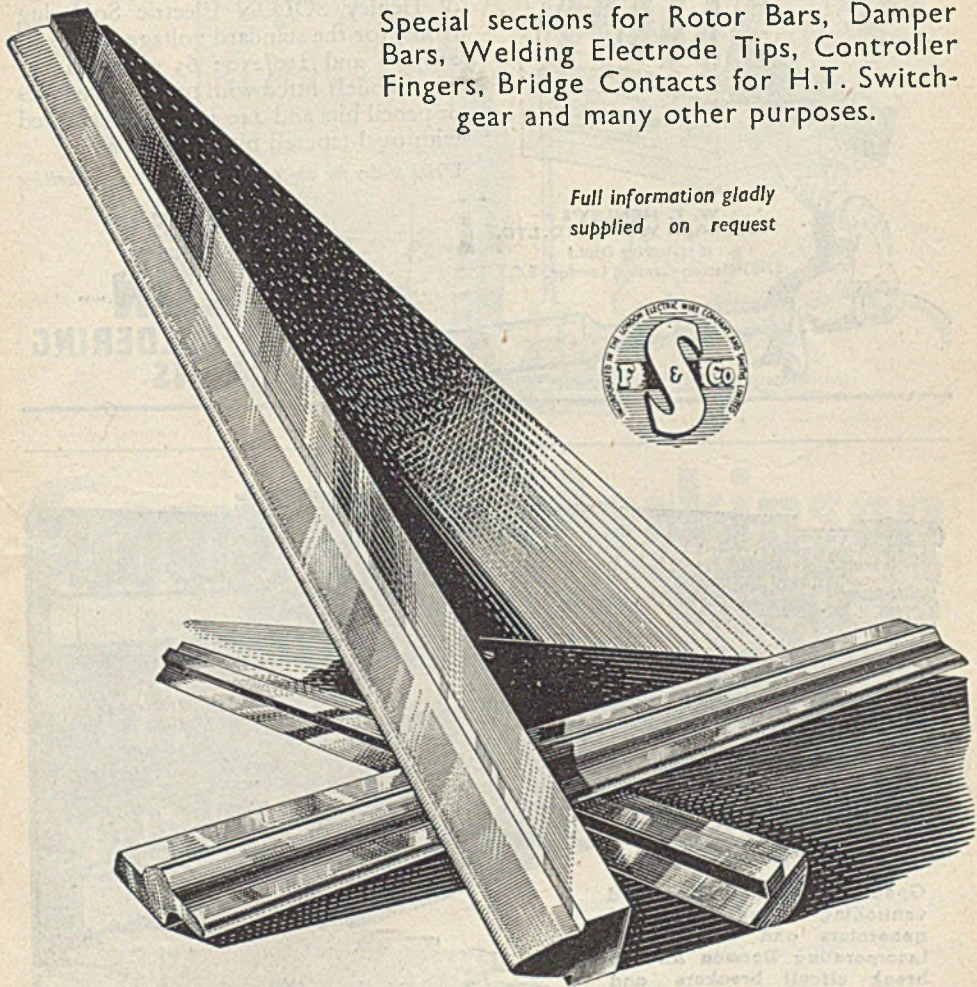
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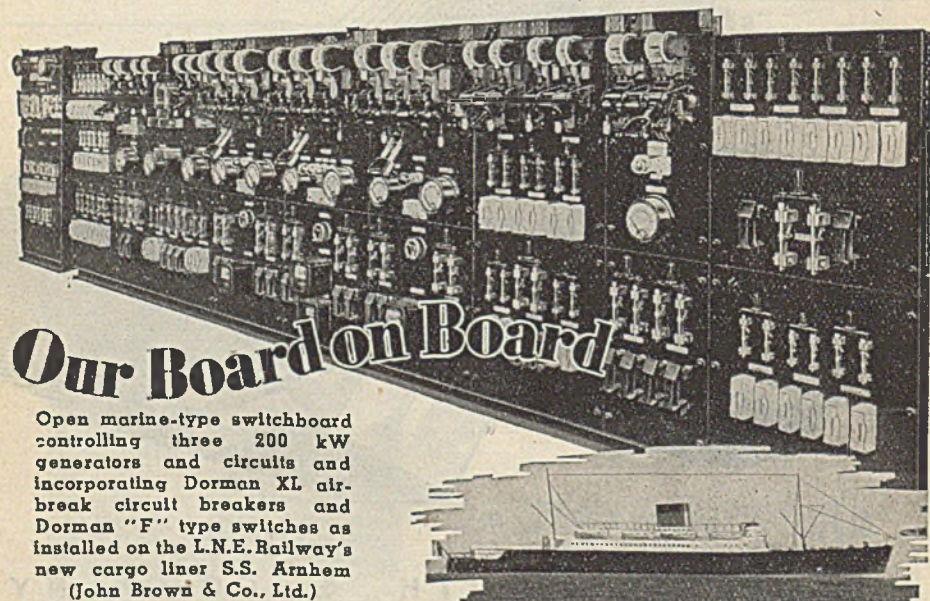
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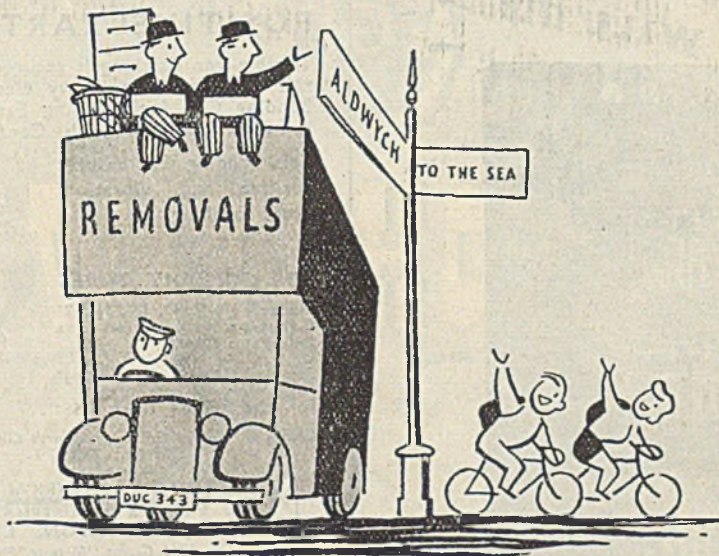
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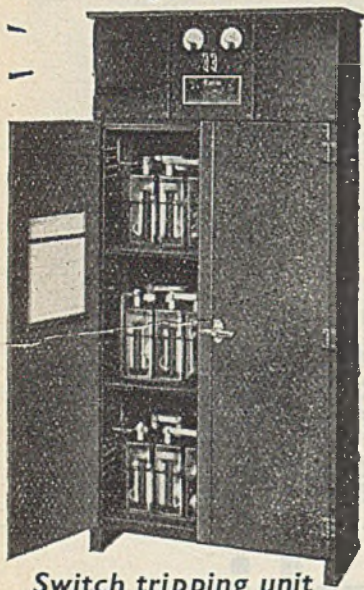
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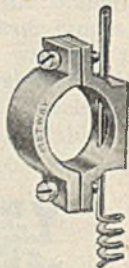
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Can also be used on Gas and Water Pipes.

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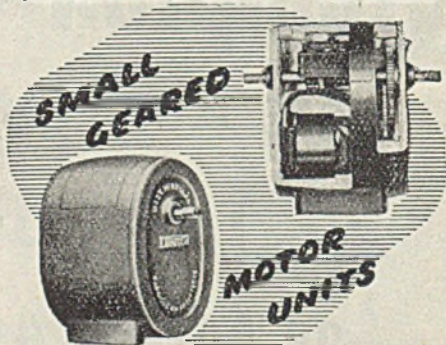
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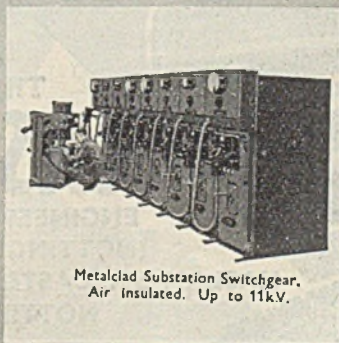


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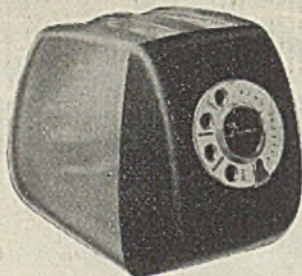
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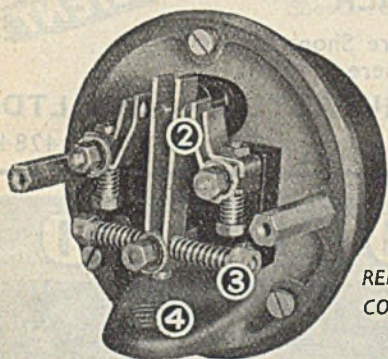
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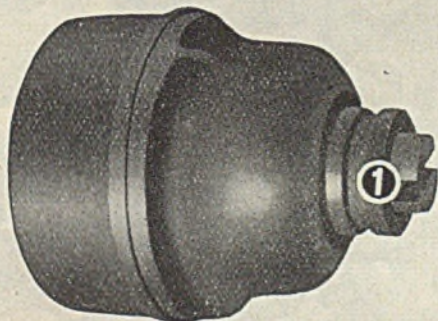
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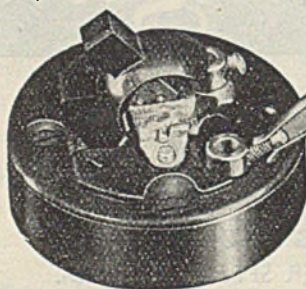
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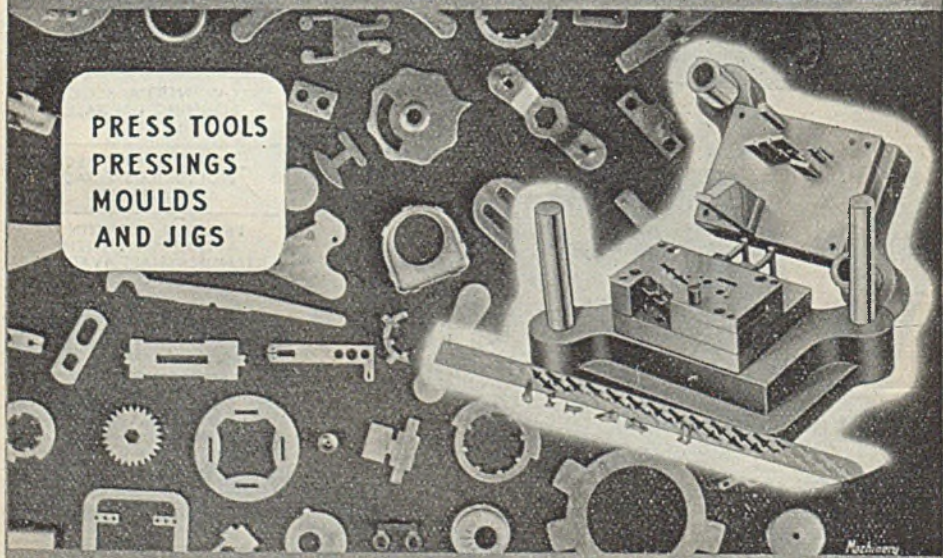
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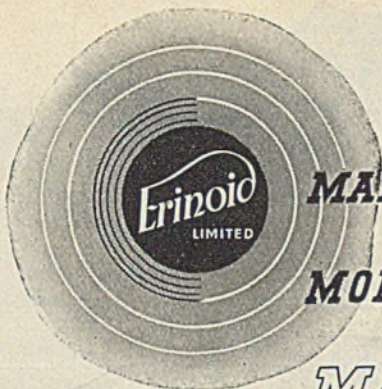
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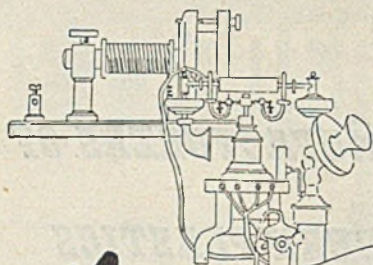
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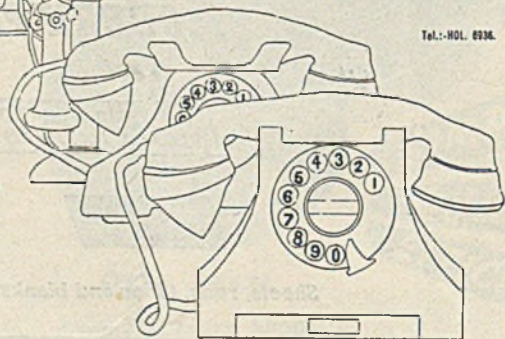
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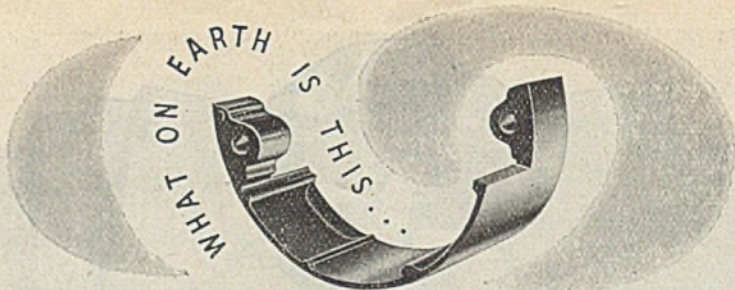
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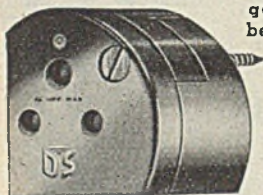
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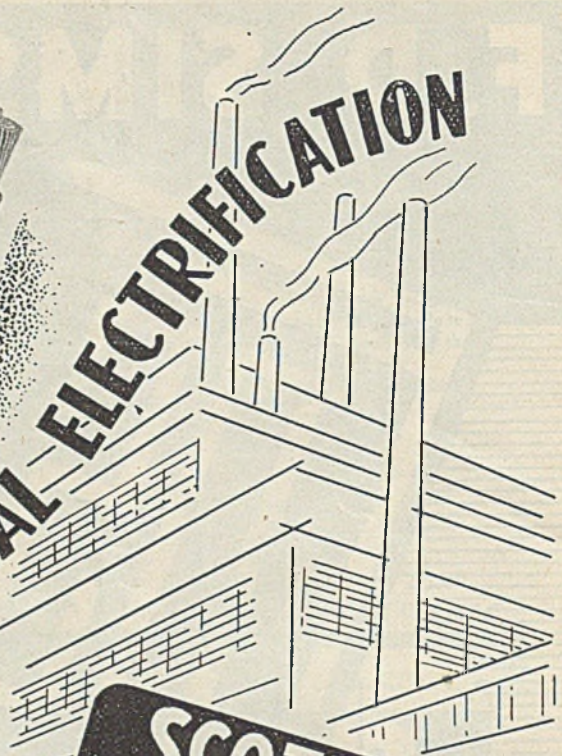
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HOME AND OVERSEAS - - - 30s.

Load Staggering

THOUGH it has, in engineering circles, been understood for a long time that the electricity load would have to be staggered next winter in order to reduce the national peaks and to permit industry to proceed without serious power cuts, schemes designed to bring about those conditions have so far received a certain amount of opposition. This has, no doubt, been based on a misunderstanding of the position, and various statements by Government departments with respect to power station buildings and coal stocks have added to the confusion. These official pronouncements may be said to have failed to make clear to non-electrically minded industry that the necessity for load spreading next winter has nothing to do with coal, nor has it anything to do with buildings—but is solely due to the fact that the industrial demands for power at certain times of the day are greater than the national generating capacity can meet. If the demands are spread over a longer working day by staggering, however, their individual values are reduced to well within the capacity of the national plant, though their aggregate value may be the same or even greater. With these conditions properly and adequately explained, industry generally might have better appreciated the necessity for some change in working arrangements, and by co-operation and goodwill have developed new agreements as between employers and workers. As it is, both the employer and employee sides of industry are now antagonised by the methods of the Ministry of Labour and

the threats of fines and penalties, and though all will obey the law, there are bound to be some who will do so with a certain amount of resentment.

"Give a Dog a Bad Name . . ."

COMPULSION is an ugly word in any language and rarely results in that all-out effort for which the Government is appealing and which the country so badly needs. We are now in August, however, and for all anyone knows it may not be longer than six or so weeks before a cold snap throws upon the national generating plant a load which may tax it to the full. The response to the work carried out by the regional boards to meet these conditions has been poor, and the failure of their attempts to make certain sections of employers and employees see reason with respect to load spreading must be held responsible for the introduction of compulsion in this instance, and there's the rub. The reduction of the industrial power load to dimensions governed by compulsory measures will do some good, no doubt, but the application of a psychology equally demanding but less dictatorial, should be a factor in the schemes to be drawn up by the regional boards and their consultative committees, so that the inconveniences which electricity users have in recent years been compelled to suffer may not ultimately react against the good name of the industry.

Regional Load Schemes

IT is understood that plans for staggering working hours in the north-western area are to be submitted to the local electricity undertakings by September 1, for later approval by the regional Board. The schemes are to be designed to bring about a gross saving of one-third of the peak load and so far as the north-west is concerned will be largely framed around the special requirements of the cotton industry. In the case of Birmingham, staggering arrangements were to some extent already drawn up when the fuel crisis broke in February last, and it is expected that adjustment of these to present-day conditions will not be difficult. It is yet too early to give any positive pronouncement upon the schemes, but since it is understood that local electricity undertakings will in all cases have an opportunity of reviewing their practical value and, where necessary,

amending them, there is no technical reason why they should not substantially reduce load shedding this winter, without serious inconvenience to the industries to which they will apply. Any difficulty in the matter is more likely to arise from the human element rather than from technical considerations, for it is this which has delayed earlier agreements, and indeed brought about the compulsory measure.

