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THE

ELECTRICIAN

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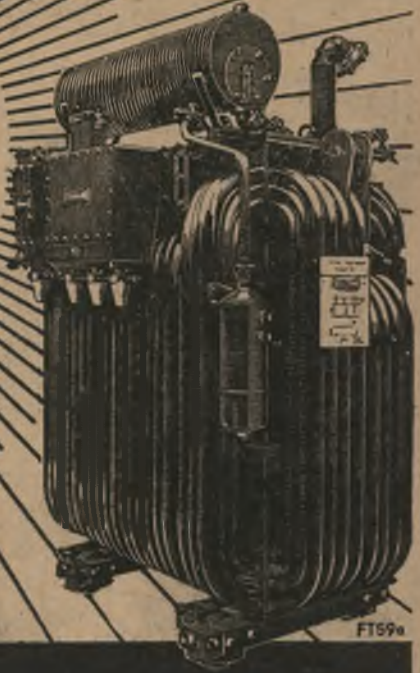
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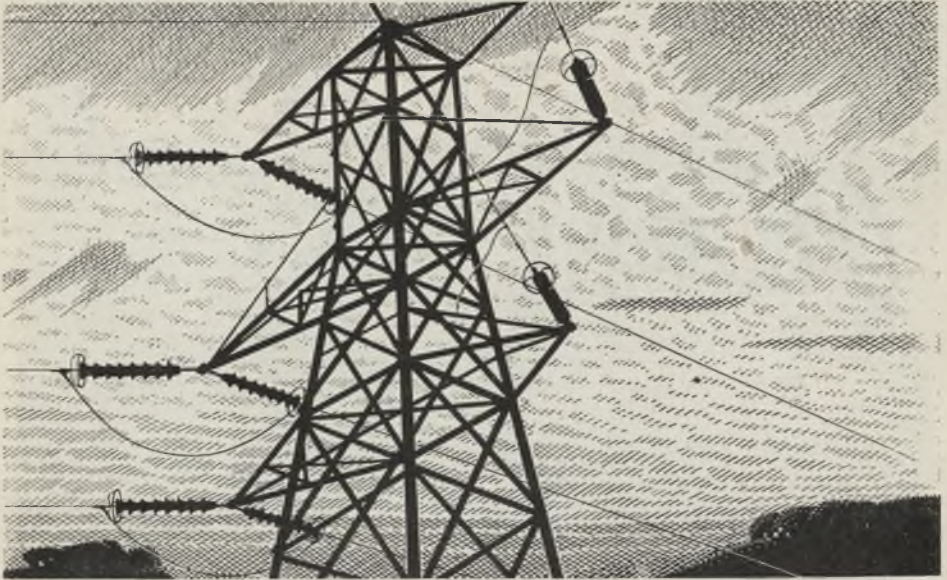
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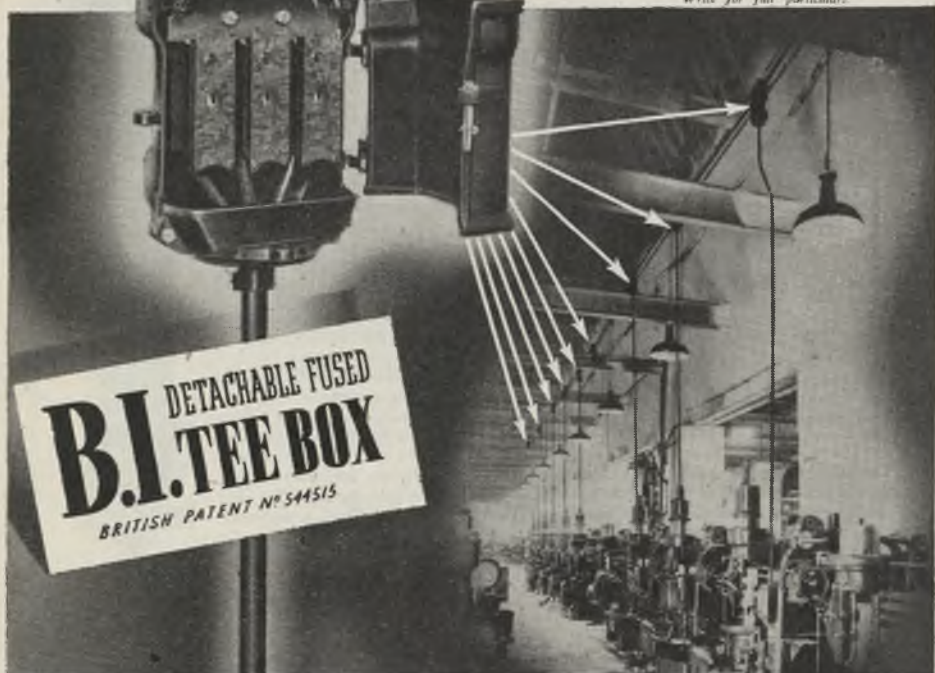
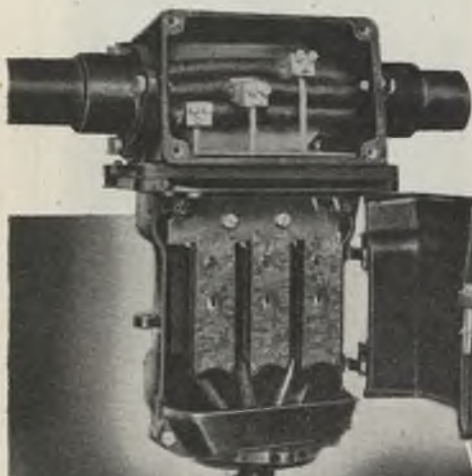
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At the age of thirteen he left school, and while serving his apprenticeship in a general machine shop, built two small upright steam engines, which later were used as the motive power in the firm's first factory. Coal and wood stoves were the early product of the company, but they soon realised the possibilities of cheap electric power. In 1913 they began the manufacture of electric cookers, being one of the first companies to enter this field.

Due to the limited market in Canada, Mr. Moffat and his brothers soon became aware of the necessity of developing an extensive export trade, and with his love of travel, "T.L." became the firm's ambassador abroad. But it was not

A reproduction of the painting by Kenneth Forbes, R.C.A., O.S.A., which was presented to Mr. T. L. Moffat by his employees, friends and associates on the occasion of his 75th birthday, November 11th, 1937.

until 1925, when he was over sixty years of age, that he made his first trip around the world.

By birth a Scot, by adoption a Canadian, Mr. Moffat is British through and through, and a staunch believer in the value of promoting reciprocal trade between the countries of the British Commonwealth of Nations. From the early years he has seen the Company gradually develop into one of the largest of its kind in the British Empire, with complete manufacturing plants in Canada and England.



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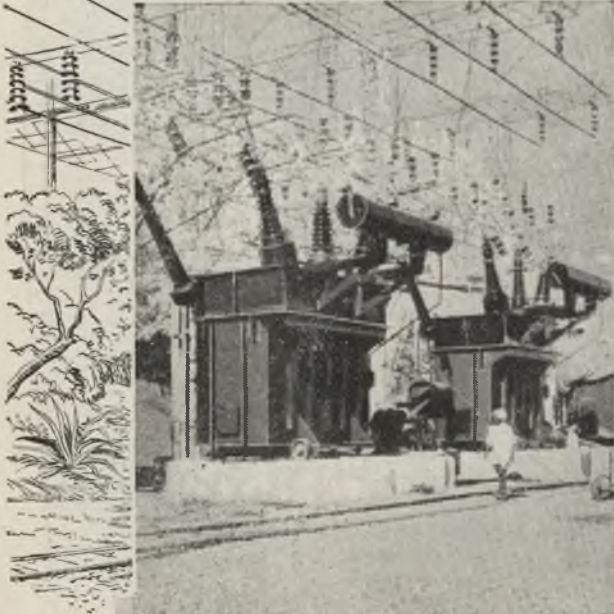
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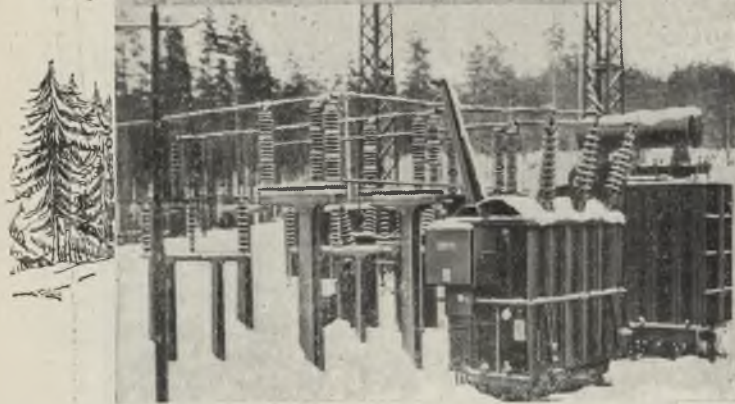
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Left: A "Metrovick" 110 kV, 3-phase outdoor transformer at a power station in Madras.



Left: A "Metrovick" 11,000 kVA outdoor transformer installed in Finland.



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WHAT ARE PLASTICS ?

Modern plastics are new non-metallic materials. They are not substitutes. While they possess certain common characteristics, they can be varied for different requirements.



FLASH-FAR-BACK

In 1865 Alexander Parkes produced celluloid. But the plastics idea was not new, for the Egyptians were on the scent in, perhaps, 1865 B.C. and have left in durable resin seals evidence of their success.



PLASTIKOS

The Greeks had the adjective 'plastikos' to describe the plastic quality, and the verb 'plasso' to form, to shape. But why 'plastics' when the articles are hard and rigid? Because, at certain stages the raw material is soft and workable like putty.

U E L
Present
PLASTICS
News Reel

NO.1

Many customers ask us to help them with their post-war requirements in Plastics. We are anxious to serve them, and the time to start planning the preliminary work is now.

There are designs and specifications to settle, tools to be made and sampled before production can start.

If you are ready to discuss your post-war ideas, our service* can help you. It includes designing, advice, manufacture of tools—everything short of immediate production.

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STRENGTH OF PLASTICS

Plastics can be as delicate as china or tough and durable. Most British War-planes are equipped with fabric-reinforced plastic pulleys which carry the control cables. These pulleys must never break down.



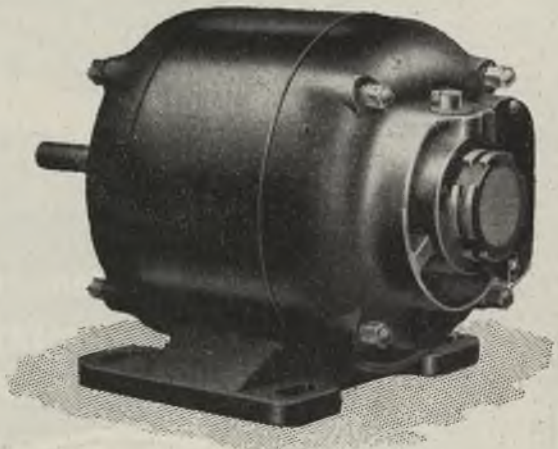
NO BURNT FINGERS

Plastic articles can be made that will resist heat. The handles of oven doors, for instance



