ELECTRICAL REVIEW

FOUNDED 1872

Vol. CXXXVII. No. 3543 OCTOBER 19, 1945 9d. WEEKLY

BOOK THE 9th NOVEMBER FOR THE E.I.B.A. VICTORY BALL

When resistance to high temperature is an important factor in the choice of a winding wire, the job calls for BI-GLASS, a winding wire rated for continuous operation at 140°C It has high resistance to moisture and abrasion. Other advantages are high dielectric strength, freedom from ageing, and high space factor . . . .

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BRITISH INSULATED CALLENDER'S CABLES LTD.

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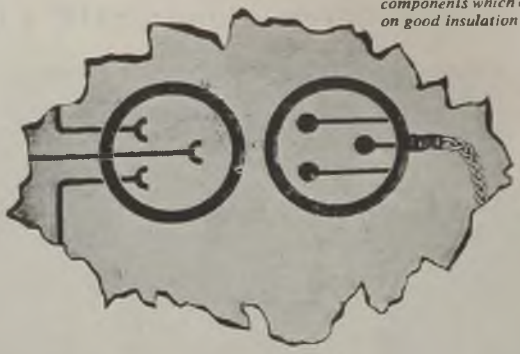

The plug and socket. Two of the many electrical components which depend on good insulation.

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The only way you can be certain of this, is when you know that the plastic preform has been thoroughly heated all the way through, and has cured simultaneously throughout.

The pre-heating of plastic preforms can only be achieved with such certainty by using radio heating. Redifon radio heaters have been specially developed to do this particular work. With outputs ranging from 250 watts to 5 kilowatts, Redifon radio heaters can deal with between 2 oz. to 3 lbs. of plastic material per minute. Saving in production time is usually over 50%.

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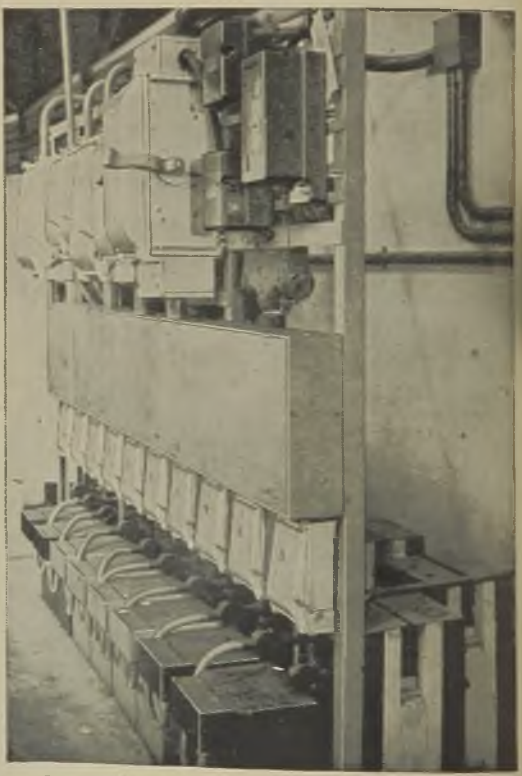

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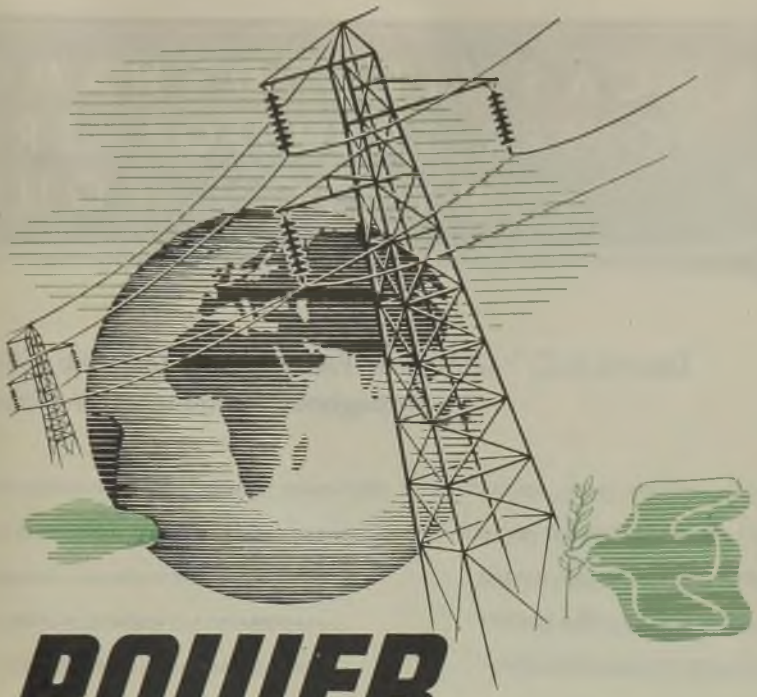

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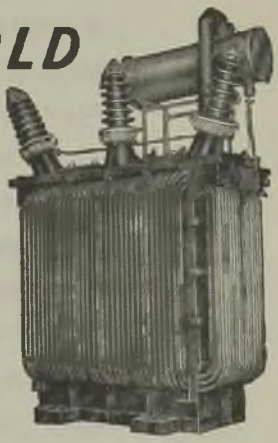