Generation Efficiency and Coal

SOME indication of the effect which the quality of present coal deliveries is making upon power station thermal efficiency, is given in the latest publication of the Electricity Commission giving analyses and summaries of the returns of fuel consumption and units generated by 344 stations during 1946. Of the lowest average fuel consumption and highest thermal efficiency stations in each group, Battersea consumed 0.96 lb. of coal per unit sent out, while similar consumption at Wick was 2.84 lb. The thermal efficiency attained at Battersea based on units sent out was 26.49 per cent., while that at Wick was 10.72 per cent., these two stations representing each end of the group classifications. Next to Battersea in low coal consumption per unit sent out was the Llynfi station at 1.05 lb., followed by Kearsley and Trafford at 1.23 lb. These figures have, of course, little significance when disassociated from other data, but from our abstract on another page of the Commissioners' statistics, it will be seen how more economical in coal consumption would be a system of delivery to power stations which permitted a better consistency of fuel, good or bad. As things now stand, the coal consumed per unit sent out varies appreciably from day to day, and several stations recorded last year an average consumption of over 2 lb. of coal per unit transmitted—a figure which, in relation to the quality of the fuel consumed, does the industry the highest credit, however.

Electrical Benevolence

SOME understanding of the work being undertaken by the Electrical Industries Benevolent Association was given at the annual meeting of the association last week, and from the graph reproduced on another page of the amount of grants paid to beneficiaries, it will be appre-

ciated how valuable that work has grown. The demands made upon the association have become considerably heavier during the last two years, and though much has been and is still being done to assist those in the electrical industry who have fallen by the wayside through no fault of their own, there is much more the association would like to do. Such assistance, whether given in money grants or in service, can, however, only be offered if the association has adequate funds, and with benevolence of the type upon which the E.I.B.A. is based, there is no reasonable limit to what can be done. The donations and contributions which reach the association are, in relation to the size of the industry, all too few and all too small. For the association to carry out its present work the strictest economy has to be observed, whereas in so large and important an industry as the electrical, it should be made free of financial considerations. The industry can be certain that none but the most deserving cases receive benevolence, and armed with this knowledge it should see that the appeal for funds does not go unnoticed. The E.I.B.A. is doing remarkable work; with more help from the industry it will do even greater things.

Public Works Equipment

THE Public Works Congress and Exhibition which concluded last Saturday at Olympia is generally regarded as having been one of the most successful yet held, and arrangements have already been made to stage a similar congress and exhibition at Olympia in November, 1948. The exhibition, though designed mainly for municipal interests, attracted a record number of visitors, while some of the congress discussions were attended by no fewer than 750 delegates. With so much wear-and-tear to be made good by public works departments and with so much replacement of war damaged equipment at a time when materials and plant are short, the congress and exhibition has assumed an importance even greater than was enjoyed before the war, and this year's display was visited by many in the hope that at least some of the problems might be solved. Judging from the reactions of many of the exhibitors, that hope was in many cases realised, and the fact that the Olympia has already been booked for next year sug-

gests that the 1948 exhibition will be even larger and more embracing of municipal interests than was that which closed last week.

The A.P.L.E. Conference

THE nineteenth annual meeting and conference of the A.P.L.E., to be held at Southport from September 15 to 19, promises to be as busy as any before the war. Apart from the Presidential Address of Mr. THOS. WILKIE, who will succeed Mr. W. N. C. CLINCH, there will be five technical papers dealing with various aspects of street lighting relative to road safety, traffic problems, crime prevention, photometry and maintenance. It is anticipated that a number of manufacturers will erect representative street lighting installations in Southport for the conference, and an explanation of these will form part of the business sessions, to be followed by outdoor demonstrations during the evening. The social side, which is always a prominent feature of the conference, will include a civic reception, a conference luncheon and a reception and dance with the President as host. The last day of the meeting will be devoted to a coach tour to a destination not yet determined, but inclusive of Liverpool and the Mersey Tunnel.

A. P. Trotter

A LINK with the past was lost last week in the death of Mr. A. P. TROTTER, who as Editor of THE ELECTRICIAN from 1890 to 1895 did so much to make known the work of OLIVER HEAVISIDE in electromagnetic theory and on the flow of alternating currents in conductors. Mr. TROTTER's career was more varied than most are privileged to enjoy, for after serving his technical apprenticeship he became, first, a consulting engineer, a technical secretary to a Chamber of Commerce, an Editor, a Government electrical engineer and inspector, and then electrical adviser to the Board of Trade. Mr. TROTTER possessed a personality which included in its make-up a strong desire to help and encourage, and the many offices he filled, including the presidencies of the Association of Supervising Electrical Engineers, the Illuminating Engineering Society and others, demonstrate how broad was his vision and how embracing was his interest.

Portrait—Mr. Percy Good

A FELLOW of the City and Guilds of London Institute and an Honorary Fellow of the Imperial College of Science and Technology, Mr. Percy Good is best known for his work in connection with the British Standards Institution, of which body he became director in 1942, after eleven years as deputy.

Percy Good received his technical training at the Central Technical College and the Thames Ironworks, subsequently becoming superintendent of the Testing Department, Faraday House. He has behind him several years' experimental work in connection with the production of insulating materials, experience which has no doubt served him well in recent developments in that field.

Whilst engaged for a time in consulting work, Percy Good also gave his attention to work as electrical assistant secretary to the B.E.S.A., as it was then called. That was as long ago as 1913, which indicates to some extent the deep-set interest which the subject of our word portrait has always held with respect to standardisation.

Despite the fact that Mr. Good is silhouetted, as it were, against an electrical background, his interests as director of the B.S.I. include standardisation in every form, and cover every industry.

He is particularly interested in the problems involved in the development of the use of certification trade marks, that is, marks placed on goods to indicate conformity to a British Standard. He was

invited in 1938 by the New Zealand Government, in association with the Australian National Standard Organisation, to visit Australia and New Zealand

to discuss the subject with them. As a result of this visit, a British Commonwealth Standards Conference was planned for 1940 and was held in London in 1946.

The visit took place during his term of office as President of the Illuminating Engineering Society and, on his return just before the outbreak of war, he was asked to be chairman of a lighting committee set up jointly by the Ministry of Home Security and the

Illuminating Engineering Society.

This committee was responsible for the preparation of many war-time lighting devices, including the street lighting fittings which were known as star-light, and for his services received the C.B.E.

The scope of this work grew until sub-committees dealt with all problems of visibility from the air and investigations into the photometric properties of the atmosphere, by which time they became a sub-committee of the D.S.I.R.

As Mr. Good was well acquainted with the research resources of most of the larger

industrial organisations, he was instructed by the Ministry to develop means of decoying aircraft at night. After the main experimental work was done and means of imitating the various characteristics of industrial plants was solved, this work was handed over to the Services.



The subject of our "portrait" this week will assume the office of President of the Institution of Electrical Engineers, on September 30 next, as announced on another page in this issue. Mr. Good played an important part in the development of the International Electrotechnical Commission, and more recently in the formation of the international organisation for standardisation.

Electricity and Agriculture

Demonstrations at the Kent, Sussex and Herts. Shows

ELECTRICITY on the farm was demonstrated on the largest stand at both the Kent and Sussex Agricultural Shows held in Maidstone, on July 9 and 10, and in Chichester on July 16 and 17. The exhibit was divided into sections which covered horticulture, the home, the dairy, poultry, general farming, transport (electric vehicles), the workshop and installations. The planning and organising were carried out by the South-East and East England E.D.A. area staff, in conjunction with co-operating members of the Southern Committee in both counties. This arrangement had a great advantage in that it enabled the exhibition to be standardised for both shows so that the whole was moved from Maidstone between July 10 and 16 and set up again in Chichester, a total of 140 exhibits being involved.

On the first day of the Kent Show, the electrical stand was visited by the Duchess of Kent, and a photograph of the Royal guest being escorted round the stand by Mr. E. E. Hoadley, was reproduced in *THE ELECTRICIAN* of July 18.

The caterers at the Kent Show were persuaded to undertake all-electric cooking, E.D.A. equipment being loaned for the purpose. At the Sussex Show, no cooking was carried out, cold meals only being provided, so that the same opportunity did not arise.

A large marquee containing a comprehensive display of modern electrical appliances for the farm, dairy, market

July 24, and the demonstrations given throughout the day, were watched with interest by a constant stream of visitors. A supply of electricity distributed from a temporary transformer station, erected in



MR. W. N. C. CLINCH, general manager, Northmet Power Co. (right), chatting with MR. G. E. JONES, Hoover, Ltd., and MR. C. R. MARSHALL, Northern area superintendent, Northmet

the park, was made available to exhibitors by the company, and the interior of the marquee was illuminated by fluorescent lamps.

In the horticultural section a mobile electrically operated machine, for cleaning and sterilising flower pots, claimed attention. It will deal with various sizes, and is said to be capable of handling 2 000 size 60 pots an hour. An electric motor of 1 B.H.P. drives two spindles mounted on a chassis, with their ends protruding. On each end is a chuck into which a suitable brush can be fitted. These brushes, revolving at high speed, remove the dirt from the pots held by four operators, two on either side. The pots are then passed down a sloping runway into a bath of sterilising liquid, through which they are carried by a chain conveyor. A fifth operator loads the pots on to the top of the machine and removes the clean ones. Also on view were circulating pumps and valves, forced draught equipment, a conversion heater, greenhouse heating equipment, a soil steriliser, soil warming equipment, a propagating frame containing growing plants, a hedge trimmer, and a glasshouse water heater to provide a supply at a correct temperature for watering plants.

The barn machinery included a recently-



Part of the dairy section of the electrical exhibit at the Kent and Sussex Agricultural Shows

garden, poultry farm and the home, arranged by the Northmet Power Company, was one of the chief attractions at the Hertfordshire Agricultural Show held in North Mymms Park on Thursday,

introduced portable "Economil," driven by a 1 H.P. motor, claimed to grind a cwt. of corn an hour; the Essex mill, an electric self-starting sack lifter with a safety device, an Adelphi mixer, an electrically-operated pneumatic grain conveyor (claimed to be capable of dealing with 40-45 cwt. an hour), a two-way hoist, the Ferranti-Jeans seed conditioner, and an electric travelling chain block and tackle for use in farm buildings.

Poultry farmers were shown incubators and brooders, brooder conversion units, an egg tester and candling lamp (demonstrated) and an egg grader in action.

In the dairy section were staged a milk cooler and cool room, a milking machine, sterilisers, a churn stool and an electrode steam raiser, a bottle washer, and a bottle filling and dicing machine, a storage water heater, a pedestrian-operated electric milk delivery pram, and the "Rapid Abnormality Indicator," an electrical apparatus for the rapid detection of abnormality in milk, particularly mastitis.

Demonstrations were given of the easy operation of the Eutalloy carbon arc torch, designed for use with the Cytringan a.c. metallic arc-welding machine. Among the advantages claimed for this appliance is that the carbon flame is maintained by an electric circuit which does not pass through the work; the welding heat is applied independently of the filler material, and the appliance is suitable for all the lighter welding applications of the metallic and carbon arcs and most of those of the oxy-acetylene flame. Also in the general farm equipment section were grinders and heavy duty electric drills, battery chargers, electric vulcanisers, a meter for measuring moisture in grain, and a portable electric forge.

The exhibits in the home section, which occupied one end of the marquee, were much admired by housewives whose inquiries were dealt with by a competent staff of demonstrators. There were upright models of cookers designed for planned kitchens, water heaters, wash-boilers, washing machines, refrigerators of three different sizes, vacuum cleaners, a water heating conversion unit, clocks, kettles, irons and other domestic electrical appliances.

The G.P.O. provided a mobile post office, with a public telephone and telegraph service.

A list of exhibitors at the Herts Show was given in our issue of July 18.

Firms taking part in the exhibitions at the Kent and Sussex shows included: Chase Protected Cultivation. Ltd., Unity Heating, Ltd., Transformer and Electrical Co., Ltd., Farm and Garden Electrification, Ltd., Heatrae, Ltd., W. M. Godfrey and Partners, Ltd., Weald Electricity Supply Co., Ltd., A. Webb and Sons, Ltd., British Roto-therm Co., Ltd., Mr. L. F. King, Maidstone

electricity department, Aidas, Ltd., Moffats, Ltd., Frigidaire, Ltd., Electrolux, Ltd., Burco, Ltd., Hoover, Ltd., Bendix Home Appliances, Ltd., Hotpoint Electric Appliance Co., Ltd., Morphy-Richards, Ltd., J. Glover and Sons, Ltd., Betram Thomas (Engineers), Ltd., Rollnick and Gordon, Ltd., Belling and Co., Ltd., Jackson Electric Stove Co., Ltd., Moffats, Ltd., Falkirk Iron Co., Ltd., Gascolnes (Reading), G.E.C., Perkins (Clean Milk) Equipment, Ltd., Cockx and Sons, J. and E. Hall, Ltd., E. A. Lister and Co., Ltd., Western Incubators, Ltd., H. W. Stephens, Cope and Cope, Ltd., H. W. Stephens, Bingham Appliances, Ltd., Preston Hall Industries, British Legion, W.E.P., Ltd., Vent Axia, Ltd., H. Morris, Ltd., G. W. King, Ltd., Christy Norris, Ltd. (exhibit by Central Sussex Electricity), J. Beresford and Son, Ltd., Hoover, Ltd., Hicks Motors, Ltd., Crompton Parkinson, Ltd., Metropolitan Vickers Electric Co., Ltd., General Radiological, Ltd., Lipton Products, Ltd., Marconi Instruments, Ltd., Oliver Pell Control, Ltd., Harvest Saver and Implement Co., Ltd., Ferranti, Ltd., English Electric Co., Streamline Filters, Ltd., Electric Construction Co., Ltd., Black and Decker, Ltd., Dowsing Co. (Electrical Manufacturers), Ltd., Aeraspray Manufacturing Co., Ltd., Acruce Electric Tool Manufacturing Co., Ltd., Diamond Motors, Brush Electrical Engineering Co., Ltd., Westinghouse Brake and Signal Co., Ltd., Simmons and Stokes, Ltd., B. I. Callender's Cables, Ltd., C.M.A.

St. Helens Jubilee

LORD CITRINE, chairman-designate of the British Electricity Authority, was one of the principal guests at the jubilee celebrations of the St. Helens electricity undertaking, on July 21. In addition to a civic lunch and dinner, the programme included visits to a number of important industrial consumers in the district, in the course of which Lord Citrine toured the glass works of Pilkington Bros., Ltd., where he had worked as an electrician in 1908, before beginning his career as a trades' unionist.

Electricity was first generated in St. Helens in the early nineties, when a small plant with a vertical steam boiler was installed in the Town Hall yard to light certain portions of the building. By 1898, the plant in operation had a total capacity of 145 kW. At present, in addition to a considerable industrial load, 168 farms (66 per cent. of the total number in the area of supply) use electricity. The large glass works in the district account for 74 per cent. of industrial power units sold.

Speaking at the dinner, Lord Citrine said it was essential that the transfer of the industry to complete public ownership should be as rapid as possible. The nationalised industries must then establish an efficiency at least equal and superior to those which preceded them. Ultimately, the test would be found in the measure of service they could render to the public. The area boards and consultative councils, he stressed, must reflect the civic spirit and pride which had formerly been the mainspring of the municipal undertakings.

MODERN SUPERTENSION CABLES

by C. C. BARNES, A.M.I.E.E., A.I.I.A.

Part I of this series appeared in THE ELECTRICIAN of July 18 and reviewed existing designs of mass impregnated screened type power cables for voltages up to and including 66 kV. In this, Part II of the series, a brief review is provided of Oil-Filled, External Gas Pressure and Internal Gas Pressure, designs.

The Oil-Filled Cable.—The fundamental disadvantages of voids within the cable dielectric were mentioned in Part I. and a major departure from established cable manufacturing practice was the development of the oil-filled cable having specially provided means whereby during the life of the cable it is kept constantly supplied with oil.

The first complete attempt to obviate ionisation under all conditions of load (or even overload) was made by Emanuelli with his fluid oil duct cable, which is based on the principle of applying pressure to the liquid impregnant so that any tendency to form gas pockets, or voids, is prevented.

During 1924 at Burghero, in Italy, a short cable line operating at 132 kV, was installed and this proved to be the first cable installation to work successfully at this voltage.

The oil-filled cable^{5,6*} differs fundamentally from the mass impregnated cable in the following respects:—1. The dielectric consists of insulating paper of a greater porosity than normally used. 2. The impregnating medium consists of low viscosity impregnating oil. 3. Longitudinal channels (ducts) are provided in the conductor of single core cables, or in the windings of three-core cables to maintain free movement of the oil along the cable (see Fig. 1.).

For terminations, a special design of single core oil-filled cable is available having the lead sheath internally fluted, thereby providing the necessary longitudinal channels directly under the lead sheath in place of the normal central ductway. The oil-filled design suppresses ionisation by inhibiting void formation with the aid of these longitudinal flow channels. When the cable is loaded and its temperature rises, the oil is free to flow via the ducts to the pressure reservoirs situated at intervals along the route and subsequently, when the load is switched off and the cable cools, this oil is returned under pressure to the cable. In this manner the insulation is maintained full of oil within controlled limits of pressure under all possible variations of load.

As a result, the voltage/time breakdown curve of the oil-filled cable becomes asymptotic at a high percentage of the short time value and the cable may be designed with an adequate factor of safety⁷ at maximum stresses up to 100 kV/cm. Since 1924 such cable has experienced world wide success and although no fundamental changes to the original design have been effected, certain modifications have been made⁸.

Pressure tanks are now frequently made with the air cells filled to several atmospheres pressure for use in positions where the static head of oil prevents the full efficiency of normal tanks being utilised.

This practice, together with a moderate increase in design oil pressures, enables longer oil sections to be fed, the number of stop joints on an average route being reduced by about 25 per cent.