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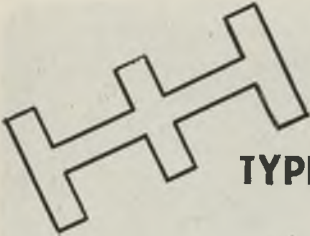
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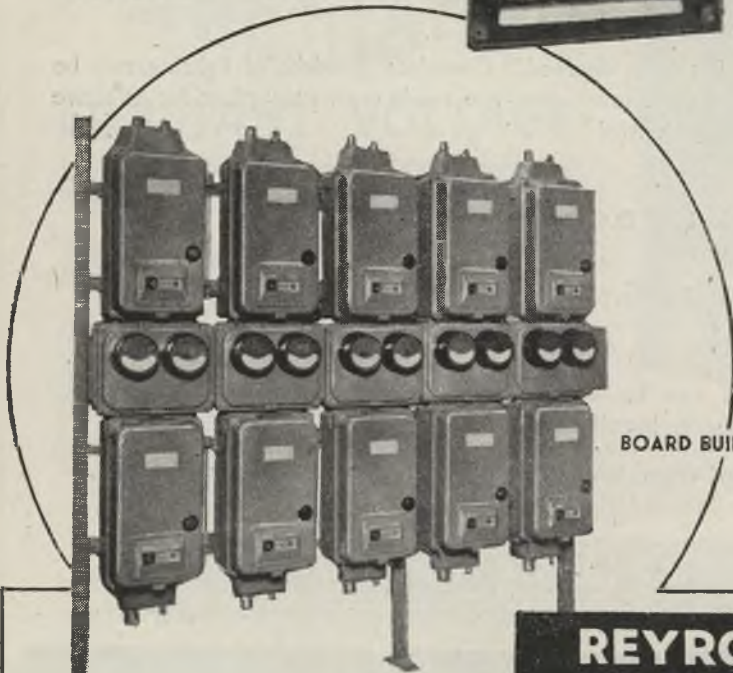
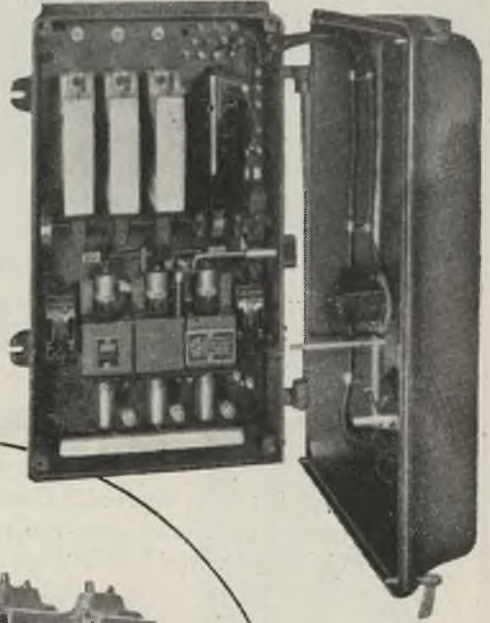
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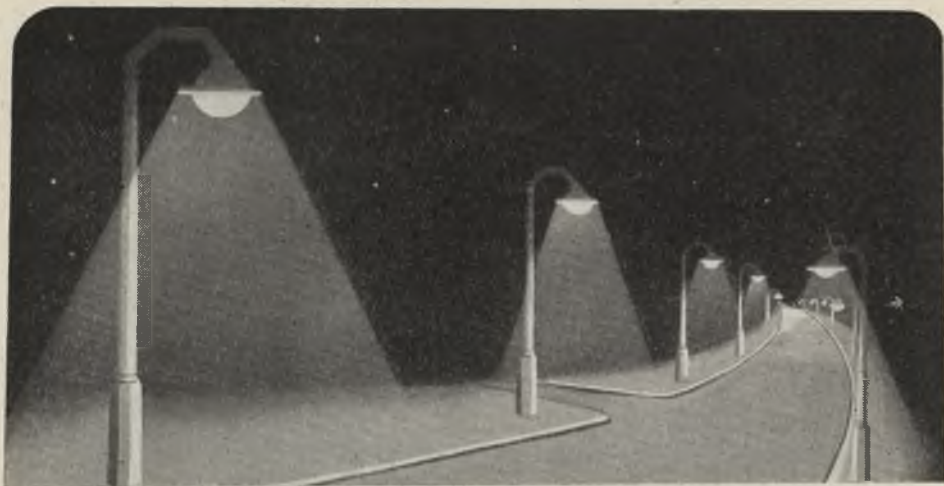
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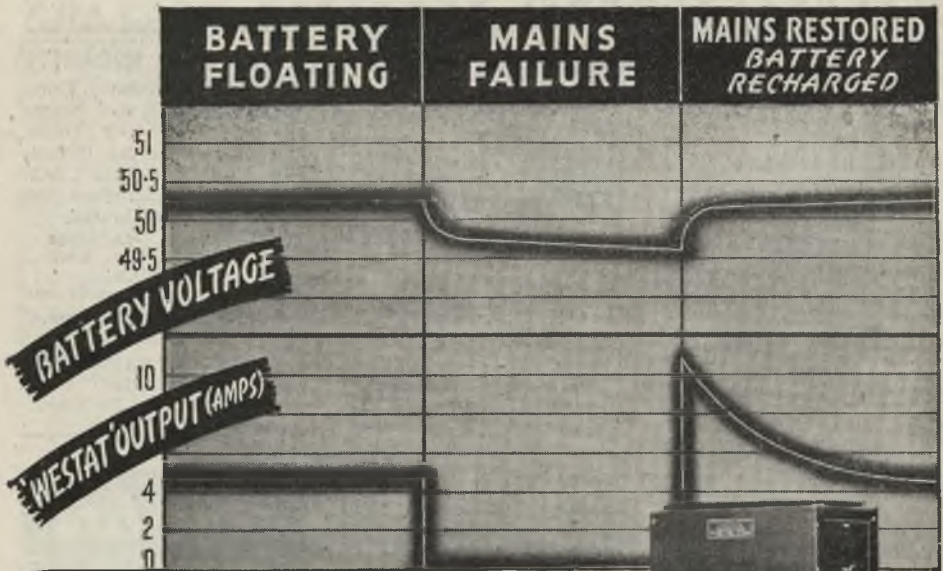
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Candidates need not be in possession of a University degree or other professional qualifications, although this is desirable, but they should possess technical qualifications at least up to the standard of Higher National Certificate.

(1) Electrical and Mechanical Engineers (Ref. No. C.2007A)

Considerable practical experience is essential and candidates are expected to be familiar with the maintenance of Medium or Heavy types of standard equipment. Applications will be considered from candidates experienced in any branch of electrical, mechanical or refrigerating engineering but greater emphasis will be laid on the candidates' aptitude to handle labour and improvise rather than on experience of precision work under factory conditions.

A general Engineering apprenticeship, followed by practical experience in one of the following branches, is desirable. Erection and maintenance of cold storage plants, general machine shops, large prime movers of all types, power distribution, etc.

(2) Mechanical Engineers for Port Maintenance and Inland Waterways, Transport Workshops, Royal Engineers (Ref. No. C.2008A)

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(3) Tyre Repair Specialists for R.E.M.E. (Ref. No. C.2009A)

Experience in the installation, maintenance and operating of modern tyre repairing machinery is desirable. Candidates must be capable of inspecting and conditioning tyres and tubes and have a thorough knowledge of tyre repairing, tyre capping and re-treading.

The final selection of candidates will be made as a result of an interview by a War Office Selection Board who may recommend accepted candidates either for a direct commission or for commissioning after a period of satisfactory service in the ranks.

Applicants should write quoting the appropriate reference number to the Ministry of Labour and National Service, Central (T. and S.) Register, Room 5/17, Sardinia Street, Kingsway, London, W.C.2, for the necessary forms which should be returned completed on or before 15th February 1945.

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Application forms and further particulars may be obtained from the Principal, Royal Technical College, Peel Park, Salford 5, Lancashire, to whom applications should be returned not later than 22nd January, 1945.

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January 5, 1945

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Overseas 30s.

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unavoidable delay of repair and maintenance work during the war. The maximum load which the supply system can carry with safety is something round about 8 400 000 kW, 70 per cent. of which is provided by industry and the rest by domestic premises, and it is when that amount of load threatens that the public warning will be given.

The position is aggravated by the fact that there are still many houses not yet repaired from bomb damage, while the coal cellars in those houses offer little hope of fires to keep out the cold. Unfortunately, a large number of the public still look upon the need for economy in fuel, too much in terms of coal, and regard electricity as something apart, or something which may in fact be used as an economical substitute for solid fuel. Supply authorities have done an enormous amount of work in trying to change this point of view but since those same authorities before the war put equal enthusiasm into their efforts to convince the public that electricity was the most efficient of all fuels, it is not unreasonable to suppose that a certain amount of confusion exists among many of the public, and electric fires are, in consequence, switched on without an understanding of their effect upon the nation's supply as a whole.

In the circumstances we suggest that in addition to any broadcast or national Press appeals, the public be advised through such bodies as the W.V.S. of the consequences of their failure to respond to any request for a lowering of their consumption, for such organisations, already fully aware through their incident officers of which domestic premises are damaged and most likely to increase their loading, have established personal con-

Electricity Overload

THE Minister of Fuel and Power has made it known that he will from time to time make a broadcast appeal to the public to be careful in the use of electricity, particularly between 8.0 a.m. and 10.0 a.m., and when such an appeal is made the position for that day will be critical. The appeal, we are informed, will not be given unless there is a danger of an overload, but in the absence of an immediate response to its warning there will be a discriminating cutting off of current in areas where the least injury will be done to war production. Already on two occasions this emergency method of preventing overload has been used and subject to weather conditions, it is feared that it may have to be repeated.

This condition of things is not so much the result of a shortage of coal in the supply industry, as difficult as that position may be, but is the cumulative effect of the greatly increased demand, especially for industry, without permitted generating plant extensions to keep pace with it, the continued use of old plant, and an

tact with the families in those houses, and knowing the circumstances in which they live, could suitably warn them.

A Double Handicap

SOME relief in the load would also be brought about by a more liberal distribution of coal, and in this connection the Ministry of Fuel cannot hope to escape criticism. It is irony enough that a country so rich in coal should be so short of it, but even more bitter is the fact that the Ministry which was formed to safeguard the interests of the fuel industries in general should not by now have found some solution to the major problem which brought it into being. There is no lack of coal in the ground, the trouble is that not enough of it is being brought to the surface. In all war industries except that concerned with coal, production has gone up, but in the pits output has gone down and down in spite of bigger wages, tempting bonuses and other inducements. The miners blame the owners; the owners blame the miners; the arguments between them seem to be interminable, and the coal industry thus remains, not the servant of the public it should be, but the plaything of all who are politically-minded. The result in effect is that the electricity supply industry is carrying part of the heating load which, in the absence of permitted extensions and repairs due to the war, should be met by coal.

Southend and the Tariff Question

NOT content with the apparent slowness in settlement of the post-war tariff question, Mr. A. C. JOHNSON, borough electrical engineer and manager at Southend, has designed for his own area, a system of charging intended to meet anticipated development. For the purpose of the tariffs, domestic premises comprise all residential property and all schools and boarding houses with assessments not exceeding £100, while all shops, hotels, offices, and so on, are regarded as business premises. Southend, like many another seaside town, has suffered from war damage and evacuation, with the result that the progress it was making came to a halt; recognising the cause of the set-back, however, Mr. JOHNSON, is of the opinion that progress will return and, with it, the public will be more electrically-minded than ever. In anticipation of the expected demand and in

order to be ready to meet it, Mr. JOHNSON holds the view that the time has now arrived for post-war planning to line up with the national demand for simpler and more uniform tariffs. The scheme he has developed involves a number of changes but he justifies them by the fact that they will bring about an annual saving to his department of £3 000, plus another £750 a year in the case of the borough treasurer's department.

Fluorescent Lighting

THERE has during the past year been plenty of evidence of the popularity of fluorescent lighting for industrial purposes, and the price reduction announced by the E.L.M.A. as operating with respect to the 80 W 5 ft. tubes as from January 1, will be generally welcomed. The opportunities of price reduction in these days are all too few to pass without creating a certain amount of comment, and that in the case of the fluorescent tube has conjured up pictures of large-scale installation work as soon as materials and labour become available. In this connection, a most useful application for this form of lighting will be found in drapery stores, and with so much rebuilding to be carried out in the country's shopping areas, the optimism which prevails may not be without foundation. Dentists, too, appear to view this type of lighting with favour and they are hopeful that fittings appropriate to their operating rooms may be forthcoming. The facilities for colour matching, at present enjoyed mostly by industry, would be especially welcomed by those whose dealings with the public are so personal that they concern clothes and teeth.

All-Electric Kitchens

THE all-electric kitchens which were the subject of a booklet issued by the E.D.A. last November, take material shape at the Building Centre, this week. The exhibits are full-scale models of the four designs described in THE ELECTRICIAN of November 17, and their display will to some extent overcome the depressing effect of the Ministry of Fuel warning with respect to a possible interruption of domestic electricity supplies. Closely associated with the kitchens exhibited, is the question of housing, and though everyone would wish that every

post-war house could include a kitchen of the type displayed, it must be recognised that not all housing committees are as electrically-minded as they should be, and that competing fuel interests will meet with at least, some success. In the circumstances supply authorities, electrical contractors and all others who have the interests of the industry at heart will see to it that the public is made fully conscious of the fact that the exhibition is staged for their enlightenment and to give support to their efforts in moving the housing committees in the direction they should go. Again, the war-time black-out in which the industry has been operating since 1939, has prevented the public from acquainting themselves with all the developments which have been made in the domestic sphere, and the exhibition presents an opportunity for a peep into the future.

Engineers' Appointments Bureau

THERE will be nothing but favourable criticism of the action of the I.E.E. Council to form what they call a Professional Engineers' Appointments Bureau, for the need of such a body has long been felt by the personnel of the industry. The difficulties in the past, difficulties in connection with the Royal Charter, have apparently been overcome in the manner outlined elsewhere in this issue, and there can be little doubt that the Bureau will be of most valuable assistance to those of the I.E.E. membership who, now in the Forces, will have no specific job to return to when they are demobilised or discharged. The operation of the Bureau, naturally enough, involves a certain amount of finance and we draw attention to the fact that in order to secure the necessary working fund to carry through the formative years, it has been agreed that appropriate letters of appeal be addressed to corporate members, among others, and to engineering organisations which will benefit from the operation of the Bureau. The body to be set up, it must be understood, will be distinct from the institution itself and its governing board will be made up of representatives of the Civils and Mechanicals in addition to the Electricals, which will in turn set up three committees concerned individually, but under the direction of the board, with appointments for civil, mechanical, and electrical engineers. The idea of the

Bureau, it is expected, will commend itself to everyone and its establishment is made in the confident hope that a generous response will be forthcoming.

New Year Honours

THE list of New Year Honours published this week contained a number of names of electrical interest, chief among which were Dr. A. P. M. FLEMING and Ald. W. WALKER who have been made Knights Bachelor. The awards are indeed well deserved for the work which Dr. FLEMING has done in the cause of education, and the concern which Ald. WALKER has shown for the development of electricity supply are both outstanding. Col. Sir STANLEY ANGIN, who did so much to maintain our communication system throughout the periods of bombing to which this country was subjected, and who to-day carries a big responsibility in maintaining contact with our armies' communication system, has been awarded a K.B.E., and those many brilliant technicians who developed our telecommunications will see in the award to their chief, some official recognition of the part they have themselves played in the maintenance of our communications. Other names of electrical interest are given elsewhere in this issue and readers will join with us in extending to all who have been honoured, every good wish and congratulations.

The Lighting of Buildings

THE Lighting of Buildings Committee before which a number of electrical associations presented evidence, have published their report as Study No. 12, after twenty-four meetings. The report which warrants careful reading, opens with a brief discussion of the principles of lighting and its influence on design, and its findings include many worth-while recommendations with respect to small dwellings. The Committee agrees with us that the lighting in many dwellings and schools is unsatisfactory, due very largely to the lack of recognised standards and means of adoption, and suggests that steps should be taken to ensure a wider understanding of available information on the subject. The report, which forms one of a series published by the Ministry of Works, also indicates a number of directions in which future research should be conducted, and these will be dealt with next week.

Economics of Coal Supplies

Standard Qualities and Relative Prices

SPEAKING at a meeting of the Fuel Luncheon Club at the Connaught Rooms on December 21, Dr. E. S. Grumell, who has been closely associated with the fuel efficiency campaign of the Ministry of Fuel and Power, discussed the problem of standard qualities of coal and reasonably relative prices.

He said he did not think it was generally recognised how flat rate increases had mounted up in recent years. The process had started before the war and such increases had completely upset the present relative values of coal.

Dr. Grumell then read two letters he had received—one from a colliery, and the other from a consumer. It was the same old story, he said. The producer did not know what he wanted, and certainly he could not plan until he knew what was going to be produced and at what relative prices. He did not think there would ever be a satisfactory answer to these questions until we faced up to a revision of the price structure and the selling of coal on relative values, as recommended by Lord Melchett's 1926 National Fuel and Power Committee. This was a problem which must be faced. It was part of what a past-president of the club—Col. Bristow—referred to when he said that the price of all fuels should be related to coal.

Forthcoming Conference

There were a host of technical developments which depended financially on the relative values of different kinds and types of coal, and this included the problem of coal preparation. It was not reasonable to expect the coal industry to clean coal unless it obtained a fair and stable relative price for its products. In this connection the Institute of Fuel had organised a conference, to be held in Manchester on February 28, at which it was hoped the coal industry would present a more or less true statement of the costs of cleaning coal, and to get a large number of industrialists to say what they really wanted in the way of coal. It seemed extraordinary that it was necessary to spend time, money and energy on continually adapting appliances, either for preparation or utilisation of coal, when a little commonsense would remove many of the difficulties.

The non-standardisation of the nation's most important raw material might really be considered as a huge joke, and it was impossible to build a sound, technical structure on unstable and constantly shift-

ing foundations. He hoped that the Ministry of Fuel and Power would do something towards giving us more standard qualities of coal and reasonably relative prices. It was no good saying it could not be done. It could be done. What was the good of spending millions sterling on education and science, if we could not apply our knowledge to the solution of a simple problem like this?

Reduced Consumption

As a result of everybody's efforts during the last three years we had reduced our fuel consumption by seven to ten millions of tons a year, which could be valued at something of the order of £14 to £20 million, and this had been achieved with, practically speaking, no capital expenditure. The majority of that saving would be permanent, although we would slip back on some of it; there was public lighting, for example, and in other directions we should lose a little after the war. On the whole, however, he thought a large proportion of the savings already made would be permanent, but that was only a beginning. Since licensing for new materials had been permitted within the last six months, plant to the value of £2 million had been licensed, which would save a further 500 000 tons of coal a year. Surely such savings enforced in war-time, indicated that there was something radically wrong with our industrial system before the war. Where was the fault?

A great deal of money had been spent on research, and no one would wish for one moment to suggest that long term research should be side-tracked, as some of it might be of great importance for future development, but had we not rather neglected the immediate dividend-earning potentialities of straightforward, if somewhat dull, fuel engineering, with which should be coupled administration and correct costing? In connection with the Manchester conference endeavours had been made to find out what it cost to clean coal, but so far they had not found a person who knew how to make a correct costing statement.

Post-war Transport.—Manchester's post-war transport facilities, including railway electrification, were recently discussed between a deputation, including representatives of Manchester's transport, town-planning, and reconstruction committees, and Sir Cyril Hurcombe, Director-General of the Ministry of War Transport.

All-Electric Kitchens

E.D.A. Models for Low-Cost Houses and Flats

FULL-SCALE models of the four all-electric kitchens—two for low-cost semi-detached houses and two for flats—designed by the British Electrical Development

war kitchen can be, but they give a clear indication of the trend of design.

Type No. 1 is a dining-kitchen, 14ft. 4in. by 9ft. 4in. (134 sq. ft.), with a laundry-utility room 6ft 6in. by 9ft. 4in. (60 sq. ft.), adjoining, for a semi-detached house. The main working part of the kitchen is "U" shaped, uninterrupted by doors, which facilitates food preparation. The sink is almost out of sight from the meals table.

The cooker is of the horizontal, or "buffet" type in which the oven is arranged alongside the hob and hot-cupboard unit. This avoids stooping and gives space underneath for the storage of saucepans and other cooking utensils. The refrigerator is of 4 cu. ft. capacity and is built-in at waist height. Described as "the people's post-war refrigerator," it has a compressor unit that is removable and interchangeable, the assumption being that this type will be standardised and mass-produced. Under the draining board is a 20-gal. electric water heater of the new two-in-one type, with 3 kW loading. Similar water heaters, cookers and refrigerators are installed in the other three kitchens.

The working area is lighted by two ceiling fittings placed on a diagonal line so as to avoid shadows, a separate light being provided over the meals table. Heating is by a 1 kW reflector type fire, fixed over the door from the living room, while a tubular heater, of 60 W per foot loading, near the floor under the window, serves as a supplementary source of warmth in the working area. Three utility plugs are spaced conveniently in the working area, one forming part of the cooker control unit. Every non-radiant heating apparatus has a pilot light.

The utility room contains cupboards for



Kitchen No. 1, with space for meals

Association, with the assistance of a panel of consultant architects and a member of the Electrical Association for Women, are now on view at the Building Centre, 23, Maddox Street, London, W. The plans were summarised in THE ELECTRICIAN of November 17, 1944.

It is pointed out that the models have had to be constructed with the materials available at the present time and, therefore, they do not fully represent what the post-



Drying cupboard with heating unit at base



Utility room, showing electric washing machine

cleaning materials and brooms, as well as a washing machine and a drying cupboard



No. 2 kitchen. Ample cupboard space is evident

large enough to deal with the whole of the family wash. When not in use the top of the machine forms an additional table. The electric drying cupboard, shown in the illustration, has at the base a 2 kW heater, protected with wire mesh, and operated by a control giving three heats. Another cupboard houses one of the new combined service units, with the supply intake and main fuse in the bottom compartment, the meter in the middle and the domestic fuses (of the cartridge type) and distribution box



The hand-made prototype electric cooker

in the top compartment. On the inside of the door is a wooden tray for spare fuses.

No. 2 design shows an alternative type of kitchen, size 12 ft. 4 in. by 9 ft. 4 in. (115 sq. ft.), for a small semi-detached house, in which meals are taken in a separate dining room, or dining recess off the living room. For the home-laundry there is a wash-boiler of 10 gal. capacity and 3.5 kW loading, under the draining board.

The lighting fittings ensure shadowless illumination of the working surfaces. A 1 kW electric radiator is mounted on the ceiling, and a tubular heater provides local warmth for anyone working at the preparation table and also dries tea cloths. Because of the proximity of the cooker to the living room door an extraction fan removes



No. 3 kitchen with heater under the window

odours and steam from this kitchen. There are three utility plugs in convenient positions in the working area.

The electricity intake and meter unit is intended to illustrate a compact design suitable for mounting inside a broom cupboard. The domestic fuses are of the cartridge type.

Model No. 3, size 11 ft. 9 in. by 7 ft. 6 in. (88 sq. ft.), is a dining-kitchen for a municipal type of flat of low rental.

The water heater is of 15 gal. capacity, which is deemed sufficient for a flat of this kind. For warming the kitchen an electric convector of 1 kW loading, is placed under the window as an alternative to the radiant heaters in the other models.

The design of No. 4 kitchen, size 8 ft. 9 in. by 7 ft. 9 in. (68 sq. ft.) is intended for flats of a higher rental than No. 3. Neither a wash boiler nor washing machine is included, the probability being that the tenants would use a public laundry service. There is a tubular heater, and a 80 W fluorescent tube, mounted longitudinally in the centre of the ceiling, provides the illumination.

What Manufacturers are Doing — II

New Developments in Switchgear—Control Board Components

DURING 1944 the factory of Ferguson Paulin Ltd., was again heavily loaded with commitments for small sub-station

the arc durations are consistently less than two half-cycles over the whole range of breaking circuits.

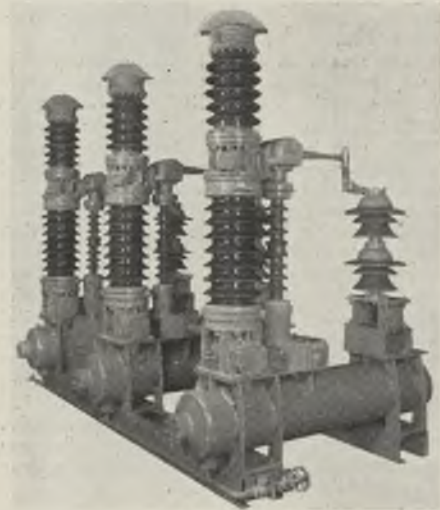


Fig. 1.— 66 kV Duo-Blast circuit breaker



Fig. 3.—General view of one of the 10 kV, 4 000A, breakers; rupturing capacity 1 000 MVA

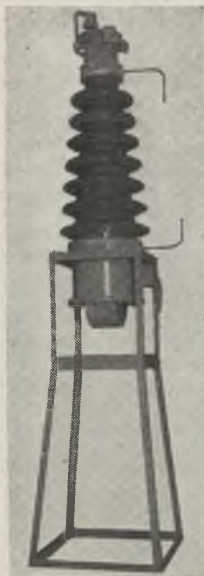


Fig. 2.—Outdoor wound, primary type current transformer for use on a 132 kV system, mounted on its stand

switchgear of standard designs, and the export market absorbed a considerable proportion of the output.

An interesting development was the completion of a design of outdoor "Duo - Blast" circuit-breaker for use on 66 kV systems and where high breaking capacity is required. Fig. 1 shows the breaker, which incorporates a set of double nozzles in the interrupter head; the air blast during circuit interruption being axial through the two nozzles. A full series of short - circuit type tests have been carried out, say the makers, and

Development and short circuit testing of other arrangements of air blast circuit



Fig. 4.—Portion of mimic diagram on control board, incorporating the type FLC switch

breakers was proceeded with and this development was extended to cover circuit breakers of the "Duo-Blast" type, for outdoor service on systems up to 220 kV. In order to be able to carry out satisfactory mechanical proving tests on air-blast switchgear in the factory, a special comprehensive compressed air supply system is being installed.

Another development was the manufacture of an outdoor wound primary type current transformer for use on a 132 kV system. Fig. 2 shows such a current transformer, mounted on its stand in order to give sufficient clearance above ground level.

The recently published programme of power station extensions throughout the country has already reflected itself in a number of orders, and during the year orders were received for 33 kV metal-clad switch units of the low oil content type for short-circuit ratings of 1 000 MVA and 1 500 MVA. Orders were also received for additional 132 kV switching stations.

The company's overseas business again included large contracts covering standard sub-station switchgear and also a number of high-breaking capacity outdoor circuit-breakers for 33 kV service in Australia. The overseas contracts included an order for a number of 4 000 A circuit-breakers for use on a 10 kV supply system having a short-circuit rating of 1 000 MVA, the

breakers to be mounted in cells. Fig. 3 shows a general view of one of these breakers, with one of the tanks lowered for contact inspection.

The company's RS rotary change-over switch was further developed during the year and designs are now available for carrying up to 60 A a.c. A similar design of quick make-and-break RS rotary switch was also developed for use on d.c. systems, and is capable of handling 10/25 A up to 600 V d.c.

The design of control boards for switchgear installation has been given some thought, the present tendency being to arrange a control board with flush-mounting instruments and having the mimic diagram arranged at eye-level, with the small control switch located in the line of the mimic diagram. The type FLC control switch was developed for this purpose, incorporating the red and green indicating lamps in the handle of the control switch itself. These lamps are arranged to flicker on turning the control switch for the next operation, and it is then necessary to press and further turn the switch through 45°, to complete the control operation, after which the switch handle indicates the new position of the circuit-breaker and the lamps are steady. Fig. 4 shows a portion of mimic diagram on a control board incorporating this type of control switch.

Distribution Scheme for Morar Area

THE district between Mallaig and Kinlochailort in the County of Inverness is to be supplied with electricity under Distribution Scheme No. 2—Morar Area, published on December 28, by the North of Scotland Hydro-Electric Board. The scheme has been approved by the Electricity Commissioners.

An electric line is to be run from Mallaig, passing through Mallaig, Morar and Arisaig to Kinlochailort; and another line will be run along the northern shore of Loch Morar to the communities at Bracora and Bracorina. Within reasonable economic limits, all premises in the area of the scheme which are situated a short distance from the electric lines will be connected without charge so long as applications for supplies of electricity are made when the works covered by the scheme are being carried out. It will not, however, be possible to deal on this basis with the more remote premises for it would be too expensive to do so, but other means of giving supplies to such premises are being investigated.

Electricity will be generated at the Morar power station. It is included, along with two other projects, in Constructional Scheme No. 1—the subject of an inquiry

which began on December 27 in Edinburgh to consider objections to the scheme. Supplies should be available in 18 months or two years from the commencement of work on the Morar power station and Morar distribution scheme. Progress must depend on war conditions and is subject to the labour and materials being available.