The reduced oil demand thus effected, in conjunction with the changes in tank and oil pressure limits, approximately halves the tank capacity required in comparison with earlier installations.

Tanks are now fitted into pre-cast concrete tubes which are buried direct in the ground. Where extreme economy has to be exercised tanks can be buried even without the concrete protection.

Oil ducts in large three-core cables are made from copper instead of steel. Such non-magnetic ducts, by eliminating iron losses, give a small increase in the maximum current carrying capacity.

Oil-filled cables for 132 kV operation have been installed in various parts of the world, and to-date it is the only design of supertension cable with an established long-time service record at 220 kV.

The normal design of oil-filled cable is reinforced over the lead sheath for a maximum pressure of about 50 lbs. but in recent years oil-filled cables designed for high pressure operation have been developed.

Oilstatic Cable.⁹—This cable design is an American development suitable for operation at a pressure of about 200 p.s.i. The cable is insulated, impregnated, and lead cased in accordance with normal technique, after which it is transported to site and drawn into a steel pipe, special arrangements being made for the lead

* The third article of this series will contain a complete bibliography

sheath to be stripped just prior to the cable entering the steel pipe; the pipe line is then filled with oil at 200 p.s.i. pressure.

The Moellerhoj Cable.¹⁰—This design is an interesting continental development in which the suppression of ionisation in void spaces inside the lead sheath is secured by a fluid oil under a positive pressure of about three or four atmospheres. The cable has the normal insu-

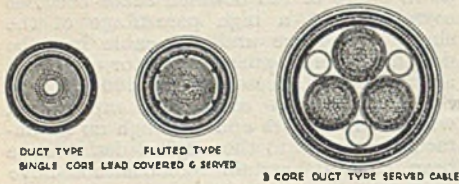


Fig. 1.—Some examples of oil-filled cable

lated and screened cores, but these cores are not twisted together in the usual manner, but are laid side by side and lead-covered with their axis in one plane, i.e., flat three-core formation. Over the lead sheath is applied a compounded paper or cotton tape followed by two corrugated bronze tapes applied longitudinally over the major axis (i.e., not lapped round the cable) and secured by spirals of hard drawn copper wire which bed into the corrugations of the bronze tape. This reinforcing is then protected from corrosion by well-compounded textile servings.

It is claimed that the Moellerhoj cable design permits high current loadings, due to the relatively large cooling surface, while the maximum stress used for design purposes, and maximum conductor temperature are of the same order as for the oil-filled cable.

On load the expansion of the dielectric is compensated for radially, therefore oil feeding of the cable is not necessary and it can be designed so that a given minimum (positive) pressure is obtained even during the cooling period when load is switched out.

The Moellerhoj cable is suitable for production in long lengths because the individual cores are impregnated separately and assembled during the lead sheathing operation. In order to minimise sheath losses and voltage drop the cores are transposed at the joints.

The Compression Cable.^{11-13, 15}—The suggested use of gas pressure to suppress ionisation in a cable dielectric was first made in 1925 by Fisher and Atkinson, and in 1926 Hochstadter patented the application of pressure through a flexible diaphragm which has subsequently developed into the compression cable.

The principal feature of this patent was that the channels for the reception and transmission of the pressure medium must be outside the electrically effective insulation and must be separated therefrom by means of a flexible impermeable diaphragm.

The compression cable principle, therefore, is the application of external pressure to a solid type cable in order to prevent the formation of voids or low pressure spaces when the cable cools down, as the load is reduced.

The construction of the compression cable differs only slightly from that of a solid type cable—the essential requirement is that the cable profile shall be non-circular, so that the sheath acting as a diaphragm can expand or contract, effectively transmitting the gas pressure to the dielectric and accommodating the differential expansion between the dielectric and the lead sheath.

The pressure is thus transmitted to the dielectric through the oval lead sheath which is made relatively thin so as to act as a diaphragm. Each of the individually lead-sheathed cores is wrapped with two non-ferrous reinforcing tapes in order to restrain the movement of the lead at the major axis, and thereby restrict the diaphragm action to the minor axis.

Commercial nitrogen gas is used as the pressure medium in compression cables

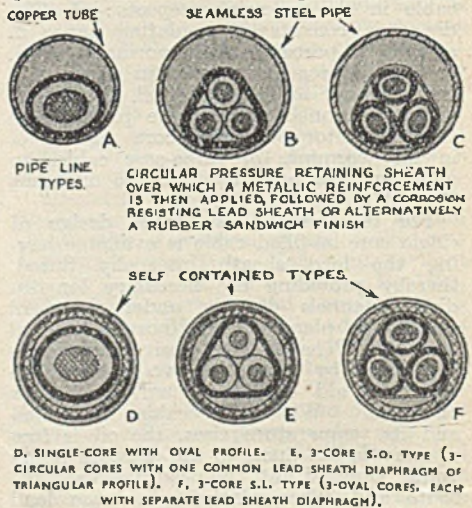


Fig. 2.—Compression type cables

since it offers no resistance to flow, and does not give rise to pressure variations on gradients along the cable route or in vertical situations.

The permissible maximum stress is taken as 70-110 kV/cm—this is laid down principally by mechanical requirements

and reasonable overall size rather than by electrical limitations since above stresses provide a factor of safety of four.

The conductor and insulation are built up as in a normal screened type cable. To obtain the non-circular sheath an oval conductor is used for the single-core and "S.L." design (see Fig. 2), and the "S.O." construction (triangular section) for the circular conductor three-core screened design.

The cable is then placed inside a gas pressure container which may be of two types.

In the first type the cable is pulled into a thin steel pipe, the internal diameter being about one inch larger than the overall diameter of the cable. The pipe is supplied in lengths of 30-40 ft. which are welded together on site. A coating of anti-corrosive material is then applied. The cable is drawn in after the pipe line has been installed and tested for gas tightness.

The other type of container consists of a lead sheath of circular section and normal thickness. This second (common) lead sheath is termed the pressure retaining sheath and is reinforced with two metal tapes and layers of bitumenised paper.

Corrosion resisting covering over the reinforcement can be provided by a third (common) lead sheathing overall, or by alternate layers of compounded hessian and rubber compound tape forming a "sandwich" protection.

These alternate finishes complete the self-contained compression cable which is an alternative design to the pipe line construction.

Several factors determine whether a pipe line or self-contained compression cable should be used under any given circumstances but the suitability or otherwise of any design is largely decided by the working voltage, as shown in Table 1.

TABLE NO. 1
Compression cable design (see Fig. 2)

Working voltage 3-phase kV	A	B	C	D	E	F
33	No	Yes	Yes	No	Yes	Yes
66	Yes	Yes	Yes	Yes	Yes	Yes
132	Yes	No	Yes	Yes	No	No
Above 132	Yes	No	No	Yes	No	No

The development of the compression cable has extended over more than twenty years, but basically it is the normal "screened" type cable in which gas and moisture are excluded from the insulation throughout manufacture.

The long-time breakdown strength of the insulation at 200 lbs. p.s.i. is greater than 400 kV/cm. compared with 160 kV/cm. for the solid type supervoltage cables already described.

Internal Gas Pressure Cables.—Continuous research and development have

resulted in three designs of internal gas pressure cables, viz., the gas-filled cable, the impregnated-pressure cable, and the gas-cushion cable; three types of gas pressure cable which are however very similar in construction. The basic principle of these three designs is the introduction of an inert gas at high pressure within the lead sheath and in contact with the dielectric in order to suppress gaseous ionisation at all operating temperatures.

Gas-Filled Cable.—The term "gas-filled cable" implies a cable in which the dielectric is comprised of pre-impregnated paper, carrying no free compound, and in which all the spaces in the dielectric (and within the confines of the lead sheath) are filled with gas under pressure. The high-pressure gas-filled cable⁴ consists of a stranded conductor which is then passed through a solid die in order to smooth out surface corrugations due to the circular section of the individual wires and thus provide a flat bed for the application of two or three thin metallised papers which screen the interstitial spaces between the wires in the outer layer of the strand, and present a smooth cylindrical surface to the dielectric, thus limiting the maximum radial dimensions of any gas space within the dielectric to that of the thickness of the individual papers in the dielectric.

Following the conductor screening, pre-impregnated paper tapes are applied to the conductor in air, followed by a 3 mil. copper tape applied with overlap. The cable is provided with a pressure retaining sheath which is applied in the case of single-core cables with 20 mils diametrical clearance over the dielectric screen, and in the case of multicore cables it is applied as a fit over the laid-up cable. One or more impregnated fabric tapes, which can be copper-wire woven, if desired, are applied over the lead sheath to form a bedding for the metal reinforcing tapes.

In the case of single-core cables the reinforcing tapes are generally of brass and consist of a layer of tape applied with a suitable lay and having a gap of $\frac{1}{16}$ in. between adjacent strips, followed by further layers of tape applied in the opposite direction to the first layer of tape and at the same angle with the axis of the cable.

In the case of multi-core cables the reinforcing tapes are of steel and consist of several layers of equal thickness, alternate layers of tape reversed and with the same lay as for brass tapes.

Another impregnated fabric tape is applied over the reinforcing tapes, and finally the second lead sheath, or further servings are applied over the reinforcing tapes for the purposes of chemical protection.

When installation of the cable is completed the interior of the pressure retaining sheath is charged with dry nitrogen to a pre-designed pressure, the supply of gas then being closed off. Alarm devices are provided to give warning of change in gas pressure.

The following performance basis is given by Beaver and Davey:—1. *Electrical Design*.—The design is such that no ionisation shall occur, up to 100° C. conductor temperature, at a voltage lower than at least twice the designated operating voltage. 2. *Physical*.—The design on the physical side is that the ratio of gas space to impregnating oil space within the sealed-off sheath has a value such that the gas density at the conductor surface

is approximately constant over the whole range of service temperature.

Another point is that the cable shall be capable of being run vertically for any height or depth without drainage of the impregnating compound.

High purity nitrogen is the gaseous medium for internal gas-filled cables, and the chief factors governing the choice of the gas are summarised as follows by Beaver and Davey:—(a) Inertness; (b) high ionisation stress; (c) physical and chemical permanence under all conditions of service; (d) high liquefaction pressure; (e) low coefficient of solubility in the impregnating oil; (f) stable under electrical discharges.

(To be continued)

Stourport "B" Power Station

IN THE *ELECTRICIAN* of January 26, 1945, reference was made to the new power station of the Shropshire, Worcestershire and Staffordshire E.P. Co., to be known as Stourport "B," and the 525 000 lb./hr. m. c. r. Stirling boiler, for operation at 1 275 lb. per sq. in. at 975°F., has this week been making its way to the station by road under trying conditions, due to heating of the tyres of the vehicle.

The boiler was first expected to arrive at the station on Monday and, at the invitation of Mr. D. H. Kendon, general manager of the company, a representative of *THE ELECTRICIAN* visited the station to watch the proceedings. Circumstances of travel, however, delayed its arrival, not only on Monday, but also on Tuesday. The boiler was still on its way when we went to press.

The boiler is being delivered by road from Glasgow to Stourport and left Glasgow on July 26. On being delivered, the drum has to be raised into position, which is 100 ft. above ground, and it is estimated that this will take until early September; the boiler should be ready for steaming in about 15 months' time. It is understood that the boiler will then be the largest in use in Europe, and that similar boilers are to be installed at Battersea.

The first section of the station, it will be remembered, will consist, in addition to the Stirling boiler referred to above, of a 60 MW turbo-alternator. The addition of a further 60 MW of new steam raising and generating plant as directed by the Central Board will raise the total capacity of the station as a whole to approximately 240 MW.

The boiler drum, which is the subject of the note, weighs 60 tons, is of forged and

welded construction, has an internal diameter of 5 ft. 6 in., is 5 in. thick, and each end of the drum will accommodate a single down-comer of a diameter to permit full circulation of the boiler water to the furnace walls and heaters. Provision is also made for suitable branches for connection of an electrically-driven steam pump to be fitted, should it be required for circulating steam through superheater tubes when raising steam or laying off the boiler. To reduce water entrained with the leaving steam, a special baffle and cyclone separator will be fitted, so arranged that no portion of the mixed steam and water rising in the circulating tubes can enter the main body of water in the drum without previous separation in the cyclones. A steam drier will be embodied and a continuous blow-down system will be installed.

Accounts of the Leicester undertaking for year ending March 31 show an income for the year of £1 189 092 (£936 054) and working expenses (including generation costs charged by the C.E.B.) of £1 060 307 (£880 820). Interest and debt repayment (excluding generation) amounted to £53 751 (£55 540) and income tax and special expenditure was £23 087 (£24 523). The total number of units generated by the undertaking during the year was 338 158 980 kWh (305 834 720) and the total sold was 255 188 746 units (216 624 526). Exports to the C.E.B. decreased from 58 084 300 units to 54 510 200, while imports from the Board rose from 20 160 100 units to 29 302 100. The maximum demand was 79 900 kW, compared with 64 540 kW in 1945-46 and a record figure of 82 720 kW in 1942-43.

Progress in Eire

Annual Report of the Electricity Supply Board

ANNUAL rainfall which was considerably above the average made it possible for the hydro-electric plants on the Shannon and Liffey rivers to meet record demands during the winter months, states the report of the Electricity Supply Board, Dublin, for the year ending March 31, 1947. The Board's output for the year from all stations was 572 million units, compared with 484 million units in the previous year, and sales were 454 million, compared with 379 million in 1946. At Ardnacrusha, the hydro-electric station had a record output of 315 million units, while the Liffey hydro-electric station produced 48 million units. An output of 205 million units from the steam plant at Dublin, however, was only attained under considerable difficulties because of the inferior quality of coal delivered. The maximum load on the system rose from 138 500 kW to 161 000 kW, and the annual load factor was 40.4 per cent. (units generated).

CONSUMPTION FIGURES

Of individual classes of consumer, the largest single increases in units sold were for motive power—from 150 million units to 173 million—and for general domestic purposes, for which sales increased from 28 million units to 169 million. Restrictions on supply by various forms of rationing were less severe during the year because of the favourable water conditions. The percentage increase for all sales was 19.7 per cent.

This increase in sales was accompanied by a rise in the number of consumers connected, from 237 000 to 248 000, and a corresponding rise of £527 031 in revenue from sales to £3 608 639. The surplus for the year's working amounted to £248 940, compared with £145 247, and the accumulated deficiency on the net revenue account was reduced to £122 393. The average price for units sold over the year was 1.90d., a decrease of .04d.

At the end of the year, the Board had five main generating stations in operation, with a capacity of 90 600 kW at the Ardnacrusha hydro-station on the Shannon, and 4 000 kW and 30 000 kW at the hydro-stations at Golden Falls and Pollaphuca (River Liffey). The coal-burning station at Pigeon House, Dublin, had generating capacity of 118 000 kW and the steam d.c. station at Cork a capacity of 6 500 kW.

Work for a considerable reinforcement of the Board's generating plant is at present in hand and, despite unfavourable building weather in the winter, good progress is reported. Foundation work has been completed at Portarlington, where a new coal-fired station is being built, and the erection of boiler plant for three new 12 500 kW turbo-alternators is expected to begin this year. Contracts have also been placed for the supply and erection of two 22 500 kW turbo-alternators at Cathleen's Falls, on the Lower River Erne, and for one 10 000 kW set for a station at Cliff House, on the same river. Both the latter stations will be hydro-electric, and the work of diverting the river is at present in hand. Other constructional schemes at present in progress include the erection of final switchgear and control gear at Pollaphuca station, where a second main generating set has already been installed, and a dam is being built at Leixlip, where part of the power plant for a new station has already been delivered. Two additional boiler units and new ash disposal plant are being installed at Pigeon House (Dublin), while a site has been chosen for a peat-fired station, with two 20 000 kW sets, at Allenwood (Co. Kildare). A steam generating plant, equipped with one 30 000 kW alternator and boiler plant designed to burn either coal or oil, is to be built at Cork.

RURAL ELECTRIFICATION

During the year, work was started on a rural electrification project of considerable scope. Progress was made in determining the simplest possible design of rural supply network, fixing rates of charge, training staff and organising area investigation and development. The scheme will be carried out by developing unit areas of about 25 square miles each. Of the areas investigated, that which yields the highest revenue in relation to the capital cost of the supply network will be supplied first in each county. At least one area in every county has so far been investigated, the report states, and by the end of the year organisation work was completed, or in progress, in 51 areas in all. The areas so far selected for supply are: Kilsallaghan (Co. Dublin), Iniscarra (Co. Cork), Patrickswell (Co. Limerick), Tinryland (Co. Carlow), Multyfarnham (Co. Westmeath), Easkey (Co. Sligo) and Mooncoin (Co. Kilkenny).

• Electrical Personalities •

We are always glad to receive from readers news of their social and business activities for publication in this page. Paragraphs should be as brief as possible.

MR. H. PATERSON, manager of the Newcastle-on-Tyne office of the Metropolitan-Vickers Electrical Co., Ltd., and Mr. C. Petersen, manager of the company's

Captain, R.A., with the 51st Highland Division, and subsequently became a Staff Lieutenant-Colonel in the Glasgow Home Guard. He is a member of the North-East



MR. H. PATERSON



MR. C. PETERSEN



MR. A. J. CRAWFORD



MR. J. B. HARTLEY

Manchester office, have relinquished their duties recently and have been succeeded, respectively, by Mr. A. J. Crawford and Mr. J. B. Hartley. Both Mr. Paterson and Mr. Petersen will remain available for consultation until the end of the year. Mr. Paterson entered the specification department of the former British Westinghouse Co. in October, 1902. In 1906 he transferred to the Newcastle district office and was appointed manager in February, 1919. He is a member of the I.E.E. and was chairman of the North-Eastern Centre in 1928; he is also a member of the North-East Coast Institution of Engineers and Shipbuilders and of the A.M.E.M.E. Mr. Petersen joined the rolling and winding engine department of the British Westinghouse Co. in April, 1914, and took charge a few months later. He then became manager of the plant sales department, and subsequently combined those duties with the managership of motor sales department. In 1926 he was made district manager of the company's London office, but in 1927 returned to Manchester as district office manager there. Mr. Crawford, after completing a school apprenticeship with the British Westinghouse Co. (broken by Army service from 1914-1919) gained experience in various commercial departments of the firm. In 1925 he went to the company's Glasgow office and remained in Scotland until 1946, when he was appointed assistant manager at Newcastle. During the last war Mr. Crawford served for a time as a

Coast Institution of Engineers and Shipbuilders and of the A.M.E.M.E. Mr. J. B. Hartley was educated at Burnley Grammar School and Technical College and did his practical training with the Corporation electricity department. He joined the British Westinghouse Co. in 1913, but from 1915-1919 was engaged in war service, first in the R.N.A.S. and later in the R.G.A., where he was awarded the M.C. and was twice mentioned in despatches. He returned to Manchester as a sales engineer in the plant department of the company, two years later transferred to the Manchester office, and in 1931 became chief assistant to the district office manager. He was appointed assistant manager in 1946.

DR. JOSEF WERNER BONDI has been appointed a director of British Oil Engines (Export) Ltd.

ALD. J. L. GILL, present chairman of Wallasey Electricity Committee, has been nominated by the Wallasey All-Party Selection Committee to be the next Mayor.

DR. C. DANNATT, whose appointment as chief electrical engineer of the Metropolitan-Vickers Electrical Co., Ltd., was announced in our last issue, has been appointed to the board of the company.

DR. OTTO ROBERT FRISCH, director of the Nuclear Physics Division of the Atomic Energy Research Establishment at Harwell, was awarded the honorary degree of Doctor of Science at a recent ceremony at Birmingham University. With his aunt,

Lise Meitner, Dr. Frisch made the first calculation of the energy released during the fission of uranium. He worked on Allied atomic energy projects throughout the war and was recently appointed Jacksonian Professor of Natural History in the University of Cambridge.

DR. ANDREW BROWN and Dr. Herbert Vickers, a former lecturer at Liverpool University, are reported to have developed a new system of jet-propulsion. The two doctors met during the war and took three years to design the new jet unit. Dr. Vickers was formerly Professor of Physics at the University of British Columbia.

MR. D. W. R. KAHAWITA, designs engineer of the Ceylon Irrigation Department, has been selected by the Government to be sent to the United States as liaison officer between the International Engineering Co. of San Francisco and the Irrigation Department of Ceylon in regard to the construction of the Walawa Ganga and Gal Oya multiple power schemes.

MR. W. H. BURTON, distribution engineer with the Doncaster Corporation, has been appointed assistant consumers' engineer in the Sheffield electricity department. Other appointments made by the Sheffield Corporation are: Mr. D. J. Agnew, junior mains assistant with the Colchester Corporation, assistant mains engineer; Mr. G. E. J. White, switchboard attendant with the Luton Corporation, junior operation shift engineer; Mr. A. Large, previously junior engineer with the Metropolitan-Vickers Electrical Co., Ltd., and Mr. F. J. Williams, previously assistant control engineer with Coventry Corporation, junior assistant engineers.

The annual staff outing of Frank Westerman (Wholesale), Ltd., took place on Saturday, July 19, when the party of 64, including, among the few visitors, Mr. W. Parker and Mr. W. Elliott, of Monmore Conduits, Ltd., after travelling

through a storm, found at Tenbury Wells sunshine which lasted throughout the rest of the day. The afternoon sports were dominated by the "Conduit Crashers" (industrial electrical department), who also contributed largely to the evening entertainment in the ballroom of the "Royal Oak," Tenbury. Mr. F. Westerman, managing director, distributed the prizes.

MR. A. W. TURNER, fitter's mate, Harrogate, has been commended by the King for the part he took in quelling a fire in an electrical sub-station. During the stormy weather in February last Mr. Turner accompanied Mr. N. E. R. Wilkinson, assistant mains engineer, on a routine inspection of an unattended sub-station at Knaresborough; as they entered an explosion took place, setting oil on fire. At personal risk, Mr. Turner quelled the flames, thus preventing serious damage to the switchgear. In recognition of the act of these two employees, the Harrogate Corporation presented them with suitably inscribed silver cigarette cases and the insurance company concerned showed their appreciation by presenting cheques. It is understood that Mr. Wilkinson will receive a letter of appreciation from the Minister of Fuel and Power.

MR. H. T. WILKENS, commercial assistant in the Tynemouth electricity department, is to retire after 40 years' service.

MR. N. STEVENS, second assistant mains engineer with the Tynemouth electricity department, has been appointed first assistant mains engineer in succession to Mr. T. B. Cole, who retires in September.

MRS. BEATRICE WRIGHT, M.P. for North-East Cornwall from 1941 to 1945, who was introduced by Mr. S. C. Hurry, chairman of the school directors, distributed the diplomas won by students during the year, at the London School of Electrical Domestic Science, Basil Street, Knightsbridge, on July 25. The directors'



Group of the staff of Frank Westerman (Wholesale), Ltd., on the occasion of their annual outing

prize for the "best all-round student" was awarded to Miss Doxford, who gained the highest percentage of marks on all subjects, and Miss Hutton carried off another prize with distinction in demonstrating. Mrs. Bain, principal of the school, reported that of 38 students who took the course, 35 gained diplomas. She also read a message from Miss Minoprio, the former principal, who is spending a

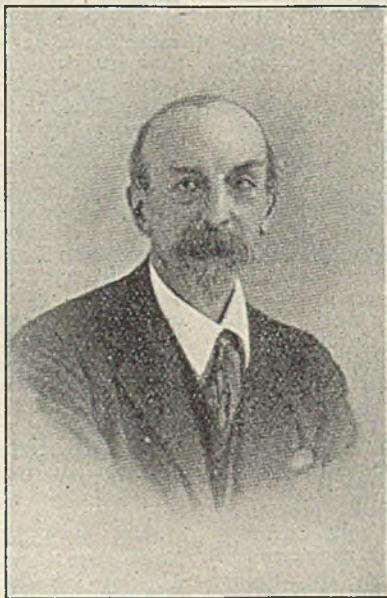
holiday in Austria. A large bouquet from the students was presented to Mrs. Wright by Miss Jackson.

MR. NORMAN FRENCH, managing director of Benn Brothers, Ltd. (proprietors of THE ELECTRICIAN), is accompanying a U.K. delegation of business men who are leaving next week on a visit to British Columbia by invitation of the B.C. Provincial Government.

Death of Mr. A. P. Trotter

THE second half of the last century was remarkable for the number of men it produced who achieved eminence in electrical science and engineering, and who lived long enough to see the fulfilment of some of their dreams and aspirations. One of these was Alexander Pelham Trotter, consulting engineer and a former editor of THE ELECTRICIAN, the news of whose death at his Wiltshire home on July 23 has been received with widespread regret. A grand old man of his profession, he had gained the esteem and affectionate regard of all with whom he came into contact and when he celebrated his 90th birthday on the 25th of last month he was the recipient of messages of congratulation and good wishes from the various engineering and scientific bodies with which he was associated, as well as a host of individual friends.

Born at Woodford, Essex, on June 25, 1857, Mr. Trotter was educated at Harrow and then at Trinity College, Cambridge, where he obtained his B.A. degree and gained the Natural Science Tripos. He served his apprenticeship with Easton and Anderson at Erith from 1880 to 1883, and during that period took out patents for prismatic glassware. He then entered into partnership with W. T. Goolden and, under the style of Goolden and Trotter, they carried on the business of dynamo manufacturers at Halifax. Mr. Trotter practised as a consulting engineer from 1886 to 1896. He also acted as technical secretary to the Electrical Trades Section of the London Chamber of Commerce from



1889 to 1890, and as editor of THE ELECTRICIAN from 1890 to 1895. In the following year he was appointed Government electrical engineer and inspector for the Cape of Good Hope and three years later became electrical adviser to the Board of Trade, a position he held until 1917.

Mr. Trotter was the author of many papers on scientific and technical matters, and a subject to which he devoted much study was that of illumination, allied with photometry. In 1911 he published a work entitled "Illumination: Its Distribution and Measurement." This was followed in 1929 by "The Elements of Illuminating Engineering." He was a member and past-president of the Illuminating Engineering Society and was at one time vice-chairman of the National Illumination Committee of Great Britain.

The diversity of Mr. Trotter's attainments, interests and activities is indicated by the fact that he was also a member of the Institution of Civil Engineers, the Institution of Electrical Engineers, a Fellow of the Physical Society of London, a former chairman of the Nomenclature Sub-Committee of the British Electrotechnical Committee of the International Electrotechnical Commission, a member of the Engineering Standards Committee, a vice-president of the Institution of Engineers-in-Charge, and a past-president of the Association of Supervising Electrical Engineers.

"Who's Who" gives Mr. Trotter's recreation as "Remembering that he is no longer a Government official."

GENERATION OF ELECTRICITY

OUTPUT INCREASED BY 10 PER CENT. LAST YEAR

AN increase of 10 per cent. in the number of units generated during 1946 is recorded in the analyses and summaries of the returns made to the Electricity Commissioners of units generated and fuel consumed at the generating stations in Great Britain.

In the return, just issued by the Commissioners, particulars are given of the units generated and units sent out from the generating stations, with the derivative figures for average fuel consumption, thermal efficiency and load factor based in each case on units sent out.

Stations containing more than one type of plant have been classified in accordance with the type by which the major portion of the output of the station was generated. In arriving at the average consumption of fuel and thermal efficiency in such cases, and also in cases where more than one class of fuel was consumed at a station, the actual fuel consumption has been converted (on the basis of the average calorific values of the fuel employed) into an equivalent tonnage of the class of fuel from which the largest portion of the output of the station was obtained. Where the whole or a portion of the output was derived from sources other than coal, coke and oil, the average consumption of fuel and thermal efficiency have been omitted.

In calculating thermal efficiencies, a unit of electricity (kilowatt-hour) has been taken as the equivalent of 3 412 mean B.T.U.'s.

The load factor has been based on the hours of generation including banking, and an indication is given in every instance of the range of running plus banking hours. The load factor has not been calculated, however, where the hours of generation, excluding banking, during the year were less than the equivalent of one-shift operation (say, 2 400 hours), and figures for the average consumption of fuel and thermal efficiency have also been omitted in such cases.

During the year the 344 stations operated by electricity undertakers generated 41 252 550 045 units, an increase of 10.6 per cent. over the corresponding figures for 1945. Of the units generated, the proportion used on works was of the order of 5.6 per cent. The stations consumed 25 482 933 tons of coal and coke, an increase of 11.7 per cent., and 34 067 tons of oil fuel as compared with 19 741 tons in the preceding year. The generating stations of railway and transport authorities and certain non-statutory stations had an output of 1 548 914 688 units. These stations consumed 1 096 268 tons of coal and coke and 33 tons of fuel oil.

Steam stations (coal, coke or oil-fired boilers) of authorised electricity undertakers with the lowest average fuel consumption and highest thermal efficiency in each group

No. of steam stations in each group†	Lowest average fuel consumption in each group			Highest thermal efficiency (approximate) in each group				
	Station	Fuel per unit sent out lb.	Maximum load sent out by generators kW	Load factor based on units sent out; Per cent.	Station	Thermal efficiency (approx.) based on sent out Per cent.	Maximum load sent out by generators kW	Load factor based on units sent out Per cent.
6(A)	*Battersea (London P. Co.)	0.96	295 950	56.7(A)†	*Battersea (London P. Co.)	26.49	295 950	56.7(A)
19(B)	*Kearsley (Lancs. E. P. Co.)	1.23	163 980	65.0(A)	*Littlebrook (Kent E. P. Co.)	24.93	122 000	54.2(B)
38(C)	*Llynfi (S. Wales E.P. Co.)	1.05	62 500	73.8(A)	*Llynfi (S. Wales E.P. Co.)	26.17	62 500	73.8(A)
22(D)	*Trafford (Stretford Elec. B.)	1.23	32 116	67.6(C)	*Castle Meads (Gloucester Corpn.)	24.97	43 980	39.4(B)
11(E)	*Llanelli and Dist. S. Co.	1.75	25 777	39.7(B)	*Bonnybridge (Scottish Central E.P. Co.)	17.63	52 770	14.8(B)
21(F)	Isle of Wight E.L. and P. Co.	1.73	15 340	30.9(A)	Letchworth (First Garden City, Ltd.)	16.52	14 220	33.3(A)
29(G)	*Rawtenstall Corpn. ...	1.85	9 635	17.0(B)	Cambridge E.S. Co. ...	15.40	8 120	33.8(C)
17(H)	High Wycombe Corpn. ...	2.04	3 205	47.0(C)	High Wycombe Corpn. ...	14.83	3 205	47.0(C)
18(I)	Folkstone E.S. Co. ...	2.37	4 366	15.0(B)	Penarth U.D.C. ...	12.46	1 440	32.5(B)
26(J to O)	Wick Corporation ...	2.84	613	37.5(A)	Wick Corpn. ...	10.72	613	37.5(A)

(The two sub-columns headed "Station" are exclusive of any new stations which only came into operation during the year)

† Group classification. A : Output of over 1 000 million units generated ; B : 500-1 000 million ; C : 200-500 million ; D : 100-200 million ; E : 50-100 million ; F : 25-50 million ; G : 10-25 million ; H : 5-10 million ; I : 2.5-5 million ; J to O : under 2.5 million

* Selected stations

† Hours of generation : (A) = 8 760 ; (B) = 6 600-8 760 ; (C) = 2 400-6 599 ; (D) = under 2 400. (B) and (C) include banking, with minimum of 2 400 running hours

Electrical Benevolence

Annual Meeting of the E.I.B.A.—New Officers

THAT the E.I.B.A. had paid out in grants in 1946 over £16 000, which represented an increase of 33 per cent. on the previous year, was stated by Mr. Walter Riggs, who was re-elected president of the association at the annual general meeting, held on July 24.



MR. WALTER RIGGS

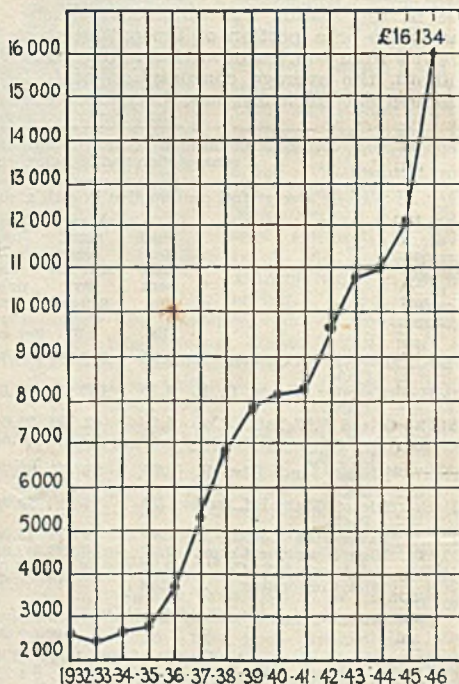
This increase was partly due to the number of men breaking down with arthritis and other nervous complaints, and of men and women being overcome by tuberculosis. The income of the association was not increasing nearly as fast as it should, and more widespread help was needed in order to balance the future budget.

Mr. Riggs emphasised that the association was no mere dole-granting body, and, in fact, only regarded pecuniary grants as one of the many means which had to be used, and on which expense had to be incurred, to the end of solving all a beneficiary's problems in the most constructive manner possible. The annual report for the year, of which a short review was given in *THE ELECTRICIAN* of July 18, described the background against which the association did its work, and should not only be carefully studied by all in the industry, but also those outside it who, conscious of the social problems of the world about them, wished to know more of progressive methods of dealing with them.

Mr. L. C. Penwill, chairman of the court of the association during the year in question, pointed out that the association's method included continuous efforts to obtain for beneficiaries the help from other sources to which they were entitled, and while this increased the association's expenses to some extent, it reduced considerably the amount which it had, itself, to find by way of monetary grants. It was impossible to measure the value in

terms of money of the work which the association had done for the 253 beneficiaries which had been on its books during the year. The only thing that was certain was that it was worth many times what the association had spent, particularly when one appreciated that after counting wives, children, and other dependents of the applicants, over 465 people were being helped.

In the election of the Council, the following new members were appointed: Mr. A. F. Bulgin, Mr. L. T. Hinton, Mr. A. McVie, Mr. B. H. Leeson, Mr. A. Parkinson, Mr. H. S. Pocock, Mr. J. W. Ridgeway, Mr. A. B. Wildsmith. At the court meeting which followed, Mr. L. C. Sharp was appointed chairman.



Amount of grants paid to beneficiaries by the E.I.B.A. in each of the last fifteen years

Electricity Supply

Maidenhead.—A new fluorescent lighting installation in the High Street will come into full operation on August 10.

Oldham.—Sanction has been granted to borrow £30 000 for mains and services and £15 000 for sub-station equipment.

Hull.—Tenders are to be invited from local contractors for electric lighting installations at nine schools, at an estimated overall cost of £15 000.

Eccles.—The Corporation has received sanction to borrow £9 213 for mains and £20 521 for plant, for an additional supply to the Royal Ordnance Factory at Patricroft.

Tredegar.—The second part of a £20 000 scheme, originally sanctioned 14 years ago for new housing estates and factories in the area, was opened by Mr. Henry Nimmo, Electricity Commissioner, recently. Mr. Nimmo switched on one of the five new sub-stations during the opening ceremony.

Bingley.—The U.D.C. has decided to accept an invitation of the National Joint Committee of Local Authorities and Chief Engineers to become members. The Bingley authority are therefore adopting the N.J.C. scale of salaries forthwith for their chief enginer and manager, Mr. O. G. Cook.