Subject to regulations to be made by the Secretary of State the Board hope to adopt the same domestic tariff in the Morar area as in the Lochalsh area, as follows:—The first 30/36 units per room per annum 5d. per unit, the next nine times that number ½d. per unit. The works carried out after the war may prove to be costly, but the Board hope that they will be able to sell all units in excess of the above amounts at ½d. per unit. Under the tariff, consumers will, in effect, pay 5d. per unit for their lighting requirements, ½d. per unit for cooking, ironing, etc., and possibly ½d. per unit for room heating and water heating. This tariff will compare favourably with the cost of lighting and heating by other methods.

The fishing industry is important to Mallaig, and attractive rates will be offered for power supplies of electricity for this and other light industries.

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. C. B. Kingsford, manager of the switchgear sales department of the British Thomson - Houston Co., Ltd., has retired after 42 years' service, and at a recent meeting at the Willesden switchgear works, he was the recipient of a gift from his friends and colleagues. Mr. Kingsford is succeeded by **Mr. L. Drucquer**, who, after experience in the test and outside construction departments, joined the switchgear sales department in 1925, and subsequently became assistant manager.



Mr. L. Drucquer

In the New Year Honours list published on Monday, there appeared, among others, the following names of electrical interest:—

Mr. P. Boswell Brown, chairman and managing director, Hadfields, Ltd.; **Prof. James Chadwick**, F.R.S., Liverpool University; **Dr. A. P. M. Fleming**, director Metropolitan-Vickers Electrical Co., Ltd.; **Mr. A. C. Macdiarmid**, chairman and managing director, Stewart and Lloyd, Ltd.; **Alderman W. Walker**; and **Prof. E. T. Whittaker**, F.R.S., Edinburgh University, who have all been made knights bachelor. **Col. (temporary Major-General)**



Dr. A. P. M. Fleming



Ald. W. Walker

D. R. Duguid, late R.E.M.E., has been awarded a C.B. (military division); **Prof. A. N. Whitehead**, F.R.S., an O.M.; and **Mr. E. A. Berthoud**, temporary assistant secretary, Ministry of Fuel and Power, has been made a K.C.M.G. **Mr. N. F. Frome**,

D.F.C., additional chief engineer, construction, posts and telegraphs, New Delhi, has been awarded a C.I.E., while other awards included **Col. (temporary Brigadier) Francis Cockburn Curtis**, Royal Corps of Signals, a K.C.B.E. (military division); **Major (temporary Lt.-Col.) F. W. Schlesinger**, R.E., an O.B.E. (military division).

Col. Sir Arthur, Stanley Angwin, engineer-in-chief, General Post Office, and **Mr. R. N. Duke**, joint deputy secretary, Ministry of Fuel and Power, K.B.E.

Mr. Basil E. Nicolls, senior controller, B.B.C., and **Mr. A. Johnson**, general manager, Post and Telegraph 'Phones, Calcutta District, C.B.E. **Mr. H. H. Manson**, director, electrical department Bahamas, O.B.E.



Sir Stanley Angwin

Awards of M.B.E. have been made to **Mr. W. Allsup**, electrical adviser and chief inspector of factories, Shillong, Assam; **Mr. M. D'Souza**, chief superintendent, Central Telegraph Office, Bombay; **Mr. J. R. Holme**, assistant executive engineer (underground cable department), Calcutta Telephone District, Calcutta; **Mr. A. E. Lomas**, operating engineer, Bombay Telephone Co., Ltd., and **Mr. G. W. Russell**, technical adviser on posts and telegraph equipment, Master General of the Ordnance Branch, General Headquarters, India.

Mr. G. Crockford Wood, deputy assistant engineer, Trunk Controller Telephone Exchange, New Delhi, has been awarded a B.E.M.

The second section of the New Year Honours list published on Wednesday, included the names of **Mr. M. T. Greenwell**, assistant general secretary of the Electrical Trades Union; **Mr. W. T. James**, director of a number of road passenger transport companies associated with the British Electric Traction Co., Ltd.; and **Mr. F. C. Williams**, principal scientific officer, Tele-communications Research Establishment, Ministry of Aircraft Production, who have all been awarded O.B.E.'s.

Mr. James Williamson has resigned his appointment as chief engineer and director of Sir William Arrol and Co., Ltd., as at

December 31, and **Mr. Gilbert Roberts** has been appointed to succeed him. **Mr. Williamson**, who was a member of the Cooper Committee, which reported on hydro-electric development in Scotland, is to act as one of the civil engineering consultants for several of the proposed hydro-electric schemes.

Recently, some 130 colleagues and friends of **Mr. A. E. Noakes**, of the chief accountant's office, held a social evening at the English Electric Association Hall, Stychfields, to mark his retirement at the end of the year after 44 years' continuous service with the English Electric Co., Ltd., and its predecessor, Messrs. Dick, Kerr and Co., Ltd. **Mr. R. E. Henderson** (chief accountant's office) presided. **Mr. A. G. Brown** (chief accountant) on behalf of the company, presented the long service testimonial to **Mr. Noakes** in appreciation of his loyal and faithful service, and **Mr. H. Dingle** (secretarial department) handed to his old colleague a wallet of notes which had been subscribed by the many friends and fellow workers of **Mr. Noakes**. **Mr. Noakes** expressed his heartfelt thanks for all that had been said and done that evening, and to their chairman, **Sir George Nelson**, and the directors for the pensions scheme which had made his retirement possible.

Sir Murray Morrison, managing director of the British Aluminium Co., Ltd., is retiring from that office as from March 30 next. **Sir Murray**, who will complete 50 years' service with the company in February, will remain on the board. **Mr. Geoffrey Cunliffe** (now general manager) and **Mr. George Boex** (now technical manager) have been appointed to succeed him as joint managing directors.



Dr. Whitney shaking hands with Mr. E. B. Wedmore after the presentation ceremony

We gave in our last issue a brief account of the proceedings in connection with the presentation to **Mr. E. B. Wedmore** by the staff of the E.R.A. and we reproduce on this page a photograph of **Mr. Wedmore** receiving the illuminated address from **Dr. W. R. Whitney**. Those who paid tribute to **Mr. Wedmore**, in addition to those named last week, were **Miss E. Ryan**, **Miss E. Cox**, **Miss Bellringer**, **Mr. H. M. Lacey**, **Dr. H. G. Taylor** (ex-staff), **Mr. L. H. Daniel**, **Mr. A. E. Tooke**, **Mr. F. J. Adams**, **Mr. R. A. McMahon**.

Obituary

Mr. J. McKie Dewar, chairman of Chadburns Liverpool (formerly Chadburn's



Mr. A. E. Noakes receiving English Electric long-service testimonial, left to right: Messrs. R. E. Henderson, A. G. Brown, A. E. Noakes and H. Dingle

(Ship) Telegraph Co., Ltd.), and of Peruvian Associated Gold Mines, on December 29.

Mr. H. G. Hughes, aged 67 years. He was for many years with Siemens Brothers Dynamo Works, Ltd., and subsequently joined the English Electric Co., Ltd. The latter part of his business career was spent with the E.R.A. and, after retiring in 1937, he devoted much time to the E.I.B.A. as a voluntary worker. On the outbreak of war he took up war work in Coventry, with **H. M. Hobson, Ltd.**, and was active to the last.

Mr. C. R. Riber, formerly of the apparatus department of Siemens Brothers and Co., Ltd., on December 17. He entered the service of Siemens Brothers and Co. on December 1, 1907, as factory manager of the apparatus department. At the close of the last war he was appointed manager of all engineering departments. **Mr. Riber** retired at the end of May, 1940. He was the father of **Mr. W. W. Riber**, of the Temple Electrical Co., Ltd.

Sir Charles S. Swan, chairman of Swan, Hunter and Wigham Richardson, Ltd., shipbuilders, aged 72 years.

Loch Sloy Scheme

Public Inquiry into Objections to North of Scotland Project

EMPHASIS was laid on the urgent national necessity of the Loch Sloy hydro-electric project when Mr. John Cameron, K.C., opened at Edinburgh, last week, the inquiry into objections to the first constructional scheme of the North of Scotland Hydro-Electric Board, covering the projects at Loch Sloy, Loch Morar, and Lochalsh.

The principal objectors are Dumbarton C.C., on whose behalf Mr. L. Hill Watson, K.C., appearing with Mr. J. F. Gordon Thomson, at the outset urged that the inquiry should be postponed for at least a month on the ground that objectors had not had proper time to consider the effect of an alteration in the situation of the proposed power station on Loch Lomondside to a point approximately half a mile south of the original site.

Mr. Cameron repelled the objection.

The County Council's principal objection was that Loch Sloy and its catchment area have been earmarked by the Council as a potential source of water supply for the county. They urged also that the generating station and other works at Loch Lomond infringe planning proposals and that any shortage of power in Central Scotland could be met more efficiently by a steam station.

The Dean of Faculty (Mr. R. P. Morison, K.C.) and Mr. R. H. Sherwood Calver represented the North of Scotland Hydro-Electric Board.

Mr. Morison, for the Board, emphasised their duty to afford supplies, which must inevitably be uneconomic, to rural areas in the North. It was from the big stations from which energy was to be sold to the Central Board that a profit would be made, and it was that profit which would permit of electricity supply to the ordinary consumer in the uneconomic districts.

The Loch Sloy scheme was intended to be developed in mountainous country west and north of the upper end of Loch Lomond. In the whole of the catchment area there were no houses, and there was no cultivated ground.

Advantages of Site

Loch Sloy itself was 780 ft. above sea level, and that high head of water, with the heavy precipitation caused by the high mountains in the vicinity, made the site particularly favourable for the production of electricity by water power.

The proposal was to take the water from the reservoir to the power station by a two-mile tunnel through Ben Vorlich, from the mouth of which it would be led

to the power station in steel piping. The only visible works would be the power station and the steel pipe lines.

There would be a change of site of the power station to about half a mile south of the original site. The new site would involve tunnelling under the railway, and it was understood that there was no difficulty so far as the railway company was concerned.

Output Figures

After meeting possible local demands for energy—and these would probably be relatively small—the output from the station would be transmitted to the Central Board system at or near Glasgow. The output at Glasgow would be 105 000 kW.

It was possible, the Dean went on, that a large proportion of the energy received by the Central Board would go back to Dumbartonshire through their system and possibly through the Clyde Valley system as well.

The Central Board were anxious to take this energy, because there was a possibility that the future demand for electricity supply could not be satisfied if the energy to be generated at Loch Sloy was not made available.

The cost of the scheme was estimated at £4 100 000, and at that figure it was believed to be financially and technically sound.

The main objections came from Dumbarton C.C., and they stated that the scheme was not in the public interest because Sloy should be reserved for water for primary purposes. The most careful survey by experienced water engineers showed that there were ample supplies, apart from Sloy available for domestic primary purposes and these other supplies were of better and cheaper water. If at some time in the distant future a supplement was necessary from Sloy, it would be possible to put a pipe in the dam. Each million gallons of water not used for hydro-electric purposes, the Dean declared, would mean a loss of 1 000 000 kW. If 10 000 000 galls. of water per day were given off from Sloy for other purposes, that meant a loss of £30 000 per annum of revenue.

At the moment some 30 000 people in Dumbartonshire consumed 2 000 000 gal. of water a day. The capacity of Sloy was 18 000 000 gal., less any compensation water that might be given off. It would be a sheer waste of resources in those circumstances to reserve Sloy.

The Earl of Airlie, chairman of the Board said that there was a pressing need for

increased electricity supplies throughout Scotland, and Loch Sloy would provide a substantial supplement to existing supplies.

Mr. J. D. Peattie, of the Central Electricity Board, said in evidence that they welcomed the proposal to buy power from the Loch Sloy scheme, and viewed any delay with considerable concern.

Cross-examined by Mr. Hill Watson, Mr. Peattie said that his Board's consumption in Central and South Scotland in 1938 was 580 000 kW, and they estimated their consumption in 1947 at 868 000 kW.

They hoped to get from extensions at Bonnybridge and Glasgow 19 000 and 90 000 extra kW respectively, and from Loch Sloy roughly 100 000 kW.

Mr. A. E. MacColl, deputy chairman and chief executive officer of the North of Scotland Hydro-Electric Board, in reply to questions, said that at the moment there was a shortage of electrical energy throughout Britain which might become acute if "Single Summer Time" during the winter months was abandoned.

Mr. MacColl went on to give detailed comparisons, adjusted so as to be strictly comparable, of costs of production at Ironbridge, in the Midlands, and at Loch Sloy. The cost at Ironbridge on a two-part tariff was £2 12s. 4d. per kW and .235d. per unit.

The figures for Sloy would be £2 0s. 11d. per kW and .0325d. per unit. On a two-part tariff, witness added, costs in the case of a steam station built at to-day's capital expenditure of at least £30 per kW would be £3 18s. 5d. per kW and .163d. per unit.

Mr. S. B. Donkin, consulting engineer and senior partner of the firm of Messrs. Kennedy and Donkin, and one of the five technical advisers to the Board, said that if work were put in hand at the beginning of next month the Sloy scheme could be completed from the electrical and mechanical point of view by 1947.

Mr. James Williamson, chief engineer of Sir Alexander Gibb and Partners, and another of the Board's technical advisers, said that three factors at Loch Sloy—large storage, a high head of water, and a high rainfall—made a very good combination for the production of hydro-electric power.

Questioned about the two sites of the power station, Mr. Williamson said that from the point of view of amenity the original viaduct site had certain advantages. There was nothing to choose between the viaduct site and the one now chosen, so far as the length of tunnel and pipe lines was concerned.

The inquiry was in progress when we went to press.