Liverpool.—A fire at Clarence Dock power station on July 23 cut the city's supply of power from 150 000 to 25 000 kW. After 62 minutes the current was restored, but a few minutes later the supply failed again. One man, a cleaner, was killed and another injured. It is estimated that the dead man received a shock of about 30 kV.

Stoke-on-Trent.—For the first time in the history of the undertaking, both units purchased and units sold exceeded 200 million, states the general manager (Capt. T. Lockett) in his report for the year ending March 31, 1947. In the former case, they totalled 225 926 489 units, an increase of 14 per cent., and units sold totalled 207 472 245, the power lost in transmission, etc., being 8 per cent. of the total purchased. In an analysis of units sold, it is shown that units for lighting, heating and cooking purposes increased during the year at a greater rate than those used for power, and combined lighting, heating and cook-

ing sales rose from 59 per cent. of power sales, in 1945-46, to 68 per cent., last year. The maximum load recorded during the year, the highest experienced by the undertaking, was 55 000 kW, compared with 48 350 kW in the previous year. Load factor (calculated on units sold) similarly rose from 42.88 per cent. to 43.05 per cent. New applications for supply received totalled 12 041, compared with 8 640 in the previous year. In the financial section of the report, it is shown that the revenue income was £906 066, compared with £794 939, an increase of 14 per cent., this increase in income being accounted for by greater sales, the average price per unit sold having remained at 1.03d. for two years. The income figure includes a profit on showroom and sundry sales of £3 590. Revenue expenditure was £111 150 more than the previous year, and at £881 025 represented an advance of 14 per cent. Expenditure on bulk supply, at £526 823, was 20 per cent. greater than the previous year. After deducting distribution costs of £74 360 (£55 944), income tax £51 664 (£50 268), management expenses £57 034 (£40 923) sundry items £53 300 (£50 358), and loan charges £117 844 (£131 752), there remained a profit of £25 041 (£25 064). Capital expenditure on distribution during the year was £179 731, compared with £32 751. The whole output from the Stoke-on-Trent generating station is supplied to the C.E.B. by the North-West Midlands J.E.A., supplies being taken by the city as required.

Lowestoft.—The discount allowed for prompt payment is to be fixed at 7½ per cent. in respect of the quarters ending June 30 and September 30, with a rebate of 5 per cent. to consumers with slot meters. The 7½ per cent. war increase will be discontinued as from and including the quarter commencing October 1, 1947.

Hereford.—Proposals that the lighting of trunk roads and main roads should be by electricity have been rejected on the grounds of cost. It appeared from the scheme put forward that the capital charges would be between £40 000 and £50 000 and that in addition annual charges for current and maintenance would be approximately £8 000. It was shown that the annual charge for lighting the streets by gas amounted to approximately £3 000, with no outstanding capital charges.

In Parliament

Plant Standardisation.—In the course of a debate on the Ministry of Supply, Mr. Wilmot said he was able to report a substantial improvement in the matter of standardising power station plant, for which there would now be two types, of 30 000 and 60 000 kW.

Generation Costs.—The Minister of Fuel and Power said the latest figures for generation costs, excluding capital charges, were, in pence per unit generated, as follows:

	1943-4.	1944-5.
Other generation costs	... 0.05	0.05
Fuel 0.25	0.29
Total (excluding capital charges)	... 0.30	0.34

Atomic Energy Plants.—Last week a statement on the proposed Government atomic energy plant in West Cumberland was made by the Minister of Supply, Mr. John Wilmot. The first stage of the process for the production of fissile material, the production of pure uranium from pitchblende concentrates, would be carried out, Mr. Wilmot said, at the Ministry of Supply factory at Springfields, near Preston. Consideration had also been given to the location of the second stage of this process, the production in a chain-reacting pile of fissile material from the uranium produced at Springfield, and at one time it was thought that the various requirements of such a site could only be met by the use of a former explosives factory at Drigg, in West Cumberland. When it was learned that the Government were considering the construction of an atomic energy plant at Drigg, however, Courtaulds, Ltd., who were proceeding with a project for a rayon factory on the site of a Royal Ordnance Factory at Sellafield, a few miles north of Drigg, stated that they thought there would be insufficient constructional and operational labour for both schemes, and this made it possible to consider the Sellafield site as an alternative to Drigg. Sellafield had proved, Mr. Wilmot went on, to be technically more suitable, and the atomic energy project would, therefore, be located there. Building and engineering work would begin in the near future and employ a considerable number of men for some time to come. The Medical Research Council and the Ministry, said the Minister in reply to a question, were investigating the problem of the effects of effluents from the atomic energy projects on the local river.

Later in the week, in the course of a

debate on the Ministry of Supply estimates, the Minister referred to the work going on at the atomic energy research establishment at Harwell, which was, he said, making good progress. The first experimental pile would be in operation later this year, and it was hoped in time to build up there a university of nuclear physics second to none in the world. The difference between Harwell and Sellafield was that the former was a general research establishment with plant of an experimental nature. The new plant to be erected at Sellafield would be production plant producing fissile material for use in atomic energy work generally. It was difficult to say when Sellafield would be in production. They were undertaking the construction of plant concerning which there was no experience, and they did not know what difficulties would be encountered.

Domestic Restrictions.—Replying to a question, the Minister of Fuel and Power said that it was not possible to state whether in fact the summer restrictions on the use of gas and electricity were being fully observed by all consumers. So far, consumption of coal by gas and electricity undertakings had been about 900 000 tons less than was estimated. The statistics available did not, however, enable him to say how much of that saving had been due to the domestic consumer. The Fuel Economy Campaign, Mr. Shinwell said, would soon be in full swing, and they had enlisted the co-operation of a large number of women's organisations and local authorities.

Two-Part Tariffs.—Mr. Channon asked the Minister of Fuel and Power whether he was aware that some electricity authorities in the country based their tariffs substantially on the rateable value of a consumer's house, with the result that many persons found that although they consumed less electricity than their neighbours they had to pay more; and whether he would take steps at an early date to ban such tariffs, with a view to encouraging greater economy in the use of electricity. Mr. Gaitskell replied that the methods of charging for electricity had recently been under examination, but they must wait until the industry was nationalised before these tariff anomalies could be successfully tackled. The problem did not only concern local authorities, and it was quite out of the question to interfere at short notice with millions of private agreements.

Mains Extensions at York

33 kV Ring Cable Round the City Boundary

WORK on what will ultimately form a 33 kV ring main round the city of York was officially commenced on Tuesday morning, when Ald. W. Dobbie (chairman, Electricity Committee), accompanied, among others, by Mr. W. A. Crocker, city electrical engineer, lifted the first sod from the cable trench at Walmgate Stray.

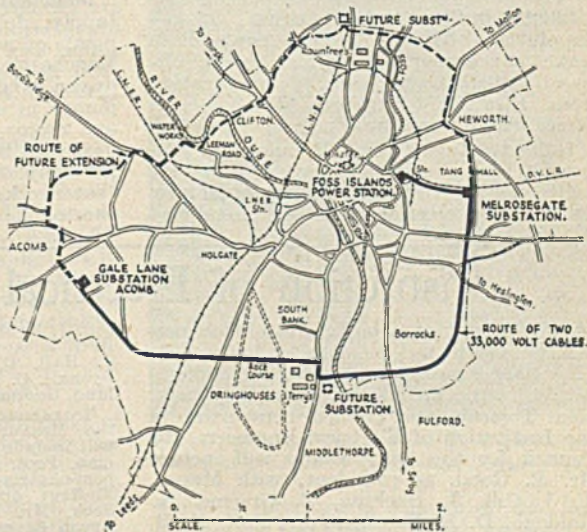
The city undertaking, which is at present connected to the grid by overhead 132 kV lines between the Foss Islands generating station and the C.E.B. sub-station at Osbaldwick, carries out local distribution at 6.6 kV and 11 kV. The new ring main, which, as may be seen from the accompanying sketch map, will follow the perimeter of the city, will be laid in stages, the first stage, two 8 000 yd. lengths of 0.20 sq. in. three-core paper-insulated cable laid direct in the ground, being supplied and installed by Enfield Cables, Ltd.

Initially, the ring main will commence at Melrosegate and will follow the southern boundary of the city to Acomb. The scheme involves the building of a new sub-station at Melrosegate, at which the existing C.E.B. 132 kV lines to Foss Islands will be made to terminate at two 45 000 kVA English Electric transformers feeding a bank of Reyrolle 33 kV outdoor switchgear. The existing 132 kV lines to the power station will then be converted to 33 kV working.

From Melrosegate the two cables, with pilot cables, will run across Walmgate Stray and the race-course to a sub-station at Gale Lane, Acomb, terminating in two 10 000 kVA transformers for local distribution at 11 kV. The total cost of this stage of the scheme will be £180 000, of which the cable contract accounts for £56 000. It is hoped to bring the cable into commission during next summer. The second stage of the ring main will begin with the building of another 33/11 kV transformer station at South Bank, and, later still, the 33 kV cable will be continued from Melrosegate around the northern side of the city to the Rowntree factory and thence to Acomb.

After the ceremony at Walmgate Stray, which was attended by the Lord Mayor of York, civic officials and members of Enfield

Cables, Ltd., a visit was made to the C.E.B. sub-station at Osbaldwick to examine the experimental length of 132 kV gas-compression underground cable installed there by Enfield Cables two years ago, and described in THE ELECTRICIAN of October 20, 1944. Following this, the party was entertained at luncheon by the Hon. John Grimston (director, Enfield Cables), who referred, in the course of a short speech, to the possibilities of importing power by means of a 400 kV marine cable from Norway. The Lord Mayor (Ald. F. Gaines) briefly responded, and the toast of "the city of



This sketch map shows the route of the new 33kV ring main

York" was proposed by Mr. C. E. F. Plutte (Enfield Cables) and replied to by Ald. W. Dobbie.

The Minister (Commercial) to His Majesty's Embassy at Buenos Aires has reported the issue of Central Bank Circular No. 789 of July 8, which announces that an import quota for the second half of 1947 will not be authorised for imports of incandescent lamps of 210/230 V of any shape, classified under Tariff Item 2292. The bank is, however, prepared to consider applications for exchange permits from users of incandescent lamps, who can produce evidence that the lamps they require cannot be made locally.

Contracts Open

WE give below the latest information regarding contracts for which tenders are invited. In the case of overseas contracts, particulars are to be had from the Board of Trade, Millbank, London, S.W.1 (corner Horseferry Road), unless otherwise stated:—

Dundee, August 13.—Supply of multi-core h.v. and l.v. p.i. cables. Particulars from City Electrical Engineer, Corporation Electricity Department, Dudhope Crescent Road, Dundee.

Farnworth, August 16.—Supply of electricity meters and one 1 000 kVA transformer. Specification from Electrical Engineer, Electricity Works, Albert Road, Farnworth, Lanes.

Skelton-in-Cleveland, August 18.—Supply and delivery of two three-phase static transformers, 50 cycles, with off-load tap-changing gear. Specification from Electrical Engineer, 147-9, High Street, Skelton-in-Cleveland.

Halifax, August 18.—Manufacture, delivery, laying and jointing of 33 kV underground cables and manufacture, delivery and erection of 33 kV metal-clad

switchgear and control panels, etc. Specifications from Borough Electrical Engineer and Manager, 19/23, Northgate, Halifax; deposit, £1 1s.

Reigate, August 22.—Supply of: (a) six units, each comprising three oil-immersed, 11 kV, 300 A switches, and six eight-way isolator and fuse units; (b) six 500 kVA, three-phase, 50 cycles, oil-immersed transformers. Specifications from Engineer and Manager, Electric House, Linkfield Corner, Redhill, Surrey.

Dover, August 25.—Supply and delivery of mercury discharge street lighting equipment. Specification from Borough Electrical Engineer, Electricity Offices, Ladywell, Dover.

Manchester, August 27.—Manufacture, supply, delivery and erection at various points on aqueduct between Thirlmere and Manchester of 15 sets of electrically-driven axial flow propeller type pumps (73 pumps in all), together with main switch and motor starting gear, etc., each set to deal with between 54 and 60 million galls. per day. Specification from Secretary, Waterworks Offices, Town Hall, Manchester, 2; deposit, £2 2s.

Institution of Electrical Engineers

AS a result of a ballot held in connection with the election of officers to fill vacancies which will occur on September 30, in the Presidency, Vice-Presidency, Hon. Treasury and Council membership of the Institution of Electrical Engineers, the Council for the next session will include Mr. P. Good, as president, with Messrs. A. J. Gill, J. Hacking, T. Graeme, N. Haldane, D. B. Hoseason and Prof. E. B. Moullin as vice-presidents.

Mr. E. Lecte was re-elected hon. treasurer.

The Council will be made up, in the case of members of Dr. T. E. Allibone, Messrs. L. H. A. Carr, C. M. Cock, J. G. Craven, J. Eccles, H. Faulkner, T. E. Goldup, Prof. Willis Jackson, Messrs. H. L. Kirke, Col. B. H. Leeson, Messrs. H. Nimmo and J. S. Pickles; associate members, Messrs. C. S. Briggs, J. M. Ferguson, Prof. J. M. Meck and Prof. F. C. Williams; companion, Mr. G. Wansbrough; associate, Mr. A. F. Plummer; chairmen and past-chairmen of sections; chairmen and past-chairmen of local centres.

Installations Section: The following have been elected to the Committee of the Installations Section: Chairman, Mr. R. H. Rawlin; vice-chairmen, Messrs. R. O. Ackerley, H. J. Alcock; past-chairmen, Messrs. Forbes Jack-

son, J. F. Shipley; ordinary members, Messrs. D. G. W. Acworth, L. S. Atkinson, R. Grierson, J. Hall, E. S. Hoare, A. N. Irens, R. T. Lythall, C. T. Melling, C. E. Mills, F. E. Rowland, George Smith, A. H. Young.

Measurements Section: The Committee of the Measurements Section for next session will include: Chairman, D. C. Gall; vice-chairmen, Prof. L. G. A. Sims, Dr. S. Whitehead; past-chairmen, Mr. L. J. Matthews, Dr. W. G. Radley; ordinary members, Lt.-Col. W. L. Beck, Mr. L. H. Daniel, Dr. L. Essen, Mr. Arvon Glynne, Prof. J. Grieg, Messrs. F. J. Lane, H. S. Petch, T. W. Ross, Dr. G. A. V. Sowler, Dr. G. W. Sutton, Dr. A. L. Whiteley; and one other to be co-opted by the Committee to fill the casual vacancy created by the election of Dr. S. Whitehead as a vice-chairman.

Radio Section: The Committee of the Radio Section for next session will include: Chairman, Mr. C. E. Strong; vice-chairmen, Messrs. F. Smith and R. T. B. Wynn; past-chairmen, Mr. A. H. Mumford, Prof. Willis Jackson; ordinary members, Messrs. C. F. Booth, G. E. Condliffe, Dr. D. C. Espley, Mr. H. W. Forshaw, Dr. R. F. J. Jarvis, Messrs. B. N. MacLarty, E. C. S. Megaw, E. L. E. Pawley, J. A. Ratcliffe, Dr. R. L. Smith-Rose, Mr. G. M. Wright.

Transmission Section: The Committee for next session will include: Chairman, Prof. W. J. John; vice-chairmen, Messrs. C. O. Boyse, J. W. Leach; past-chairmen, Messrs. J. Andrew Lee, E. T. Norris; ordinary members, Dr. L. G. Brazier, Messrs. C. M. Cock, E. L. Davey, R. Davis, L. Druquer, G. H. Gillam, S. E. Goodall, H. Leyburn, Dr. J. McCombe, Messrs. H. Payn, P. J. Ryle, J. A. Sumner.

Industrial Information

Suspension of Customs Duty

Customs duty on electric filament lamps of 24 V and under entering Eire has been suspended until March 31, 1948, by a Government Order.

Machine Tool Exhibition

The Machine Tool Trades' Association will stage an international exhibition at Olympia, London, late in August, 1948. It will be called the Machine Tool and Engineering Exhibition, London, 1948. This will be the first exhibition of its kind to be held in London since the M.T.T.A. Exhibition at Olympia of 1934.

Distributors of Electric Vehicles

Recently appointed distributors of "Brush-Bred" battery-electric vehicles are Auto Service Garage, Ltd., Bournemouth (for Dorset, South Wiltshire and South Somerset); and Nicholl and Sons, of Bedford (for the counties of Bedford, Huntingdon and Northampton).

"Enterprise Scotland" Exhibition

A wide range of the goods selected for the "Enterprise Scotland" Exhibition was inspected by the King and Queen at Holyrood Palace on Monday, July 21. More than 40 industries are taking part in the exhibition, which opens on August 25. An increasing volume of enquiries from trade buyers and overseas visitors regarding the goods to be shown is being received.

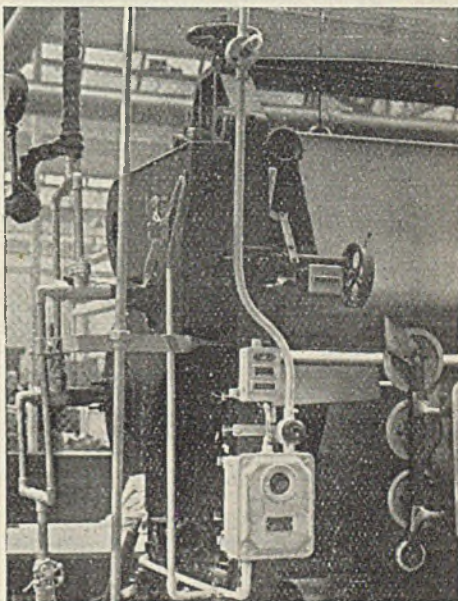
Emergency Lighting Equipment

In order to ensure that the continuity of the lighting will not be broken in the event of a mains interruption, the management of the Opera House, Jersey, the Majestic Picture House, Liverpool, and the Grosvenor Sports Arena, Southport, have decided to instal "Keepalite" automatic emergency lighting equipment, manufactured by the Chloride Electrical Storage Co., Ltd., of Clifton Junction, nr. Manchester. Similar equipment has also been ordered by the Queen Alexandra Hospital, Cosham, and the Infectious Diseases Hospital, Sunderland.