Professional Engineers' Appointments Bureau

TO meet the needs of professional engineers who are seeking appointments, and of employers who have vacancies on their technical staffs, an organisation to be known as the Professional Engineers' Appointments Bureau is, according to the I.E.E. Journal, to be set up shortly.

The Council of the institution, it is stated, are of the opinion that an efficient bureau of this kind can play an important part in the resettlement of professional engineers, whose normal channels of work have been deflected by the war, particularly if it is administered and guided by persons who have detailed knowledge of the practical problems that will be encountered in bringing together applicants suitably qualified and employers with corresponding needs.

While problems touching the employment of engineers, either individually or collectively, are not part of the function of the institution under the Royal Charter, it has been established on high legal authority that it is not improper for the Council to take an interest in the affairs of a body distinct from the institution and constituted as a separate entity, by nominating to its governing board such engineers as the Council may select.

The Governing Board will consist of 15 members, namely the Presidents and Secretaries for the time being of the Institutions

of Civil, Mechanical and Electrical Engineers and three members from each of their Councils, to be appointed by the Councils annually, and steps will be taken to secure the retirement in rotation, in the usual manner, of these nine members.

For carrying out and guiding the general work of the bureau, the board will appoint three committees which will be concerned individually, but under the direction of the board, with appointments for civil, mechanical and electrical engineers. Each committee will consist of the five members of the board who are nominated by the council of the institution concerned or who are its *ex-officio* members, together with six additional members also nominated by the council of that institution.

The objects of the bureau are briefly as follows:—To receive inquiries from employers and to seek to meet their needs. To receive applications for registration for employment from engineers who, by reason of their qualifications, are members of the Institution of Civil, Mechanical or Electrical Engineers, or from persons whose engineering qualifications for election or admission to one of those bodies have been approved by the respective councils. To keep lists of organisations willing to receive engineering pupils, apprentices, or assistants under agreement. To give advice generally in matters relating to the employment.

Psychology of Electrical Trade

By FRANCIS G. W. TREE, A.M.I.E.E.

A CONSENSUS of opinion reveals a general expectation of an unprecedented demand for post-war electrical equipment, and there is little doubt that the electrical trade is likely to enjoy a relatively easy transition to peace-time pursuits. But, unfortunately, this general anticipation is sowing the seeds of those apathetic weeds which in former times hampered electrical progress, and certain commercialists are fostering wishful thoughts of a public demand, unrestricted by counter interests. Even to-day, many in the electrical trade are wearing blinkers, in supposing that the merits of electrical devices are in themselves sufficient to promote a wholesale public demand; whereas, the public mind is by no means wholly convinced of the true worth of electrical equipment.

Competition Set by Other Services

Indeed, if only because of high purchase costs, the public mind still prefers to enslave human life, rather than eat into financial resources. Furthermore, in spite of certain post-war plans for all-electric houses, other interests have already exercised a considerable bias, and have affected the assurance of a vast number of dwellings being far from totally electric. By the plans of various housing authorities, many homes of the future will have scanty provision for conversion to all-electric dwellings, even though subsequent occupants may desire full electrical service. Thus it is that the electrical trade must wisely anticipate having to oppose contemporary interests and to capture the market by every available approach.

The general Press and shop windows are obvious means of bringing commodities to the notice of the public, but contemporary interests are equally aware of these facilities. It is, therefore, necessary for commercialists of the electrical trade to resort to some mode of approach capable of creating a predominant interest in electrical devices, and it is suggested that the psychological medium is the most likely to gain that interest.

It is not the purpose of this article to give a study of the fundamentals of human instincts and psychology, but rather to stress those angles of approach which so largely govern public reaction. Consider, for the moment, the general public response to advertisement. In itself, human interest in advertising springs from the inherent instinct of self-preservation, and it is the basic instrument by which the individual opposes competition. Good advertisement

is both good defence and attack, whether in ordinary personal pursuits or in commerce. The intelligent member of the public appreciates good advertising as something akin to his or her make-up, and consequently, the public mind is quick to sense faulty approach. For instance, the average person abhors propaganda and has a thorough distaste for catalogued statistics. Alternatively, the average person appreciates a pictorial illustration, because it is commonly assumed that "the camera cannot lie" and the message of the picture seems the better in consequence. This is not intended to show favour to pictorial illustration, but simply to emphasise the relative influences upon the public mind. Applying this in a more practical form, the average person is not impressed by a mass of figures concerning electrical devices, but is very concerned with how the devices can improve personal circumstances. Thus, to state that "so and so" electric cooker is a statistical proposition par excellence is less likely to encourage purchase than an intimation that the elimination of shrinkage of food resulting from the use of the cooker, means "two meals for the price of one." The latter assertion is not intended to imply, that half truths or complete untruth should be used in preference to statistical facts, but is quoted to show the relative impressions made by the two modes of advertisement.

Choice of Words

Consider the psychological effect of the commonplace advertising caption "We *keep* electrical goods" as compared with "We *sell* electrical goods," and it is at once apparent, that the use of the word "keep" is ill-advised.

That the electrical trade mind is somewhat lacking in apt approach is evidenced all too often; and only recently, at a meeting of a professional body, an electrical engineer seriously recommended that the modern electric cooker should be fitted with a canopy and an exhaust fan to remove the "unwanted" food vapours from its oven. Without discussing whether or not such food vapours are undesirable, it is surely apparent that the introduction of a canopy cum exhaust fan electric cooker would so closely resemble the other forms of cooker we have so long deplored, that, the public mind would be justified in regarding the product as a throw-back to the dark ages. Surely, with such a suggestion coming from an engineer of learned standard, there is room for psychological improvement in the trade mind. It is commonly said, that the

public want service not sales, and this is intended to emphasise that service to the public is more important than sales statistics. Within certain limits this is true and flaunting "testimonial" advertisements is not impressive; they should be used judiciously as a background for more tangible facts. For instance, there is little interest to the public mind, that seventy-five per cent. of twelve million homes are electrically illuminated; whereas, it certainly is interesting that during the quarter of human lifetime under artificial light only some nine pennyworth of every £1's worth of light is usefully employed. It is even more interesting if the latter statement is followed by an appropriate illustration of how modern electric illuminants can give better light and minimise the financial cost. Thus it is, that the electrical trade advertisements of the future should not be a catalogue of figures, but should evidence in word and in picture those easy to comprehend features which demonstrate the advantages of using electrical devices.

Positive Suggestion

Apart from the direct style of approach, the appeal should be positive and not on the line, "Why not use our electrical equipment?" In asking such a question, one gives rise to all kinds of arguments and answers, and the public mind becomes confused rather than attracted. Avoid the negative appeal, and state boldly "You need our electrical equipment," followed by appropriate details telling the benefits of usage. Similarly, every effort should be made to avoid those passive advertisements which do nothing but cause the ejaculation "How nice!" and one cannot but wonder—how nice for whom? To be effective, an advertisement must be subtle in its suggestiveness and effective in its persuasiveness. As a guiding example, no man wants to tire his wife at a wash-tub and no woman can beautify herself with a mop; whereas, the electric washing machine and the floor cleaner will give beauty by labour saving. Perhaps not a good example, but sufficient to emphasise the point in debate. Finally, whatever the form of advertisement, it must be sympathetic and scientifically appropriate to the market. Incidentally, it must be qualitative as well as quantitative, although quantity in itself seldom suffices to capture interest. The qualitative statement directs the person whose interest has been attracted; whereas, it generally requires the quantitative, namely—reputed advertisement, to arouse the mass mind to an awareness of the full need. Briefly, the general public may be categorised as—those who want to buy and know what to buy; those who want to buy but need advice; those who would buy if they realised they needed to buy; and those who

will seldom buy even though they need to do so. The first class are by far in the minority and are largely composed of technically minded persons to whom statistical figures may appeal; whereas, the other classes require a careful approach, and a clear picture of the appealing features. Thus, while it is not thought that the foregoing will essentially provide a solid foundation for any general line of public approach, it is contended that the points raised should produce a realisation of those essentials without which the demand for electrical devices will fall far short of our desire.

London Students

A paper of interest to electrical engineers of all branches was read before the I.E.E. London Students' Section on December 20, when Mr. J. F. Stirling, took as his subject "The Condensation of Atmospheric Moisture on Insulation Surfaces."

The author explained that substances may have affinity for water, either by virtue of chemical action or by intermolecular attraction, and in the latter case the physical form of a solid could promote condensation on its surfaces.

The theory of condensation was outlined and the differences in the equilibrium conditions for plane, convex and concave surfaces were stated, and the important fact was stressed that it is possible for moisture to condense and be retained on a porous or fibrous surface because of the concavity of the surface of the water particles lying within minute crevices.

From experiments he had carried out the author drew many interesting conclusions, including one that no appreciable condensation occurred on silk fabrics until the relative humidity reached 60 per cent. but that after this the amount of condensation increased rapidly; also that the cracking of a shellac surface and the powdering of mica promoted condensation.

Since the relative humidity of the atmosphere may frequently exceed 90 per cent. the practical aspects of this subject were all important. It was imperative that the completed windings of electrical machinery should be thoroughly dried in *vacuo* and by heat, followed immediately by the application of a moisture excluding medium. The varnish or enamel used for finishing should not readily become brittle or tend to crack with age since surface cracks promoted the condensation of moisture. Also, the disintegration of insulating materials to powder caused moisture to condense in the cavities between the grains; hence the need for scrupulously keeping all insulating surfaces free from powder or dust, irrespective of the nature of the latter.

Southend Electricity

New Tariffs Adopted—Meter Rents Abolished

At their last meeting the Southend-on-Sea Borough Council accepted a report by Mr. A. C. Johnson, borough electrical engineer and manager, embodying proposals for new tariffs and the discontinuance of existing surcharges to consumers in the outside areas, and meter rents. The new tariffs come into operation this month.

Post-war Development

In his report Mr. Johnson stated that, in view of recent events in connection with the Memorandum on Electricity Distribution prepared by the Joint Committee of Electricity Supply Organisations, some considerable time was likely to elapse before a standard form of tariff was adopted, and even then price levels would vary with local conditions. Because of the multiplicity of tariffs now in operation and of serious price anomalies, and because also of anticipated post-war development, Southend could not afford to delay any longer the revision of its system of charging for current. To stand still in such matters was to kill progress and it was desirable that such revision should operate before the return of evacuees.

Owing to the war and evacuation, the position in Southend had deteriorated but the public was more electrically minded and were now demanding the use of electric apparatus in the home, and the time had arrived for post-war planning to line up with the national demand for simpler and more uniform tariffs. At present consumers had the choice of a number of different tariffs consisting of a flat rate for lighting, three flat rates for heating, a contract rate, an "all-in" rate and three free hire installations, together with variations in the unit charges for supplies given through prepayment meters and for supplies given to areas outside the borough. All these tariffs were to be superseded by a block tariff consisting of a unit charge of 5d. for all consumption up to the number of specified units per quarter and a unit charge of $\frac{7}{8}$ d. for all consumption in excess of the specified units. The "specified units" were 30 plus one half unit for every £1 of rateable value. The unit charges were to be 5d. and $\frac{7}{8}$ d. instead of 5d. and $\frac{7}{8}$ d. to consumers who made use of a cooker or water heater. The department reserved the right to switch off storage water heaters on the winter peak loads by means of remote control in accordance with present practice if found expedient. The minimum charge per consumer would be 10s. per quarter. If the

supply was given through slot meters to installations including cooker or water heater, the unit charges were to be 6d. and $\frac{7}{8}$ d. instead of 5d. and $\frac{7}{8}$ d. All other prepayment supplies to be given at 6d.

The corporation domestic apparatus now the subject of free hire agreements was to be transferred to simple hire and charged at the normal rentals. All rentals for hire were to be made payable at the end, instead of at the beginning of each quarter. Existing consumers would have the option of changing over to the new tariff at the end of any quarter and would be required to do so not later than two years after the introduction of the block tariff. Meanwhile, the war increase of 15 per cent. on pre-war tariffs was to be continued and the minimum charges on the free hire installations were to be resumed as soon as possible, as a number of consumers were not making use of the apparatus.

Advantages of System

The preparing, rendering and collecting of accounts will be greatly simplified by the new proposals. Considerable saving in labour and materials will also be effected. It is estimated that the annual saving in the electricity department will amount to over £3 000, and the Borough Treasurer anticipates a saving in his department of £750.

Except for the cancellation of the contract rate (affecting approximately 300 consumers) and of the three flat rates for heating, there will not be any alternative to the other three business tariffs, which, however, will be amended as follows: (a) A flat rate of 5d. per unit for lighting plus 15 per cent.; (b) a two-part tariff based on the kVA demand as per existing tariff, but with a unit charge of $\frac{3}{4}$ d. all the year round instead of $\frac{3}{4}$ d. in winter and $\frac{1}{2}$ d. in summer; (c) an industrial heating flat rate varying between $\frac{3}{8}$ d. and 1d. per unit (with coal clause) depending on diversity factor and load factor. A minimum of 10s. in any quarter will be charged if the account does not reach this figure.

Except in the case of special contracts, all power supplies are to be given on one of the following rates: (a) A block rate of 3d. per unit for the first 1 000 units per quarter, 2d. per unit for the next 5 000 units per quarter and 1d. per unit for all units in excess; (b) a two-part rate consisting of (1) a fixed charge per kVA as per existing rate, and (2) a unit charge of $\frac{1}{2}$ d. with coal at 32s. 6d. per ton.

Television-Receiver Sound Channel

Discussion by I.E.E. Radio Section

THE subject chosen for discussion at a meeting of the I.E.E. Radio Section held on December 19, was "The Television-Receiver Sound Channel."

In the absence through indisposition of Dr. D. C. Espley, the discussion was opened by Mr. G. W. Edwards.

In a summary of Dr. Espley's address he said it was widely assumed that in television reception the subjective qualities of picture and sound were interdependent when reproduced together. In view of the smaller technical difficulties in the sound channel it was to be expected that, within the limits of reasonable economy, the sound reproduction in a television receiver would play its part in improving the subjective quality of the picture, for which relatively costly apparatus was required.

B.B.C. and U.S. Practice

The B.B.C. placed the sound carrier below the vision carrier, while in the United States the positions were reversed. B.B.C. practice was preferable on the score of percentage frequency-band requirements on the vision carrier, although the advantage would become insignificant at frequencies above 50 Mc/s and for a 405-line standard. The American practice was preferable in a receiver designed to take advantage of constancy of sound-carrier/vision-carrier frequency spacing, and in which, as was usual, the sound intermediate frequency was smaller than the vision intermediate frequency, owing to the smaller percentage tuning range on the local oscillator designed to cover a number of stations.

The need for constancy of carrier spacing (sound/vision) was sometimes disputed, as it reduced the flexibility of receiver design. In a single-programme system, the vision channel might be present, and double frequency-changing would enable the sound intermediate frequency to be placed at a much more convenient level. The present trends in vision i.f. amplifier designs would cause great difficulties with sound amplification at high intermediate frequencies, bearing in mind the requirements of band maintenance with gain control, gain per stage, and the need for the most economic inclusion of standard broadcast facilities.

In the discussion which followed there was general agreement that a sound carrier of the same order of frequency as the vision carrier was desirable. But under the conditions likely to apply in this country there was no necessity to fix any rigid frequency

relationship between the carriers, though considerations of filter design gave a bias in favour of placing the frequency of the sound carrier below that of the vision channel.

Suppression of Interference

The American decision to adopt frequency modulation for the sound channel and the possibility of realising in this country the advantages claimed for this system from the point of view of interference suppression were freely discussed. The greater cost and complication of a frequency modulation receiver and the need for exact tuning, possibly by means of automatic frequency control, were stressed. It was agreed that complementary pre-emphasis and de-emphasis were needed to control the virulence of the high-frequency energy in the residual noise, but if the degree of pre-emphasis was based on the average distribution of energy in the audio spectrum there was a danger of over-modulation in the high audio-frequency region from the peaks associated with transients.

Some of the improvements in quality attributed to frequency modulation were in fact due to the wider frequency band available on a u.h.f. channel, and, it was thought, could be realised with equal facility in an amplitude-modulated system. So far as susceptibility to interference from motor car ignition systems was concerned, the shortcomings of amplitude modulation could be considerably reduced by the inclusion of a limiter designed to follow the fringe of the modulation envelope in the receiver. The simultaneous transmission of separate amplitude modulation and frequency modulation sound channels, situated on either side of the vision channel, would enable manufacturers to satisfy the immediate demand for inexpensive receivers while the rival claims of the two systems were being resolved.

There was some division of opinion on the need for exceptionally high quality in the sound channel.

It was agreed that there should be closer approximation in the receiver of picture and sound sources; this might be achieved by mounting the c.r. tube inside the loud-speaker aperture. Discontinuities in tonal balance should be avoided, or dealt with at the transmitter. The necessity for manipulation of controls at the receiver, once the programme had started, would be less tolerable with television than with normal sound broadcasting.

News in Brief

Liverpool Transport Developments.—In a report on the post-war reconstruction and development of the Liverpool passenger transport undertaking, Mr. W. G. Marks, the general manager, dealt separately with the advantages and disadvantages of electric tramways, motor-buses, trolley-buses and underground electric railways. The Committee has now asked him to report on the relative capital and maintenance costs of each form of transport.

Tynemouth Housing Equipment.—The Housing Committee has agreed to the provision of all-electric domestic equipment in temporary houses.

I.E.E. Students' Dance.—A dance is to be held jointly by the North-West Students' Section of the I.E.E., and the students of the Manchester College of Technology, on February 10, from 6 p.m. to 10 p.m., at the College, Whitworth Street, Manchester.

Electrical Firms' Donations.—Contributions to the Royal Berkshire Hospital during the last quarter included the following from Newbury and district: Edmundson's Electricity Corporation, Ltd., £52 12s. 7d.; Wessex Electricity Co., £36 15s. 4d.

Edinburgh E.A.W.—The Edinburgh branch of the Electrical Association for Women had Mrs. Beveridge, wife of Sir William Beveridge, M.P., with them at a function in the electricity showroom, when a cheque for £40, realised at a bring-and-buy sale, was handed over to the rehabilitation centre for war blinded.

Illuminating Engineering Society.—The next meeting of the Birmingham Centre of the Illuminating Engineering Society, on January 26, is to take the form of a "Brains Trust," and is to be held at the Imperial Hotel, Birmingham, at 6 p.m. The question master will be Mr. J. G. Holmes.

Science in Industry.—A conference on "The Place of Science in Industry," arranged by the British Association, through its Division for the Social and International Relations of Science, is to be

held at the Royal Institution, Albermarle Street, London, W., on January 12 and 13. There will be four sessions. The first (chairman, Mr. Ernest Bevin) is on "What Industry owes to Science"; the second (chairman, Lord McGowan) on "Fundamental Research in Relation to Industry"; the third (chairman, Sir John Greenly) on "Industrial Research and Development"; and the fourth (chairman, Lord Woolton) on "The Future: What Science might Accomplish."

E.I.B.A. Northern Counties Area.—The annual general meeting of the Northern Counties Area of the Electrical Industries Benevolent Association will be held on January 29, at 3.30 p.m., at Tilley's Restaurant, Blackett Street, Newcastle-upon-Tyne, under the chairmanship of Mr. E. Charlton.

Aluminium-ware Supplies.—Mr. Dalton, President of the Board of Trade, stated recently in the House of Commons that 21 firms had applied for licenses for the manufacture of aluminium-ware, and these were now being issued. Supplies would be small at first, but some aluminium-ware should be in the shops early in the New Year.

Synthetic Rubber Production.—According to Mr. John L. Collyer, president of the B. F. Goodrich Co., while it is still impossible to determine the balance of power between synthetic and natural rubber, experience in 1944 has confirmed the belief that after the war natural and synthetic will be in competition over a wide field.

School Electrical Installations.—The Glasgow Education Committee has arranged for the electricity department to execute electrical work at Penilee school at a cost of £685 and at Stow College annexe at £95. The West Hartlepool Education Committee proposes changing the present gas-lighting system at Lynnfield School to electricity, and estimates are to be prepared. The Southport Education Committee is to provide electric dish washing and other electricity plant at the refectory kitchen at a cost of £321.

TWENTY-FIVE YEARS AGO

FROM THE ELECTRICIAN of January 2, 1920: Our readers will be interested to know that we have received a communication from the Board of Trade informing us that we have been awarded the Diploma of the Grand Prix en Collectif, by the International Jury of the British Section of the Ghent International Exhibition, 1913. The issue of this award has been deferred until now in consequence of the war. It is to be expected that in the future these international exhibitions will again be organised, and the matter is one which might well be considered by those engaged in the work of reconstruction, as it is a form of propaganda which could be made of the greatest possible use.

Electricity Supply

Burton-on-Trent.—Switchgear is to be renewed at a cost of £817.

Darlington.—A supply of electricity is to be afforded to the works of Messrs. T. Ness, Ltd.

Burton-on-Trent.—The Electricity Committee is to extend mains to provide supply to a farm at Hoar Cross.

Scarborough.—The T.C. is to spend £474 increasing the capacity of two electricity sub-stations at Snainton.

Oldham.—A fringe order to supply four cottages in Failsworth, has been obtained by the Electricity Committee.

Lancing.—The Council is to expend a sum not exceeding £500 on lighting, part of which is to be by electricity.

London.—The Metropolitan Water Board is to remodel and electrify the Ferry Lane pumping station at a cost of £19 900.

Middlesbrough.—Batteries for three electrical vehicles at an estimated cost of £70 each are to be purchased by the T.C.

Stockton-on-Tees.—Consideration is being given by the T.C. to the installation of additional electric plugs in Council houses.

Cheltenham.—The Cemetery Committee has asked the Borough Electrical Engineer to prepare a scheme for lighting the crematorium chapel.

Sunderland.—The T.C. is to spend about £1 800 in order to afford a supply of electricity to a factory being built by the Ministry of Works on the Pallion trading estate.

Portslade.—The U.C. has decided to carry out a scheme for converting all street lighting in the district to electricity. Sanction is to be sought for a loan to finance the scheme.

Billingham-on-Tees.—The U.C. has asked the North-Eastern Electric Supply Co., Ltd., to reduce electricity charges for 15 W and 25 W lamps used for street lighting.

Middlesbrough.—The Corporation has agreed to transfer £4 000 from the electricity income tax suspense account to the general reserve fund of the electricity undertaking to meet post-war contingencies.

Camberwell (London).—The Works Committee recommends arranging for the County of London Electricity Supply Co., Ltd., to instal street lighting at a cost of £2 390 and an expenditure of £3 000 for any further lighting.

Southport.—The Electricity Committee has agreed that in the event of the Lighting Committee deciding to convert the North Promenade street lighting from gas to electricity, it will undertake to provide the cables at an estimated cost of £750.

Stockton-on-Tees.—The Electrical Engineer is to prepare plans for the reconstruction of West Road sub-station at a cost of £13 200 and Outram Street sub-station at £6 000 including equipment.

Reeth (Yorks).—The R.C. is to approach the North-Eastern Electric Supply Co., Ltd., regarding an electricity supply for Upper Swaledale. The scheme was first raised before the war when a survey was carried out, but the work was postponed.

Cookham.—The Ascot District Gas and Electricity Co. have written to the Cookham R.D.C. stating that in response to inquiries which they have received relating to electricity facilities, the company hope, in addition to the existing standard lighting and power tariffs, it may be possible to offer a two-part tariff in which the rate will approach 1d. per unit.

Cardiff.—According to the annual reports for 1941/4, in the four years between 1941 and 1944, the electricity undertaking has contributed £113 351 to the relief of the city's rates. The reports showed that for 1943-4 output of the power station was 278 265 922 units; units imported from the grid totalled 133 306 000, making a total of 411 571 922 units sent out. Of this latter total 8 628 000 units were exported to the grid, showing a total of 402 943 922 units sent out to the corporation system. Aggregate capital expenditure on the undertaking up to March this year was £4 223 486. Net debt outstanding was £2 239 586. Total income for the year was £989 376 and expenditure £773 017.

Rural Electrification in Ireland.—Authority to make advances up to £5 000 000 to the Electricity Supply Board for the purpose of rural electrification in Ireland is embodied in the Electricity (Supply) (Amendment) Bill, 1944, which was issued recently. It is estimated that the total cost of rural electrification, based on pre-war figures, will amount to £12 000 000. The £5 000 000 is intended to enable the Board to begin the work in the immediate post-war period. Only half the amount will be repayable by the Board, the other half being payable to the Central Fund out of voted monies. Under this Bill the Board are also empowered, subject to the approval of the Minister for Finance, to secure the manufacture in Eire of items of electrical plant required in the development of its programme. The Bill also authorises the Minister for Finance to advance to the Board further sums up to a total of £7 500 000 in addition to the £5 000 000, which, it is estimated, should meet the Board's requirements for three and a half years.

Industrial Information

Electric Discharge Lamps.—In view of the issue of the Discharge Lamp Lighting

Effective Works Lighting.—The photograph reproduced on this page shows a section of an inspection department in an engineering works lighted by Mazda 80 W fluorescent lamps in open top reflectors. In this department close inspection, both visual and by the use of gauges, is carried out on very bright parts. Good low brightness lighting is essential to accuracy of inspection and the installation, carried out by Messrs. Arthur Ellis (Electrical) Ltd., Birmingham, has achieved this. The illustration shows how well the "tunnel" effect has been avoided.



Mazda fluorescent lighting in an engineering works

(Revocation) Order, 1944 (S.R. and O., 1370), which revokes the control order of 1943 (S.R. and O., 1201), the war emergency Code of Practice C.P. 3, 1944, Limitation of Electric Discharge Lamp Lighting, will now be inoperative.

Servicing Refrigerators.—Service Bulletin No. 2, issued by the International Refrigerator Co., Ltd., on the servicing of B.T.H. refrigerators, describes the special equipment that has been set up to make the testing of the Monitor Top domestic models a relatively simple procedure, and also the assembly, purging, charging and testing of these units an easy operation.

Londex Relays.—Londex Ltd. have just issued a revised catalogue, No. 205/44, of their relay and remote control apparatus. The relays described and illustrated are designed for use in switchgear, lighting systems, aircraft, ships' radio, machine tools, electronic equipment, fire alarms, burglar alarms, and so on. There are several new types and others of improved design.

Hope for the North-East.—In a survey of industrial conditions in the Tyneside district the Newcastle-upon-Tyne branch of the Association of Scientific Workers states that the two basic industries of the future are the chemical and power industries. The possibility of underground gasification of coal and the introduction of gas turbines for power generation is discussed.

the Ministry of Production, deal with standards of preservation and packaging for the war in the tropics, small batch quality control, rubber die processes, motion study in practice, industrial resettlement and hand trucks for engineers.