Photocell Counting Control

An example of the successful incorporation of simple electronic gear with existing machinery in a factory of Wolsey, Ltd., at Leicester, has caused interest in the hosiery industry. The equipment was required to ensure the true measurement of the amount of fabric passing over steam-heated rollers in a calender machine. With the original counter, employing a friction drive, it was possible for the

figures to be falsified by pressure on the friction drive. The new installation retained the counter system, but introduced a small lamp projector, photocell extension unit, and amplifier—all standard G.E.C. products. While the cloth is passing over the rollers the yardage count proceeds normally, but when there is no



G.E.C. photocell installation on a fabric calender at the factory of Wolsey, Ltd., Leicester

fabric to interrupt it, a beam of light falls directly on the photocell, and the relay in the amplifier unit is operated to cut out the counter trip-switch, so that no recording takes place. A guard was provided to prevent the photocell being obscured by any means other than the presence of fabric passing through the machine. In addition, there was fitted a pilot lamp, readily seen by the foreman, to indicate the counting impulses. The system is applicable to a number of similar machines in allied manufactures.

Notes for Contractors

Under an agreement between the National Federated Electrical Association and the E.T.U., wages at bare time rates for the hours constituting a normal working day are to be paid on a maximum of six bank, statutory or other holidays per annum. In areas where they are normally

observed as holidays in the electrical contracting industry, the following constitute such paid holidays: Good Friday, Easter Monday, Whit-Monday, August Bank



G.E.C. stand at the Public Works Exhibition which closed at Olympia on Saturday last

Holiday Monday, Christmas Day and Boxing Day. These days will not be paid holidays in areas where they are not normally observed as holidays in the electrical contracting industry, but in those areas traditional local holidays normally observed in substitution thereof will be paid holidays, subject to the provision that "substituted" days shall not rank for payment under the agreement until their inclusion has been ratified by the N.J.I.C. Where there are less than six days per annum, national or local, normally observed as holidays in the industry, further holidays are not to be created for the purpose of the agreement. In the event of a Saturday becoming a paid holiday under this agreement, the wages to be paid are those applicable to the normal working hours on a Saturday. It is important to note that payments shall be made only to operatives who work on the working day preceding and the working days following the paid holiday.

Change of Address

As from August 5 Crompton Parkinson, Ltd., will be occupying Astor House, Aldwych, London, W.C.2, a 35 years' lease having been acquired earlier in the year. The electric vehicle division remains at Electra House, but as from August 5 the telephone number, telegraphic and cable addresses will be the same as those for Astor House, namely:—Telephone: Chancery 3333; telegrams: Crompark, Estrand, London; cablegrams: Crompark, London.

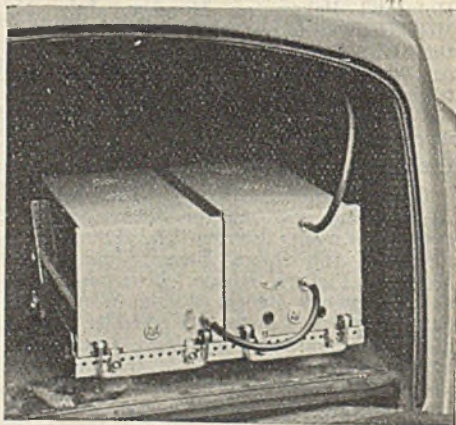
I.E.E. Western Centre

The report of the activities of the I.E.E. Western Centre during the 1946-47 session shows that the membership of the centre was 1 860, made up of 169 members, 648 associate members, five companions, 166

associates, 177 graduates over 28 years, 184 graduates under 28 years, and 511 students. The membership of the Installations Group was 311, and the Transmission Group 172. Only 30 per cent. of the total membership were contributors to the Benevolent Fund at December 31, 1946, the average amount subscribed being 14s. In connection with the Homes Fund, the target figure for the Western Centre, including the South-Western Sub-Centre and West Wales (Swansea) Sub-Centre, was £2 955, of which £983 14s. 3d. had been received.

Police Radio Demonstrated

Travelling in a radio-equipped patrol car during mid-afternoon one day last week, a representative of THE ELECTRICIAN, at the invitation of the Marconi's Wireless Telegraph Co., Ltd., was able to carry on a two-way radio conversation with the Marconi offices in Kingsway from all points on a three-mile circuit through some of the most densely crowded and soiled streets in central London. The apparatus used was a new v.h.f. low-power radio telephone, which has been adopted by the Home Office for police purposes and has, the makers believe, many other applications. In the demonstration car, the transmitter and receiver units were mounted in the luggage boot, while



The new Marconi v.h.f. radio-telephone fits with ample clearance inside the luggage boot of a small car. On the right is the transmitter and on the left the receiver, both units being mounted on a common sprung framework. Remote control of the apparatus is from a panel below the dashboard

messages received from a static station in Kingsway were heard through a loud-speaker above the passenger's seat, at a volume sufficient to give complete audibility above the heaviest traffic noises. The mobile transmitter, operating in the

78-100 Mc/s range, is crystal-controlled, and will deliver 10W unmodulated carrier to a vertical quarter-wave omnidirectional aerial mounted on the car roof. The modulating stages may, if desired, be employed as a low frequency amplifier for a public address system, when they will deliver an audio-output of 11W to a loud-hailer outside the car. In the receiver—a double-superheterodyne—frequency is crystal-controlled and the sensitivity is 5 μ V for 20dB signal/noise ratio. A special feature of the equipment is the high degree of fidelity obtained on speech transmission, the response being with \pm 3dB from 300 to 3 000 cycles. Both transmitter and receiver operate from the normal 12 V car battery, with a load of 15A on "transmit" and 6.7A on "receive." Provision is made, in the design of the static station, for diversity working from two or more separate transmitters, remotely modulated from a central point.

Branch Reopened

Young and Wildsmith, Ltd., announce that their Ilford branch will be re-opened at 41, York Road, Ilford, Essex, on July 15. Temporary telephone: Ilford 2033.

Cast Iron Research

The bulletin of the British Cast Iron Research Association, gives the names of five new ordinary members and one new trade member, and a large number of abstracts from foundry literature.

Trade Publications Received

Bound volumes of "The Crabtree" for 1945 and 1946, published by J. A. Crabtree and Co., Ltd., Walsall.

John Vessey and Sons, Ltd., have published a brochure entitled "Crucible Cast Steel."

An illustrated booklet giving details of metal-clad switch and fuse gear, issued by Cantie Switches, Ltd., Northgate Works, Chester.

Four recent publications by the London Electric Wire Co. and Smiths, Ltd., 24, Queen Anne's Gate, Westminster, S.W.1, dealing, respectively, with "Anacos" copper chromium, copper-silver alloy, machined components and silver-clad copper—new products of the company.

We have received from Young and Wildsmith, Ltd., the electrical accessories and domestic electrical appliances, temporary Post-War List No. 12, May, 1947.

A book of instructions, issued by Protolite, Ltd., Central House, Upper Woburn Place, London, W.C.1, for brazing and grinding Prolite tips and tools.

A booklet published by Murex Welding Processes, Ltd., from Waltham Cross, Herts, giving details of their "Tubex"

hard facing welding rods and methods of application.

An illustrated booklet published by Protolite, Ltd. (a subsidiary company of Murex, Ltd.), Central House, Upper Woburn Place, London, W.C.1, giving particulars of their "Prolite-Nurake" milling cutters.

Publication No. 2572, issued by Johnson, Matthey and Co., Ltd., 73-83, Hatton Garden, London, E.C.1, giving particulars of vitrified enamel scales and markings on glass developed by the company, and their applications.

An illustrated brochure issued by H. J. Enthoven and Sons, Ltd., of 230, Thornton Road, West Croydon, Surrey, describing the evolution of activated rosin-cored solder manufactured by them.

An advance copy of "The Brown-Boveri Review," No. 10, October, 1946, the contents of which refer exclusively to the papers read and demonstrations given at the gathering at Baden in May, 1946.

Booklet RCM 2a (second edition), published by the Lea Recorder Co., Ltd., Recorder House, Cornbrook Park Road, Manchester, 15, which describes and illustrates the "Romer-Lea" coal meter for measuring coal or other materials passing down pipes and chutes.

A copy of an illustrated catalogue, just issued by the United Steel Companies, Ltd., 17, Westbourne Road, Sheffield, 10, dealing with a series of creep-resisting steels, which have been developed over the last twelve years for specific uses under high temperature conditions.

A book published by the Indestructible Paint Co., Ltd., 6, Chesterfield Gardens, Curzon Street, London, dealing with the main characteristics and uses of insulating varnishes and compounds, and giving details of Voltalac products, with technical data.

Institute of Metals

The thirty-ninth autumn meeting of the Institute of Metals will be held at the Institute of Engineers and Shipbuilders, 39, Elmbank Crescent, Glasgow, from September 23 to 26.

Reports from Germany and Japan

Among reports containing scientific and technical intelligence from Germany and Japan, now available at Stationery Office sales offices, are the following: B.I.O.S. 1389, Design and Production of Counting Instruments (Electrical) (3s.); B.I.O.S./JAP/PR/651/2/3, Japan's Power Plants and their Equipment: Part A, Thermal Power Plants with Appendices I and II (19s. 0d.); B.I.O.S./JAP/PR/654/5, Japan's Power Plants and their Equipment: Part A, Thermal Power Plants, Appendices III and IV (20s.).

Company News

METROPOLITAN ELECTRIC SUPPLY CO., LTD.
—Int. div. on ord., 3%, less tax, for six months ended June 30, 1947.

PYE, LTD.—Dirs. recommend fin. div. of 5%, less tax, on 8% cum. partcipg. pref'd. ord. stock, making 10% for yr. to March 31 last. Div. of 25%, less tax, is being pd. on defd. ord. (same). Net prft. for yr. amnts to £120 453 (£120 077), struck before provdg. £65 000 for taxn. Group consolidated prfts. will exceed £150 000.

BENN BROTHERS, LTD.—Dirs. recommend payment of following final divs., less tax, for the year ended June 30, 1947:—3 per cent. on pref. shares, which with interim div. of 3 per cent. paid in February makes 6 per cent. for year. 20 per cent. ord. shares, which with the interim div. of 5 per cent. paid in February makes 25 per cent. for year. (Last year 20 per cent.) 5s. per share on the deferred shares. (Last year 4s.).

WARD AND GOLDSTONE, LTD.—Full reprt. to Mar. 31 shows prft. after all gen. charges £263 068 (£213 470). Deduct taxn. £112 619 (£141 077), depren. £20 370 (£16 043), dirs.' fees £400 (same), provident scheme £1 500 (same), war dam. nil (£369), lvg. net prft. £128 179 (£54 081). To res. future taxn. £30 000 (£5 000), pref. div. £3 080 (£2 800), fin ord. div. 30%, mkg. 50% (35%), fwd. £153 514 (£84 365). Current assets £562 297 (£464 206), against current liabs. and provs. £280 636 (£248 638).

ELECTRIC CONSTRUCTION CO., LTD.—Gross prft. to Mar. 31, £199 980 (£265 864), plus other income £1 813 (£3 101), mkg. £201 793 (£268 965). To E.P.T. nil (£46 000) and after exes. net prft. £58 320 (£89 990). Inc. tax absorbs £30 000 (£45 500), pref. divs. £3 850 (£3 675), ord. div. 12½% (same), gen. res. £9 911 (£20 000), superann. fund £2 000 (nil), fwd. £39 773 (£40 339). Fixed assets at total cost £786 220 written down by depren. to £358 220. Curr. assets £751 433, agst. outstandg. liabs. £213 411.

GENERAL ELECTRIC CO., LTD.—Pft. on trdg. and income from invstmnts. to Mar. 31, after mkg. full provn. for E.P.T. and pfts. tax, was £2 270 965 (£2 300 554). Deduct depren., fees, pensions £625 764 (£574 141), inc. tax £740 000 (£770 000), lvg. net prft. £905 201 (£956 413). Divs. on 6½% "A," 7½% "B," and 4½% "C" pref. stocks take £185 361 (£174 800), gen. res. £320 678 (nil), reprs. and rehabilitatn. nil (£350 000), div. on ord. again 10% and same bonus 7½%, both less tax, £404 093 (same), fwd. £986 859 (£991 790).

Consd. blee. sheet as at Mar. 31 shows current assets of £22 133 727. That is a surplus of £10 342 360 over running liabs. Debtors amount to £8 198 231 and stocks to £11 939 030. Current liabs., £11 791 367, consist largely of three items—trade creditors £6 116 707, taxes £3 424 383 and repairs £1 000 000.

ARON ELECTRICITY METER, LTD.—Prft. on trading to Mar. 31 £62 666 (£22 093 loss), plus fees and sundry income £43 (£749), mkg. £62 709 (£63 325, inclgd. £62 576 E.P.T. repaymt.), less dirs.' fees £2 238 (£2 268), exes. £5 887 (£6 025), legal fees £1 418 (£1 366), E.P.T. £6 600 (nil), patents £184 (£177), staff pension £1 616 (£1 542), int. £7 (same), war damage nil (£742), lvg. £44 759 (£29 105). To tax £25 937 (£16 542), gen. res. £5 000 (nil), ord. div. 15% (10%) £12 535 (£8 356), fwd. £23 244 (£21 957).

ZINC CORPORATION, LTD.—Full acct. for 1946 show gross val. of products £2 675 347 (£2 136 132), deduct mining, milling, etc., £1 624 360 (£1 328 873), mine devt. £229 944 (£148 744), admin. £50 909 (£39 358), mining royalty £55 588 (£25 840), leavg. £714 546 (£593 317), plus int. divs., etc., £106 824 (£73 475), mkg. £821 370 (£666 792). To tax prov. £438 863 (£328 846), dirs.' fees £10 881 (£7 720), shaft sinkg. and new plant £80 881 (£202 848), prfts. equal. res. £36 000 (nil), pref. divs. £22 296 (£31 652), ord. div. 7s. 6d. (2s. 6d.) per share or unit, less tax £231 730, fwd. £171 711 (£70 992). Current assets £1 783 061 (£1 512 795), liabilities £1 434 935 (£820 357), provsns. £448 546 (£430 324), rev. res. and undivided prfts. £351 711 (£261 307). Invests. in assoc. cos. stand at £3 618 226 (£3 043 823). Ore milled durg. yr. was 448 037 tons, of wh. 384 482 tons were mined from lead lode and 63 555 tons from zinc lode.

HICK HARGREAVES AND CO., LTD. (engineers, etc.)—Trdg. prft. after taxn. and charging £28 132 (nil) staff pension benefits for yr. to March 31, £68 918 (£60 334), plus bk. int. nil (£133) and int. on investmt. and tax res. certs. £331 (£673). To depcn. £16 508 (£18 241), lvg. net prft. £52 742 (£42 899), fin. div. 8%, mkg. 10% (same), res. £20 000 (£10 000 contin. res.), employees' benev. and welfare fd. £3 000 (£2 000), fwd. (sub. dirs.' fees) £11 265 (£7 798).

CROSSLEY-PREMIER ENGINES, LTD. (controlled by Crossley Bros.)—Prft. to April 30, includg. adjustments in respect of contracts completed prev. yrs. and after depcn. £39 969 (£85 973). To inc.-tax

£17 000 (£39 500), N.D.C. and prfts. tax £2 800 (£4 700), lvg. £20 169 (£41 773), ord. div. 12½% (25), gen. res. £6 500 (£7 000), staff superann. res. nil (£500), fwd. £23 481 (£22 942).

MOUNTAIN COPPER CO., LTD.—Full rpt. for yr. ended December 31 shows prft. on sales of produce £109 221 (£107 950), plus sundry inc., mkg. £13 021 (£108 225), less tax, depen., etc., lvg. net prft. £32 173 (£23 215), add gain on disposal of equipmt. £1 117 (£4 652), provn. for U.S. tax not reqd. nil (£17 423), to gen. and exchange resvs. nil (£17 423), depen. res. nil (£6 410), div. 15% (10%), plus bonus 10% (2½%), prov. for part red. of deb. stock nil (£7 500), fwd. £40 518 (£27 853). Cons. prft. and loss acct. shows prft. on sales of produce £232 684 to which is added sundry inc. mkg. £233 347. Prft. for yr. after tax, depen., etc., £92 994. Cons. blce.-sheet shows curr. assets £516 940 and curr. liab. £264 715.

JOHN THOMPSON ENGINEERING CO., LTD.—In his statement to shareholders. Mr. W. J. Thompson (chairman) said that the results of material and labour shortages reflected in the trading figures, which showed a considerable recession compared with those of the preceding year. It was, however, the directors' belief that the reduction in trading profits was temporary. It was believed that the present year's turnover, in spite of stoppages due to the fuel crisis, etc., and the inevitable increase in costs forced upon employers by the introduction of the five-day week, would, nevertheless, show improvement; as it had done so far. The total work in hand over all the group companies, including export orders, still represented a record in the company's history, and orders were still being booked, notwithstanding extended dates of delivery. The largest single contract in the company's history had just been received from Australia with a value there of over £2 000 000. This now brought the total work in hand over all the group companies to well over £10 000 000. In spite of the emphasis on production, the company had given every encouragement to the various research projects which were on hand, such as the technique of fabricating and examining by X-rays pressure vessels in special materials like stainless steel, nickel, etc.

MORGAN CRUCIBLE CO., LTD.—Full accts. to Mar. 31 show trdg. prft. after depreen. and prfts. of wholly-owned sub. cos. which include £49 566 foreign taxn. recov. £511 300 (£388 291), plus divs. and int. on invests. £74 466 (£75 255), credits in respect of provs. made in prev. yrs. no longer reqd. and proptn. of divs. from certain sub. cos. ref. to periods in excess of one yr. £82 423 (nil), and E.P.T. less inc. tax

thereon estd. to be recov. in respect of deficy. for 1946-47 £64 835 (£229 775), mkg. total of £733 024 (£693 331). To dirs.' fees £6 000 (£3 379), int. on bk. ln. £7 255 (£9 614), on employees' ln., less tax, £1 146 (£1 189), inc. tax (less adjustments in respect prev. yrs.) £265 772 (£251 100), prfts. tax £11 017; net prft. £441 834 (£428 049). Div. on 5½% first pref. takes £30 250, on 5% second pref. £29 673, int. on 5% obligations nil (£6 069), rehabilitation res. £100 000 (nil), gen. res. £100 000 (£150 000). Fin. on ord. 8½%, mkg. 12½% (11½% on smaller cap.), fwd. £100 831 (£88 042). Cons. bal. slt. (co. and one subsid. at Mar. 31, 1947, and remaining subsid. cos. at Dec. 31, 1946) shows fixed assets £1 615 528, patents, trade marks, goodwill £2 507 715, trade invests. £90 263 (value at market price, £461 558). Current assets total £3 397 295. Res. and surplus attrib. to Morgan Crucible £1 419 966, loans £33 692, current liabs. and provs. £1 293 958.

SIEMENS BROS. AND CO., LTD.—The 66th ordinary general meeting was held in London recently. In the course of his statement to stockholders, Dr. Henry R. Wright (chairman and managing director) referred to acute labour shortage in their Woolwich works which had prompted the decision to transfer work to a new trading estate at Spennymoor, Co. Durham. They now had 900 employees there, and this number would be raised to 1 800 as soon as general alterations to the buildings were completed. The company had also had built a 200 000 sq. ft. factory at West Hartlepool, and the first 100 000 sq. ft. of this was expected to be ready for occupation by September this year. The provision of new plant for the three factories, the building of a new instrument factory at Woolwich in place of a smaller building lost during the war and other factors would entail very heavy capital expenditure, to meet which it had been proposed to increase the capital of the company by £1 000 000. Referring to trading activities, Dr. Wright said that they had a large volume of work for the G.P.O., while on the design side their major preoccupation was with various applications of the motor uniselector for automatic trunk switching projects. They had also started a school at the Woolwich works for training ships' officers in the use of marine radar equipment. The value of orders placed for power cables was over three times the value in 1945 and, in spite of shortages of material and labour, overseas orders for various products exceeded the previous year by 20 per cent. The subsidiary company, Siemens Electric Lamps and Supplies, Ltd., continued to expand and last year had the highest sales in its history.

Commercial Information

County Court Judgments

NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be actions. But the Registry makes no distinction. Judgments are not returned to the Registry if satisfied in the Court books within 21 days.

ANSELL, — (male), 2, Alexandra House, Church End, Finchley, Middlesex, electrical engineer. £13 10s. 2d. June 3.

B.E.C. (British Electrical Corporation, Ltd.), registered office, 18-20, York Building, Adelphi, W.C.2, manufacturers. £24 16s. 3d. May 20.

CORNFORDS (B. and M., Ltd.), registered office, Central Works, Sudbury Circle, Sudbury, Middlesex, merchants, builders, and electrical engineers. £22 7s. May 21.

DEETH, L. A. (male), 238a, Fulham Road, West Brompton, Middlesex, builder and electrical contractor. £19 9s. 3d. May 20.

STEVENS WHOLESALE (HOUNSLOW), LTD., registered office, 295, Staines Road, Hounslow, Middlesex, electrical and mechanical apparatus manufacturers. £10 13s. 10d. May 29.

WAVERLEY RADIO (a firm), 42/44, High Street, West, Wallsend, Northumberland, radio dealers. £22 18s. 10d. May 15.

BLYTHER, — (male), 2, Kirkley Road, Wimbledon, Surrey, electrical engineer. £35 1s. 9d. May 14.

COX, A. J. (male), Bear Hill, Alvechurch, Worcester, electrical dealer. £10 14s. 10d. April 25.

PRATT, Horace, 125, Allerton Road, Bradford, mechanical engineer and electrical contractor. £19 8s. 8d. April 28.

RUSSELL-ELECTRIC (a firm), 9, Station Arcade, High Street, Merthyr Tydfil, electrical contractors. £18 10s. 10d. April 15.

Adjudication

MANSSELL, Beatrice (married woman), trading as The Abies Battery Co., 7, Tudor Road, Anerley, London, S.E.20, lately carrying on business at 117, Anerley Road, Anerley, London, S.E.20. Court: Croydon. Date of Order: June 16, 1947. Date of Filing Petition: May 5, 1947.

Intended Dividend

LOWTHER, Oliver Peter, St. Gildas, Brookway, Friars Cliff, near Christchurch, Hants, formerly 27, Beaufort Mansions, Beaufort Street, S.W.3, in the county of London, electrical engineer, and lately residing at 103, Hawkins House, Dolphin Square, S.W.1, in the county of London. Court: High Court of Justice. Number of Matter: 301 of 1939. Last Day for

Receiving Proofs: August 6, 1947. Name of Trustee and Address: Macleod, Torquil John Murdoch, 4, Bucklersbury, London, E.C.4.

Receiving Order

LANGTON, Ronald Henry Alfred, 61, Heathfield Court, Chiswick, W.4, in the county of Middlesex, radio engineer. Court: Brentford. Date of Filing Petition: June 12, 1947. Number of Matter: 7 of 1947. Date of Receiving Order: July 16, 1947. Number of Receiving Order: 6. Whether Debtor's or Creditor's Petition: Creditor's. Act of Bankruptcy proved in Creditor's Petition: Section 1-1 (G), Bankruptcy Act, 1914.

Amended Notice

RICHARDSON, Albert Victor, residing at 5, Grantham Road, Bradford, radio and electrical engineer, and carrying on business at 126, Manningham Lane, and lately carrying on business at John Street Open Market and 195, Manchester Road, Bradford, under the style of "Market Radio and Electrical Supplies," and formerly carrying on business in partnership with another at 81, Manchester Road, as an auctioneer. Court: Bradford. Date of Order: July 7, 1947. Date of Filing Petition: July 7, 1947.

Metal Prices

	Monday, Price	Inc.	July 28 Dec.
Copper—			
Best Selected (nom.)...per ton	£130 10 0	—	—
Electro Wire bars	£132 0 0	—	—
H.C. Wire, basis	£149 0 0	—	—
Sheet	£173 10 0	—	—
Bronze Electrical quality			
1% Tin—			
Wire (Telephone) basis per ton	£172 5 0	—	—
Brass (80/40)—			
Rod basis per lb.	1s. 1½d.	—	—
Wire	1s. 6½d.	—	—
Iron and Steel—			
Pig Iron (E. Coast Hematite No. 1) ...per ton	£8 19 0	—	—
Galvanised Steel Wire (Cable Armouring) basis 0.104 in.	£84 5 0	—	—
Mild Steel Tape (Cable Armouring) basis 0.04 in.	£21 15 0	—	—
Lead Pig—			
English	£91 10 0	—	—
Foreign and Colonial... ..	£90 0 0	—	—
Tin—			
Ingot (minimum of 99.9% purity)	£412 10 0	—	—
Wire, basis per lb.	6s. 6½d.	—	—
Aluminium Ingots ...per ton	£80 0 0	—	—
Spelter	£70 0 0	—	—
Mercury (spot) per bott.	£17 3 6	—	—
(ex. warehouse)			

Prices of galvanised steel wire and steel tape supplied by O.M.A. Other metal prices supplied by B.I. Callender's Cables, Ltd.

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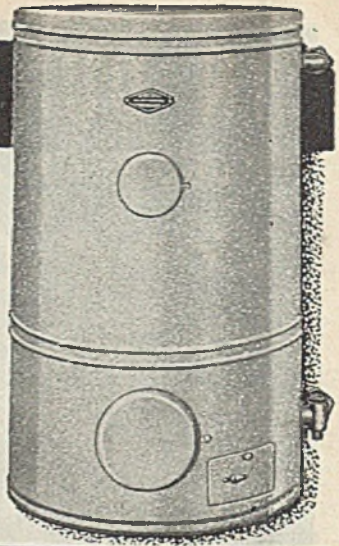
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Sadias are in use today and we are building more and more each week. Although the number of orders prevent delivery from stock, the Sadia U.D.B. is well worth waiting for. Write for further details now. Delivery of orders supported by W.B.A. Priority can usually be arranged to fit in with the building programme.



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89, Douglas Street, Glasgow, C.2.

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WATER HEATER

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RESIN PAPERS
(IMPREGNATED AND COATED)



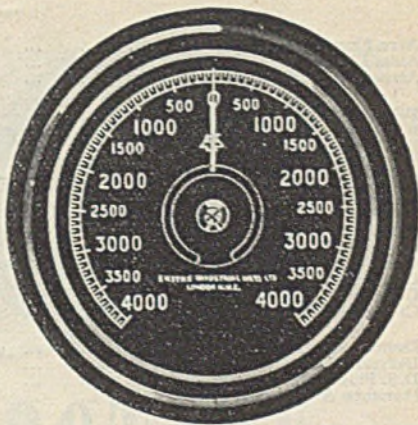
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possible by a jewelled movement of simple design and robust construction; by individual attention at every stage of making, testing and calibrating.

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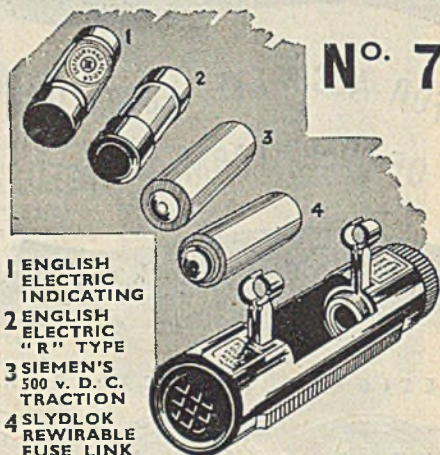
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The Industrial Instruments Division of S. Smith & Sons (England) Ltd.

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British Diamix Ltd.	314
British Thomson Houston Co., Ltd.	303
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Howells Electric Motors Ltd.	365
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Kent, Wm. (Porcelains), Ltd.	320
Lindley Thompson Transformer & Service Co., Ltd.	307
Litholite Insulators & St. Alban's Mouldings Ltd.	350
Londex Ltd.	364
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Metway Electrical Industries Ltd.	312
Micramatic Electrical Instruments Co., Ltd.	364
Midland Electrical Manufacturing Co., Ltd.	306
Ministry of Supply	364
Mosses & Mitchell Ltd.	366
Newman Industries Ltd.	305
Remington Rand Ltd.	302
Reyrolle, A., & Co., Ltd.	304
Rowlett Engineering Co., Ltd.	366
Scemco Ltd.	366
Scholes, Geo. H., & Co., Ltd.	359
Scottish Cables Ltd.	322
Sims, F. D., Ltd.	321
Smith, Fredk., & Co., Ltd.	309
Smiths Industrial Instruments Ltd.	351
Stainless Steel Wire Co., Ltd.	318
Sun Electrical Co., Ltd.	363
Symonds, R. H., Ltd.	308
Temple Electrical Co., Ltd. (The)	349
Terry, Herbert, & Sons, Ltd.	367
Tullis Russell & Co., Ltd.	368
Uhlhorn Brothers Ltd.	362
Universal Tools Ltd.	316
West Insulating Co., Ltd.	318
Westinghouse Brake & Signal Co., Ltd.	Cover iii
Whiteley, B. S. & W., Ltd.	319
Wilcox, Ed., & Co., Ltd.	352
Zenith Electric Co., Ltd. (The)	308

Fusing Facilities



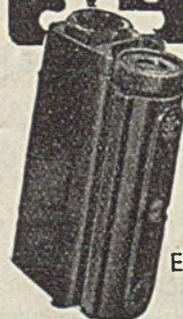
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CLASSIFIED ADVERTISEMENTS

SITUATIONS VACANT

NORWICH CORPORATION ELECTRICITY DEPARTMENT.

APPOINTMENT OF ASSISTANT DISTRICT MAINS ENGINEER.

APPLICATIONS are invited for the above position in the Wymondham District of the Norwich Undertaking. Candidates must have received a sound technical training and have had recent experience in the construction and operation of E.H.V. and L.V. underground and overhead systems.

Salary and conditions of service will be in accordance with Grade 8b, Class H, of the N.J.B. schedule, at present £429 per annum.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination. He must own a car, for which he will be paid an allowance in accordance with Corporation Scale of allowances.

Applications endorsed "Assistant District Mains Engineer," stating age, qualifications and details of experience, together with not more than three testimonials, should be submitted to the undersigned and received not later than the 9th August, 1947.

In their applications, candidates should state whether they are related to any member of the City Council. Canvassing will disqualify.

JOHN A. SUMNER, M.I.E.E., M.I.Mech.E.,
F.I.A.,
City Electrical Engineer,
4 Duke Street, NORWICH.

COUNTY BOROUGH OF OLDHAM, ELECTRICITY DEPARTMENT.

APPLICATIONS are invited for the appointment of Chemist in the Corporation's Power Stations.

Applicants should possess a degree or equivalent qualification in Chemistry and have had practical experience in the chemical laboratory of a modern Generating Station, preferably with high pressure boiler plant. Salary in accordance with N.J.B. Schedule, Grade 8, Class "H," at present £481-£507 per annum.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937. The successful applicant will be required to pass a medical examination and to comply with the conditions as to residence to which appointments under the Corporation are subject. Canvassing will be a disqualification.

The age limit for new entrants to the Local Government Service is 45 years unless a transfer value in respect of Superannuation is payable. For the purpose of this appointment the age of applicants who are serving or have served in H.M. Forces will be regarded as being reduced by the number of years of their war service.

Applications, endorsed "Chemist," stating age, full details of education, training and experience, with copies of not more than three testimonials, to be forwarded to the Chief Engineer and Manager, Corporation Electricity Department, Greenhill Offices, Oldham, not later than Saturday, 9th August, 1947.

THOMAS ALKER,
Town Hall, OLDHAM. Town Clerk.
24th July, 1947.

SITUATIONS VACANT

SHEFFIELD CORPORATION ELECTRICITY DEPARTMENT.

APPOINTMENT OF ELECTRICAL DRAUGHTSMAN.

APPLICATIONS are invited for the position of Electrical Draughtsman in the Construction Department of this Undertaking. The duties relate principally, but not exclusively, to power stations. They include preparation and checking of drawings and diagrams, preparation of wiring and cabling schemes for execution by direct labour or by contract, and site supervision and testing as required.

Applicants must have a sound technical training, preferably with experience in the manufacture of power station equipment, and must be experienced in the layout of switch-gear, plant, cabling, station auxiliaries and auxiliary supplies.

The salary will be in accordance with Class M, Grade 9, of the N.J.B. Schedule, present commencing value £521 per annum.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937. Applicants must preferably be not more than 40 years of age or have had previous Local Authority service carrying transfer value within the meaning of the Act. The selected candidate would be required to pass a medical examination.

Applications on forms to be obtained from the undersigned to be received, with copies of not more than three testimonials, by Monday, August 18th, 1947.

Canvassing or any communication to a member of the Council, either directly or indirectly, is prohibited and is a disqualification.

General Manager and Engineer,
Sheffield Corporation,
Electricity Department,
Commercial Street,
SHEFFIELD, 1.

IDC/BS.
18th July, 1947.

COUNTY BOROUGH OF OLDHAM, ELECTRICITY DEPARTMENT.

Appointment of Junior Charge Engineer.

APPLICATIONS for the above appointment are invited. Applicants must possess the Higher National Certificate in either Mechanical or Electrical Engineering, or equivalent qualification, with sound practical experience. Salary in accordance with N.J.B. Schedule, Class "II," Grade 9, at present £402-£417 per annum.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937. The successful applicant will be required to pass a medical examination, and to comply with the conditions as to residence to which appointments under the Corporation are subject. Canvassing will be a disqualification.

Applications, endorsed "Junior Charge Engineer," stating age, full details of education, training and experience, with copies of not more than three testimonials, to be forwarded to the Chief Engineer and Manager, Corporation Electricity Department, Greenhill Offices, Oldham, not later than Monday, the 11th August, 1947.

THOMAS ALKER,
Town Hall, OLDHAM. Town Clerk.
21st July, 1947.

SITUATIONS VACANT

METROPOLITAN BOROUGH OF ISLINGTON.

ELECTRICITY DEPARTMENT.

Appointment of Technical Staff.

- (a) Shift Charge Engineer.
 (b) Relief Shift Charge Engineer.
 (c) Junior Mains Engineer.

APPLICATIONS are invited for the following permanent appointments—

Shift Charge Engineer.—Salary will be in accordance with Class G, Grade 8, of the National Joint Board Schedule at present £490 7s. rising to £499 16s. per annum.

Relief Shift Charge Engineer.—Salary will be in accordance with Class G, Grade 8a, of the National Joint Board Schedule at present £458 17s. rising to £471 9s. per annum.

Applicants should have had a sound general education, a good technical training and experience in the operation of Central Station plant. Experience of oil-fired boilers will be considered an advantage.

Junior Mains Engineer.—Salary will be in accordance with Class G, Grade 9a, of the National Joint Board Schedule, at present £360 3s. rising to £375 18s. per annum.

Applicants should have had a sound technical training, preferably with some experience of E.H.T., H.T. and low tension underground cable systems. Consideration will, however, be given to those who have been unable to obtain practical experience but have the necessary technical qualifications. On request, any applications submitted for a similar position filed recently will be reconsidered. Duties include assisting on outside mains work and the carrying out of mains records.