Wrought Aluminium Alloys.—The Wrought Light Alloys Development Association's information bulletin No. 8, entitled "Riveting of Wrought Aluminium Alloys," just published at the price of 1s., deals comprehensively with every phase of the subject, the main chapters being devoted to "Design of Riveted Joints," "Drilling Practice," "Riveting Practice," "Rivets for Special Purposes," "Automatic Riveting," and (in the appendices), "Heat Treatment of Aluminium-Alloy Rivets."

Export Licensing.—The following goods have been removed for the Schedule to the Export of Goods (Control) (No. 10) Order, 1943, and consequently require licences only when exported to those destinations to which the export of all goods is controlled:—Iron and steel (including alloy steel) in the following forms:—Castings and forgings, but not including machinery parts; stampings and pressings with or without rolled edges, but not including machinery parts. Bells, bell domes and bell gongs. Electrical goods of the following descriptions:—Parts of watt-hour meters, pocket lamps, hand torches and inspection lamps and cases therefor.

Production and Engineering.—The principal features in the current bulletin, issued by the Ministry of Labour and

Copper and Copper Alloy Springs.—The Copper Development Association has issued under this title a book dealing with the design of flat, helical, torsion and miscellaneous springs and their manufacture; the mechanical and physical properties of the commoner copper alloy spring materials, their fatigue strength and corrosion resistance; and the behaviour of springs under various conditions. The work, which supplies information not readily available hitherto, concludes with an extensive bibliography.

The M. and C. Apprentices' Magazine.—The Christmas number, published by Mavor and Coulson, Ltd., announces that the firm's gold medal awarded annually to the best fifth year apprentice has been won by William Black, of the conveyor drawing office, and the silver medal for the second best fifth-year apprentice has been awarded to James Strain, of the coalcutter drawing office. Direct payments and awards under the suggestion scheme in 1944 amounted to £289 5s. 8d. Personal, departmental and branch notes and articles on various subjects complete the publication.

Wade's Tables.—A revised pocket edition of these tables dealing with the size and strength of wooden poles for telegraph and overhead electrical transmission lines, has been published by Messrs. Gabriel, Wade and English, Ltd. It is stated that English and Scotch red fir would not appear to be as strong as foreign imported, but English and Scotch larch is stronger than redwood. An A pole is four and a half times as strong as a single pole, an H pole is three times as strong, and a Rutter pole is seven times as strong as a single pole. Copies of the tables can be obtained from the company's office, Gilberdyke, Brough, E. Yorks, or Mr. Christopher Wade, 1, Shakespeare Road, Bedford, price 5s.

Cast Iron Research.—The twenty-third annual report of the British Cast Iron Research Association states that the Research, Development, and External Relations Committees, set up last year, had been considering post-war policy. In the range of high-duty cast irons, research work on the acicular irons had been continued and optimum compositions for this complex alloy system worked out. It was proposed to complete one major section of this work by determining a wide range of engineering properties on commercially made material. Reports of work done on ladle additions and on induction hardening of cast iron had been completed. The acquisition of equipment for spectrochemical analysis was now virtually complete and a report had been issued on the application of the photo-electric absorpti-

meter to the analysis of cast iron. With over 500 members the association had never been so fully representative of the industry as it is at the present time.

New Zealand Railways.—The gross revenue of £15 325 306 from the New Zealand railways for the year ended March 31, 1944, set a new record, exceeding the previous year's revenue by £1 196 313 (8.47 per cent.). The expenditure amounted to £12 757 336, an increase of £1 454 923 (12.87 per cent.). The net revenue of £2 567 970 showed a decrease of £258 610 (9.15 per cent.) compared with that for 1942-3, and on a percentage basis the net return on capital was 3.71 per cent., as compared with 4.31 per cent. last year. A factor in the increased expenditure was the provision of £410 500 for deferred maintenance. The amount of traffic handled during the year was greater than ever before. The number of ordinary passenger journeys exceeded last year's record by 1 146 109 (6.67 per cent.), and the tonnage hauled also set a new record of 9 026 626 tons, an increase of 1.56 per cent. over last year's figures. The maintenance of signals and electrical appliances cost £326 190, as against £271 499 in the previous year. The running costs of the 21 electric locomotives amounted to £116 856.

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 Department of Overseas Trade, Millbank, London, S.W.1 (corner Horseferry Road), unless otherwise stated.

Batley T.C., January 10.—Supply and delivery of one 750 kVA transformer and one e.h.t. ring main unit. Specifications from the Borough Electrical Engineer, Electricity Works, George Street, Batley.

Dundee T.C., January 10.—Electric light installation in 31 blocks, comprising 162 houses, at the Kirkton housing estate. Particulars from the City Quantity Surveyor, 21, City Square.

Leeds Housing Committee, January 22.—Electrical maintenance repairs over a period of six months ending September 30, 1945, in connection with seven groups of dwellings. Specifications from the Housing Director, Priestley House, Quarry Hill, Leeds.

Stone U.D.C., January 23.—Supply, delivery and erection of approximately 1 mile overhead line and 1 000 yds. underground cable in two sections. Specifications from the Electricity Department, 56, High Street, Stone, Staffs.

Company News

GREENWOOD AND BATLEY, LTD.—Intm. Div. 5% (same) on ord., payable Jan. 12.

PERNAMBUCO TRAMWAYS AND POWER CO.—Div. on 5% fst. debs. 2½%.

GENERAL CABLE MANUFACTURING CO., LTD.—Fin. div. 9% (same), mkg. 15% to Sept. 30 (same).

DUSSEK BROS. AND CO., LTD.—Fin. div. 8½% (same), mkg. 12½% for year. Pfts. for year to Oct. 31, £20 635 (£21 174).

KALGOORLIE ELECTRIC TRAMWAYS, LTD.—Estimated net rev. for Nov. 1944, £385 (£399). Aggregate for 11 mos. from Jan. 1, £5 608 (£4 779).

BRISTOL INDUSTRIES, LTD.—Tradg. pft. for yr. to Oct. 31 £107 487, £40 902 increase. Carry fwd., subject to dirs.' fees, £11 924 (£9 008). £10 000 over-reserved for tax has been added to gen. res.

SHAWINIGAN WATER AND POWER.—Gross rev. nine mos. ended Sept. 30 \$17 678 769 (\$17 938 473). Net b'ce. \$1 688 624 (\$1 483 755). Divs. \$1 459 427 (same), surplus \$229 197 (\$24 327).

CHADBURNS (LIVERPOOL).—Pft. to Mar. 31 last £7 421 (£6 274). Brot. in £13 967 (£14 693). Div. 6% (same) and 4% (same) bonus, £3 000; tax res. nil (£4 000); fwd. £18 388 subject to dirs.' fees.

E. K. COLE AND CO., LTD.—Fin. div. on ord. 12%, mkg. 20% (15%) less tax for yr. ended Sept. 30, 1944. Part. div. on prefd. ord. 3% (same). Net pfts. for yr. after deprecn. and taxatn. £138 165 (£82 093).

BULLERS, LTD.—Net pft. to July 31, £24 602 (£23 984), plus £26 577 (£20 828) brot. in. Pref. div. £3 750, deb. redemptn. £3 821 (£3 638), pension £5 000 (same), fin. ord. div. 5%, mkg. 7½% (same) £5 847, fwd. £32 761.

GENERAL CABLE MANUFACTURING CO., LTD.—Net tradg. pft. to Sept. 30, £83 483 (84 659). Dirs.' fees £800 (£550), audit £158 (£157), deprecn. £3 326 (£3 212), tax £58 400 (£60 250), pref. div. £4 500, ord. div. 15% £11 250, to res. £5 000 (all same), fwd. £2 920 (£2 871).

ALBION DROP FORGINGS CO., LTD.—Tradg. pft. to Sept. 30 (after tax) £20 174 (£22 907). Deprecn. £419 (£415), dirs.' fees £1 375 (£1 500), war damage £442 (£607), net pft., £17 938 (£20 485). Div. 12½% (same) £9 375 to deprecn. res. £3 000 (£5 000), fwd. £15 434 (£9 871).

GEORGE TURTON PLATTS AND CO., LTD.—Net pft. (after tax) for yr. to July 31, £33 938 (£33 856), to pref. div. £1 936, fin. on ord. 10% (same) and bonus 10% (7½%), mkg. 27½% (25%) less tax, to specl. deprecn. res. £7 500 (£6 621) conting. res. £5 000 (£4 000), fwd. £26 045 (£25 320).

MARCO REFRIGERATORS, LTD.—Tradg. pft. to Sept. 30, £33 640 (£34 586), plus transfer fees £2 (£1 10s.). To deprecn. £1 604 (£1 456), A.R.P. £750 (£1 567), bank int. £239 (£19), etc., leav. net pft. before tax and dirs.' fees, £29 960 (£30 291 after dirs.' fees), added to £4 927 (£4 754) brot. in. To taxn. £25 597 (£26 592), dirs.' fees £900 (same), div. 2½% (5%), fwd. £7 078.

BUTLER MACHINE TOOL, CO., LTD.—Tradg. pft. to Sept. 30, £84 128 (£95 189), plus divs., etc., £2 432 (£2 159) and E.P.T. recov. £3 000 (nil), mkg. £89 560 (£97 348), sals., ex. etc., £15 319 (£14 473), super-annuation £944 (£907), A.R.P. £841 (£991). Deprecn. £13 038 (£13 792), E.P.T. nil (£8 000), leav. net b'ce. £59 418 (£59 185), plus £31 inc.-tax surplus. Fwd. £17 674 (£17 020).

CLEVELAND BRIDGE AND ENGINEERING CO. LTD.—Mfg. b'ce. to Sept. 30, £204 776 (£22 092 after tax, N.D.C. and contng.), plus interest recvd. £1 254 (£15). Deprecn. £5 132 (£4 760), dirs.' fees £1 400 (same), defd. repairs, taxn. and contng. £150 000, lvg. £49 498 (£14 883), mkg. with £5 470 brot. in net pft. £54 968. Pref. div. £1 232, 4½% ord. div. £13 153 (both same) to res. £35 000 (£2 000), fwd. £5 582.

(Continued on p. 22.)

Metal Prices

	Friday, December 29.	
	Price.	Inc. Dec.
Copper—		
Best Selected (nom.) per ton	£60 10 0	—
Electro Wirebars	£62 0 0	—
H.C. Wires, basis ... per lb.	9½d.	—
Sheet	10¼d.	—
Phosphor Bronze—		
Wire(Telephone)basis per lb.	1s. 0½d.	—
Brass (60/40)—		
Rod, basis per lb.	—	—
Sheet " " " " "	—	—
Wire " " " " "	10¼d.	—
Iron and Steel—		
Pig Iron (E. Coast Hematite No. 1)... per ton	£ 6 18 66	—
Galvanised Steel Wire (Cable Armouring) basis 0.104 in.	£ 27 10 00	—
Mild Steel Tape (Cable Armouring) basis 0.04 in.	£ 20 0 00	—
Galvanised Steel Wire No. 8 S.W.G.	£ 26 0 00	—
Lead Pig—		
English per ton	£ 26 10 00	—
Foreign or Colonial	£ 25 0 00	—
Tin—		
Ingot (minimum of 99.9% purity) ... per ton	£ 303 10 00	—
Wire, basis... .. per lb.	3s. 10½d.	—
Aluminium Ingots ... per ton	£ 110 0 00	—
Speller... ..	£ 25 15 00	—
Mercury (spot) Ware-house per bottle	£ 69 15 00	—

NOTE.—Above prices are nominal only, no allowance being made for tariff charges, charges for insurance, etc. Prices of galvanised steel wire and steel t tape supplied by Cable Makers Association. Other metal prices by British Insulated Cables Ltd.

EDWARD WOOD AND Co., LTD.—Trdg. pft. to Aug. 31 £39 637 (£42 474), plus inc. from investmts. and transf. fees £335 (£347), mkg. £39 972 (£42 822). To deprecn. £4 688 (£4 845), dirs.' fees and loan int. £352 (same), leavg. net pft. £34 932 (£37 625), added to £21 188 (£15 463) brot. in. Pref. div. absorbs £1 000 (same), ord. div. 9% (same), employees' pft. sharg. £2 500 (£2 800), taxn. res. £18 000 (£20 000), defd. reprs. £3 000 (nil), fwd. £23 520.

GENERAL ELECTRIC Co. LTD.—The full Committee of the Stock Exchange has upheld the decision of the New Issues Sub-Committee in rejecting the application for permission to deal in £2 000 000 4½% "C" cum. pref. stk. The sub-committee rejected the application on Dec. 28, but the decision was subject to appeal to the full Committee. This appeal was lodged on Tuesday with the result stated. The Committee's decision is not a reflection on the co., the security or the issuing house.

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.

HOLTHAM, Hy., 80, Shamrock St., Hebburn, electrical engineer. £11 4s. 5d. Nov. 16.

MONK, Geo. W., 22, Woodland Rd., London, N.11, radio engineer. £10 7s. Nov. 2.

Satisfaction

NELCO, LTD., Shalford, Sy., engineers.—Sat'n. Dec. 4, of mort., reg. Jan. 20, 1936.

Orders on Application for Discharge

WAINWRIGHT, Basil J., 2, Hillcrest Gardens, Dollis Hill Lane, Cricklewood, lately carrying on business as "The Wells Road Garage," and as "Wainwright Neon Displays," 197, Wells Road, Shepherds Bush, aforesaid, previously at 14, St. Thomas' Road, Harlesden, N.W.10, electrician. Date of order, Nov. 14, 1944. Discharge suspended for six months ending May 14, 1945.