Each of the above permanent appointments will be subject to the provisions of the Local Government Superannuation Act, 1937, and to a satisfactory medical examination. Candidates are required to disclose in writing whether to their knowledge they are related to any Member, or holder of any senior office under the Council. Canvassing either directly or indirectly will be a disqualification. The Council are unable to make any arrangements for the provision of housing accommodation for the successful candidates.

Application forms for the above positions may be obtained from the Engineer and General Manager, Electricity Department, 341/3, Holloway Road, London, N.7, and should be completed and returned to him, endorsed appropriately, not later than noon on 12th August, 1947.

W. ERIC ADAMS,

Town Clerk.

Town Hall, Upper Street, N.1.

BOROUGH OF LUTON.

APPLICATIONS are invited for the position of SWITCHBOARD ATTENDANTS. Applicants must have had sound experience in the control of high and low pressure switchboards and the operation of rotary converting plant.

Conditions of service and rate of pay will be in accordance with the National Joint Board Schedule, Class "G," Grade 9a, at present £343, rising to £358 per annum.

The successful candidate will be required to pass a medical examination and to contribute to the Corporation's Superannuation Scheme. Applications, giving age, details of training and experience, and accompanied by testimonials, must be delivered not later than Monday, 18th August, 1947, to C. T. Melling, M.Sc. (Tech.), M.I.E.E., M.I.Mech.E., Borough Electrical Engineer, Electricity Offices, St. Mary's Road, Luton.

Canvassing, directly or indirectly, will disqualify.

W. H. ROBINSON,

Town Clerk.

Town Hall,

LUTON.

25th July, 1947.

SITUATIONS VACANT

METROPOLITAN BOROUGH OF ISLINGTON.

ELECTRICITY DEPARTMENT.

APPOINTMENT OF TECHNICAL ASSISTANT.

APPLICATIONS are invited from qualified engineers for the above appointment at a salary in accordance with Class G, Grade 5, of the National Joint Board Schedule, at present £601 13s. rising to £634 4s. per annum.

Applicants should possess a wide experience in the technical work connected with the development of all sections of an Electricity Supply Undertaking. Corporate Membership of the Institution of Electrical Engineers is essential, and preference will be shown to engineering graduates of a British University.

The person appointed will be required to prepare estimates, specifications and comprehensive technical reports covering a large amount of development work which must be undertaken, including loading and short circuit surveys and the study of alternative schemes for a superimposed 66/33 kV transmission system. Ability to investigate and report on the application of electricity to the air-conditioning and space heating of large buildings, including the use of heat pumps, will be an advantage.

The appointment, which is permanent, will be subject to the provisions of the Local Government Superannuation Act, 1937, and to a satisfactory medical examination. Candidates are required to disclose in writing whether to their knowledge they are related to any member, or holder of any senior office under the Council. Canvassing either directly or indirectly will be a disqualification. The Council are unable to make any arrangements for the provision of housing accommodation for the successful candidate.

Application forms for the above position may be obtained from the Engineer and General Manager, Electricity Department, 341/3, Holloway Road, London, N.7, and should be completed and returned to him, endorsed "Technical Assistant," not later than noon on Friday, 15th August, 1947.

W. ERIC ADAMS,

Town Clerk.

Town Hall, Upper Street, N.1.

CITY OF BRADFORD ELECTRICITY DEPARTMENT.

SUB-STATION MAINTENANCE ENGINEER.

APPLICATIONS are invited for the position of Sub-stations Maintenance Engineer.

Candidates must have had a sound technical training and experience in the operation and maintenance of manually and automatically-operated converting plant (both rotary and rectifier type), 6.6 kV and 33 kV switchgear, and transformers with automatic voltage control.

The salary and conditions will be in accordance with the N.J.B. Agreement, the salary being that attaching to Class H, Grade 10, which is at present £329 rising to £347 per annum.

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

Applications, stating age and giving full particulars of training and experience, accompanied by copies of two recent testimonials, and endorsed "Sub-stations Maintenance Engineer," should be sent to Mr. T. H. Carr, M.I.C.E., Electrical Engineer and Manager, 45-53, Sunbridge Road, Bradford, so as to reach him not later than 15th August, 1947.

W. H. LEATHAM, Town Clerk.

Town Hall, BRADFORD.

July, 1947.

SITUATIONS VACANT

APPLICATIONS are invited from suitably qualified candidates to fill temporary posts of Engineer Control Officers, Atomic Energy Research Establishment, Harwell, near Didcot, Berks.

Candidates, who must be natural born British subjects and born within the United Kingdom or in one of the self-governing Dominions, or parents also born within the United Kingdom or in one of the self-governing Dominions, should have served an apprenticeship in an engineering works and should either be Corporate Members of the Institution of Civil Engineers, the Institution of Mechanical Engineers, the Institution of Electrical Engineers or have passed examinations recognised by any of these Institutions as granting exemption from Section A and B of their examinations for Associated Membership.

The successful candidates will be engaged on the operation of heavy industrial plant with intricate control mechanism, and supervision and control of subordinate operating staff. Plant will be in continuous operation and successful candidates must be prepared to undertake responsibilities on shift.

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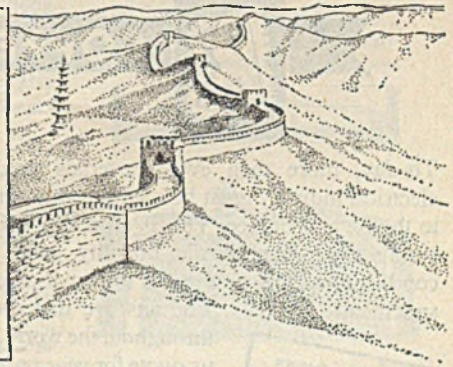
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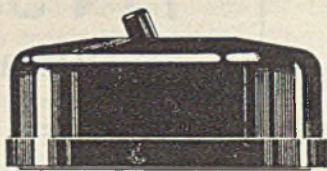
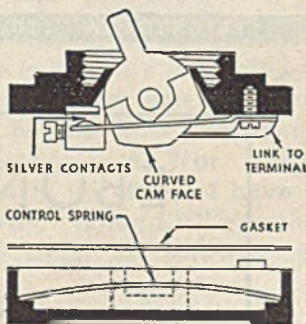
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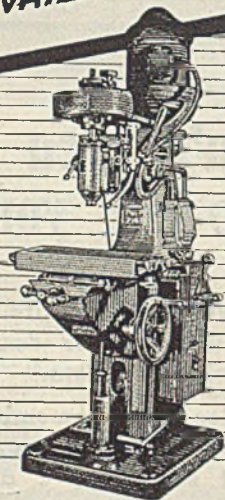
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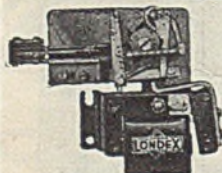


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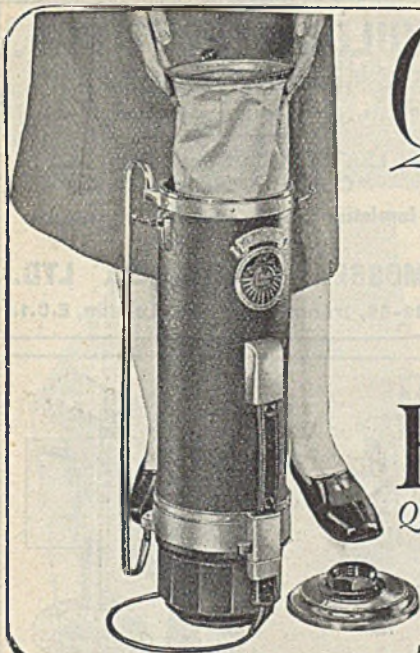
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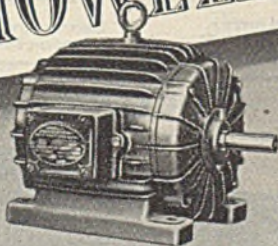
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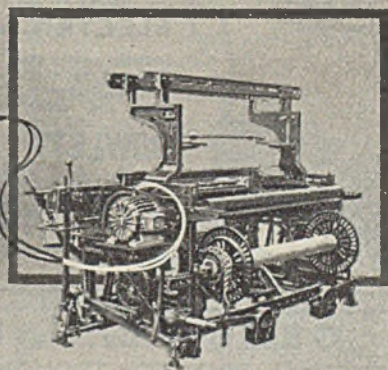


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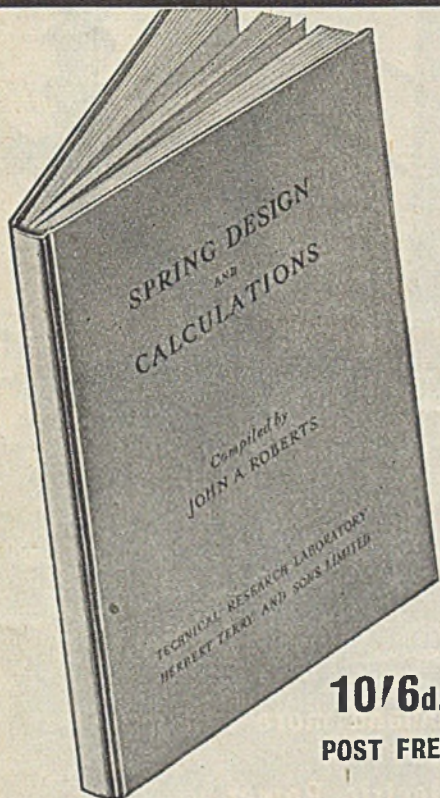
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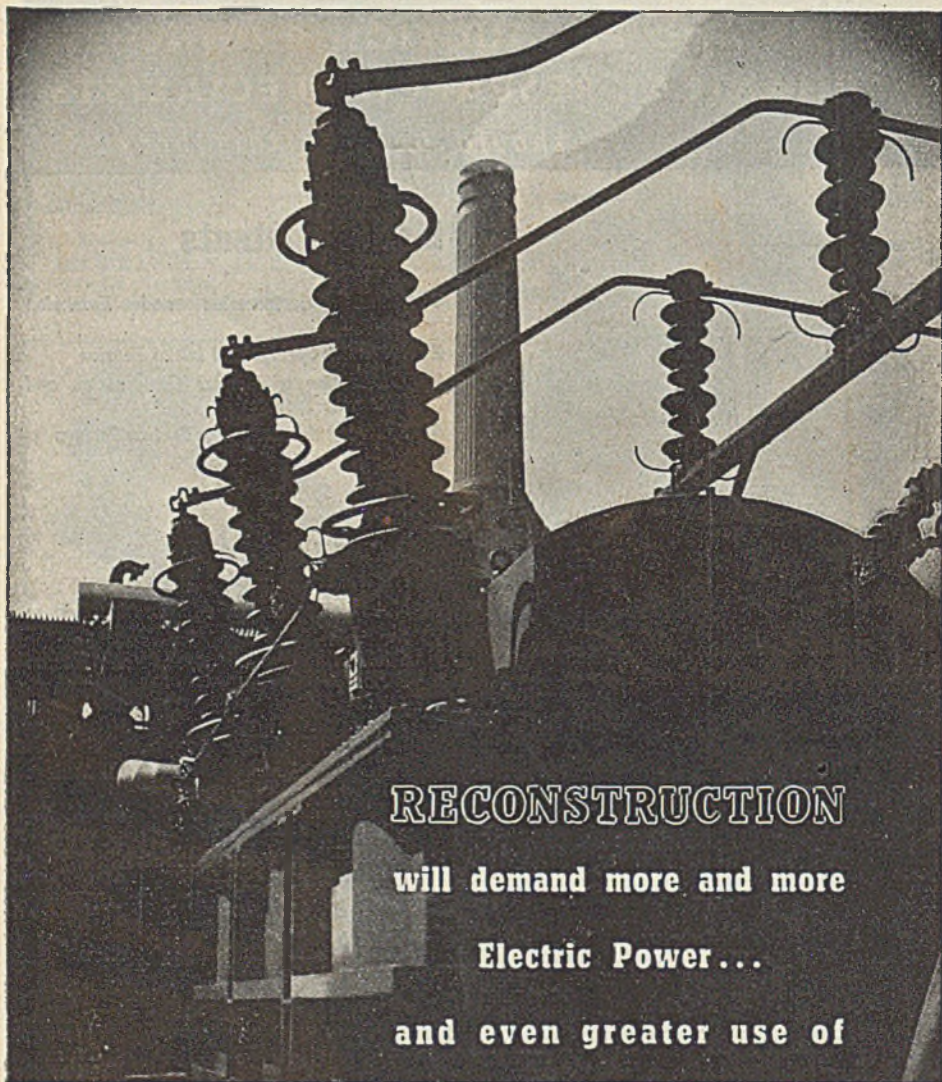
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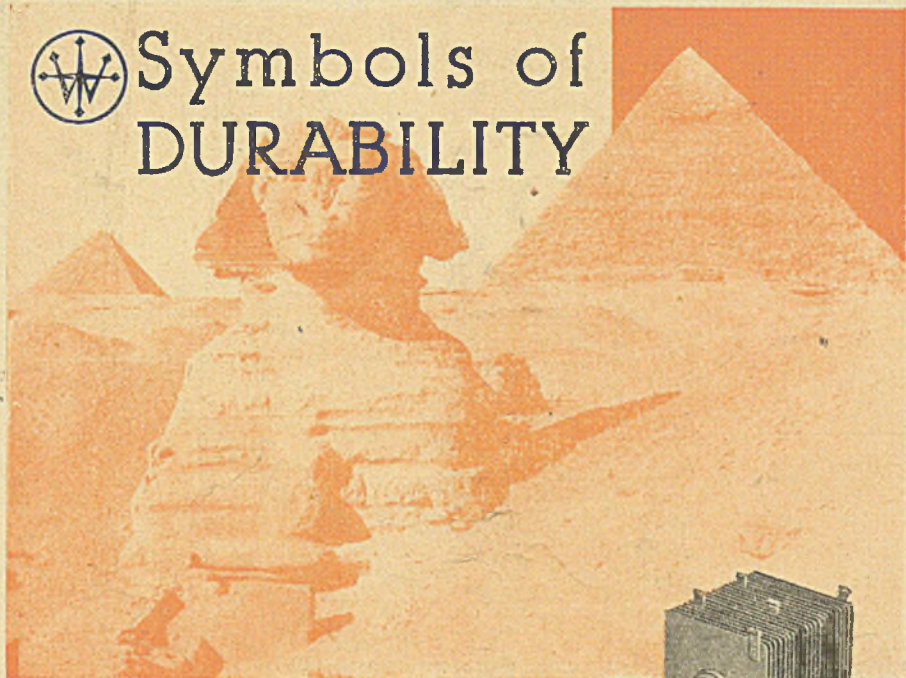
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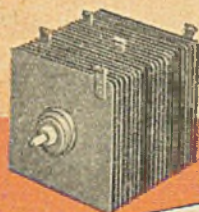


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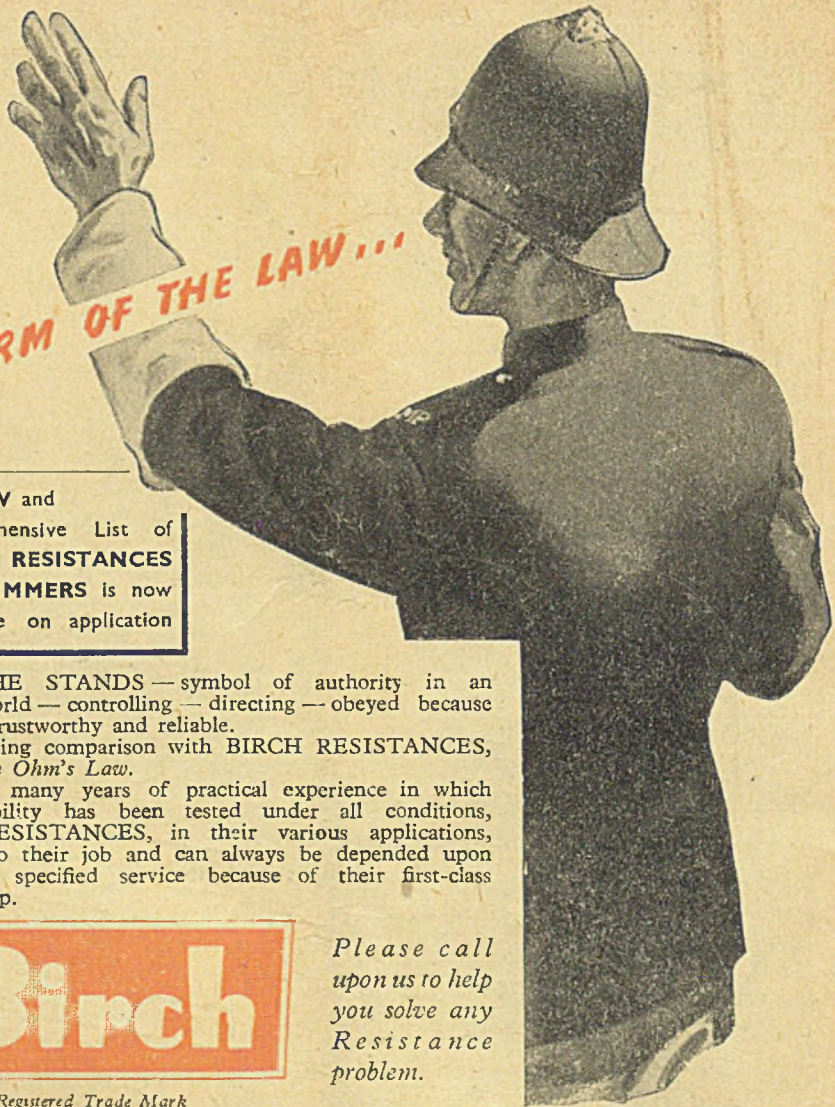


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