EVERINGHAM, William, now residing at 38, Estcourt Avenue, Headingley, Leeds, and carrying on business at 35, Quay Road, Bridlington, plumber and electrician. Date of order, Nov. 7, 1944. Discharge granted subject to the bankrupt consenting to judgment being entered against him by the Official Receiver for the sum of £50.

Notice of Dividend

JACKSON, Richard, 5, Romney Avenue, Dalton-in-Furness, and lately carrying on business at 38, Whalley Range, Blackburn. First and final dividend 3s. 6½d. per £, payable Jan. 5, 1945, Official Receiver's Office, 16, Cornwallis Street, Barrow-in-Furness.

Notice of Intended Dividend

BUTCHER, Norman Ernest, "Reydon," Bluebridge Road, Brookmans Park, Hert-

ford, and carrying on business at 2, Woodfield Road, Welwyn Garden City, under the name of Herts Electrochemical Co., as a battery manufacturer. Claims to be sent by Jan. 15, to the Trustee, Stephen Pagden Child, College Hill Chambers, Cloak Lane, London, E.C.4.

Coming Events

Monday, January 8.

I.E.E., S. MID. CENTRE.—Grand Hotel, Birmingham. Joint meeting with the Institution of Post Office Electrical Engineers. Discussion opened by D. B. Hoseason, "Training of an Engineer." 6 p.m.—I.E.E., WESTERN CENTRE, Cardiff. Joint meeting with the Institution of Post Office Electrical Engineers. "The Merging of Line and Radio Technique," A. H. Mumford. 5 p.m.

I.E.E., N.E. CENTRE.—Newcastle-on-Tyne. "The Influence of Resistance Switching on the Design of High-Voltage Air-Blast Circuit-Breakers," by H. E. Cox and T. W. Wilcox. 6.15 p.m.

Tuesday, January 9.

ILLUMINATING ENGINEERING SOCIETY.—E.L.M.A. Lighting Service Bureau, London, W.C.2. "The Poetry of Light," R. Gillespie Williams. 5.30 p.m.

I.E.E., SCOTTISH CENTRE.—Glasgow. "Transmission and Distribution of Electricity to Mines," B. L. Metcalf. 6.15 p.m.

Wednesday, January 10.

I.E.E., WESTERN CENTRE.—Bristol. Joint meeting with the Institution of Post Office Electrical Engineers. "The Merging of Line and Radio Technique," A. H. Mumford. 2.30 p.m.

Thursday, January 11.

A.M.E. AND M.E., LONDON BRANCH.—39, Victoria Street, S.W.1. "Electrical Aspects of U.S. Mining Machinery," R. Crawford. 4.30 p.m.

Friday, January 12.

NORTH-EAST COAST INSTITUTION OF ENGINEERS AND SHIPBUILDERS.—Newcastle-upon-Tyne. "Measuring Instruments for Use in Engineering and Shipbuilding," B. A. Robinson. 6 p.m.

Saturday, January 13.

I.E.E., N.E. CENTRE.—Visit to Dunston Power Station.—Association of Supervising Electrical Engineers. E.L.M.A. Lighting Service Bureau, London, W.C.2. Lecture, "Installation, Maintenance and Operating Problems of Theatre Lighting," L. G. Applebee. 2.15 p.m.

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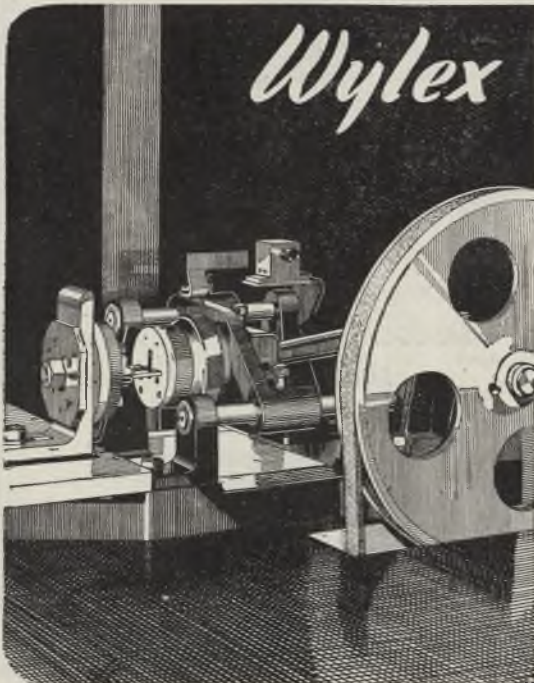
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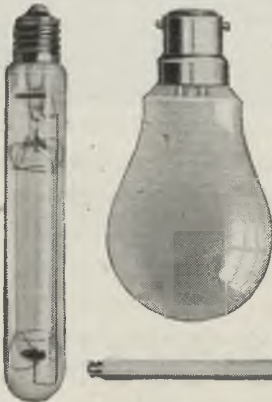
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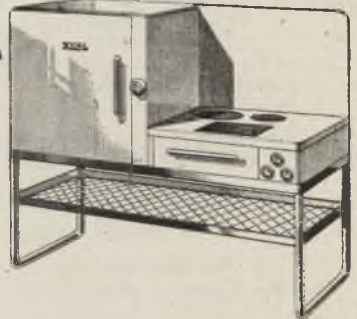
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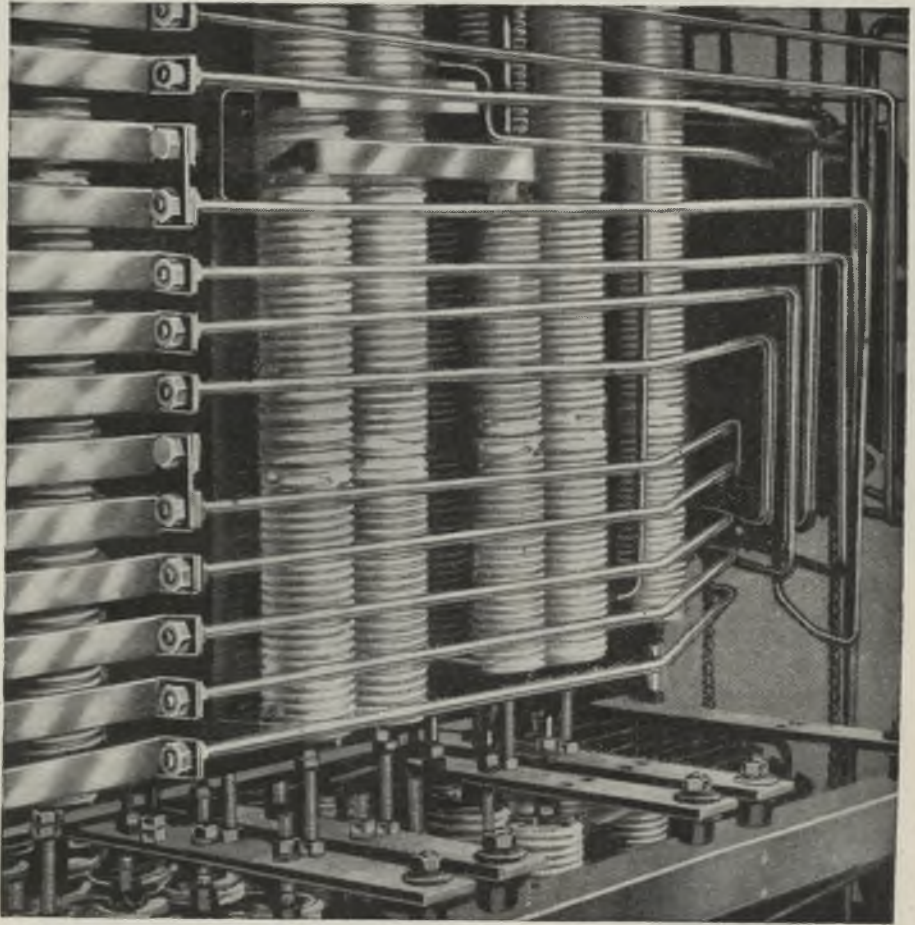
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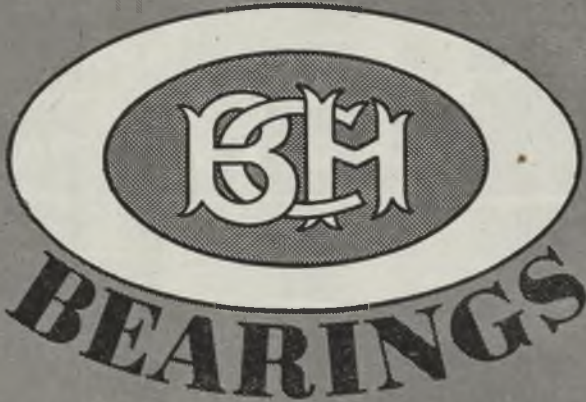


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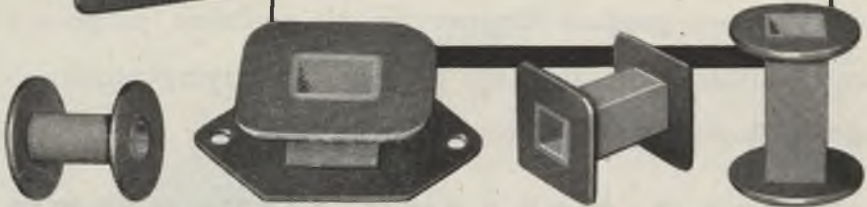
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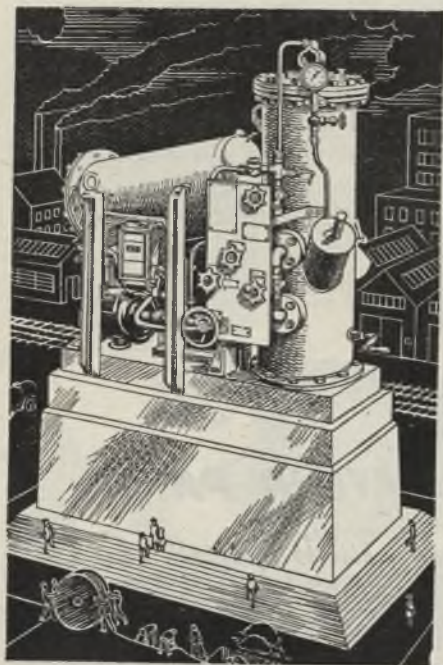


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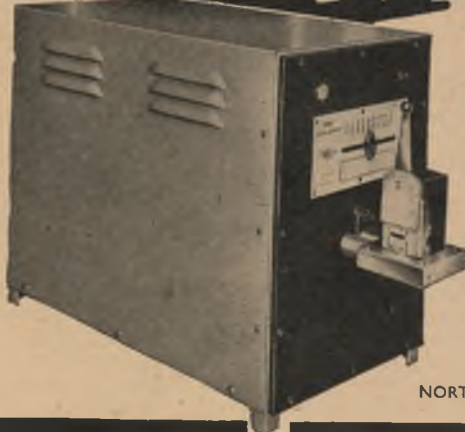
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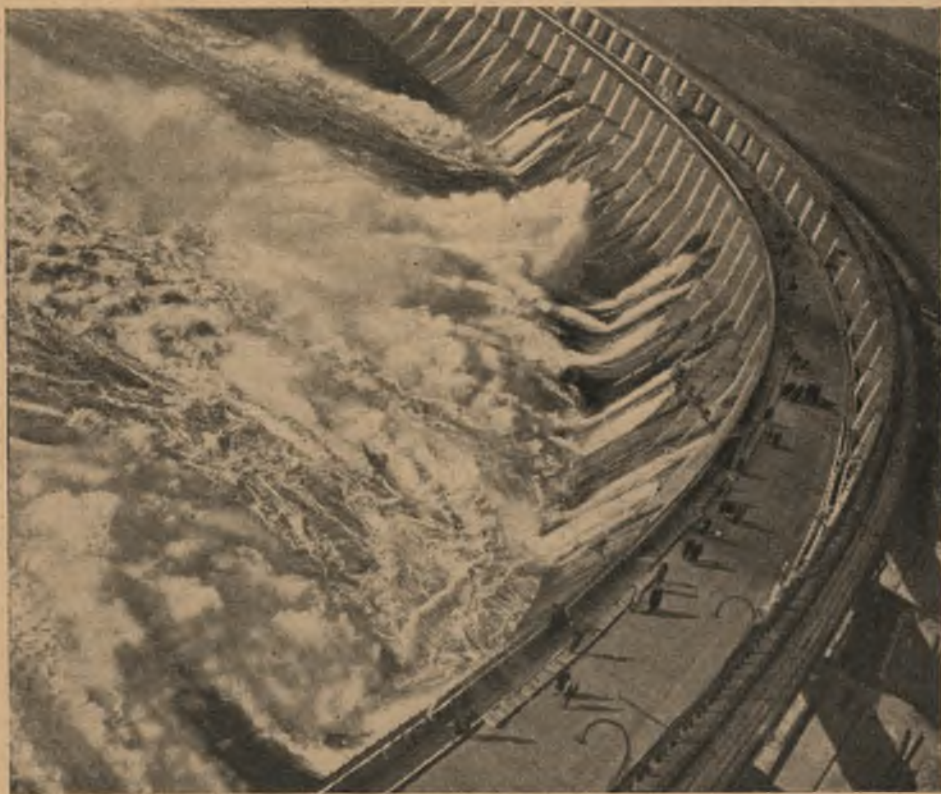


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The Dnieper Hydro-Electric Station represents one of the most colossal building tasks ever attempted, more than 60 per cent of the construction being submerged. The result of five years' labour, it was the principal source of hydro-electric power for the Ukraine, with a capacity of 850,000 H.P. and saving three million tons of coal per annum.



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