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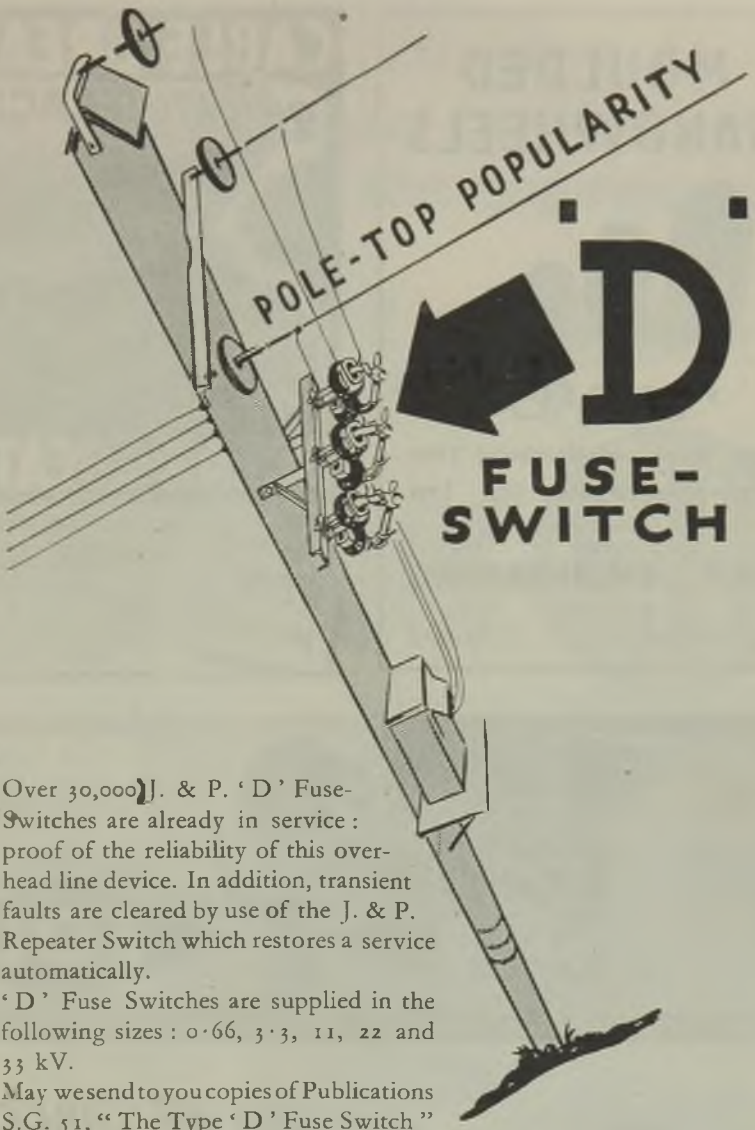

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Practical guides to economy

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Whether you use petroleum fuel, gas or diesel oils, creosote or creosote/pitch mixture, you have at your disposal expert advice on how to reduce losses and wastage and improve the operational efficiency of your plant.

The advice is given in these three Bulletins :

THE INDUSTRIAL USE OF LIQUID FUEL
(*Bulletin No.* 24)

A valuable reference to the correct fluidity of various fuel oils at the point of usage ; to the care of burners and the effective control of combustion ; the recovery of waste heat from furnace flue gases ; better furnace loading.

HEAVY-OIL ENGINES
(*Bulletin No.* 23)

The facts you need to know about efficient engine operation, easily and quickly grasped. The Bulletin includes a useful rota for cleaning and overhauls, the specimen daily and weekly log sheets (essential to economical operation).

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(*Bulletin No.* 36)

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MANAGING EXECUTIVES as well as operatives will be well rewarded by a study of these Bulletins. They point the way to substantial oil economies, and improved working. The Bulletins are free from your Regional Office of the Ministry of Fuel and Power.

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ELECTRICAL REVIEW

October 19, 1945

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

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Consumers' Rights

The True Criterion of Service

LIKE all purveyors of commodities, the electrical industry in order to thrive has to find out the wishes of the consuming public. The obligation to do so is all the greater because what it provides is really essential to national prosperity or to reasonable amenities of life and because the most obvious channels of communication with the public—the electricity supply undertakings—are protected to some extent by statute, and consumers cannot change from one to another.

What are the Needs?

At the same time the difficulties of gaining an insight into popular needs are also great, largely because of the technicalities involved which, obscure to consumers, are apt to create an attitude of aloofness in those whose knowledge of the subject is not readily expressed in popular language and who are perhaps inclined to be impatient of such manifestations of public preference as led before the war to dissatisfaction with older types of cookers whenever some superficial change was made. Moreover, consumers of electricity are without means of expressing their views through representative bodies, which so well serve the interests of those on the other side of the table, although the Electrical Association for Women, whose twenty-first annual conference is reported by us this week, has to some extent cleared the path.

By virtue of his position with the London County Council, which is a very large purchaser of electricity from many undertakings and is also responsible for housing, Mr. Forbes Jackson, the new chairman of the I.E.E. Installations Section is favourably placed for mass-observation of its electrical requirements and of the manner in which they are met. Tariff vagaries he has found to have little importance for consumers, but they have a bad appearance and have undoubtedly done the credit of the industry in men's eyes much wrong. Unexplained differences in tariff forms are an irritant, but price itself is not a common cause of complaint. More serious is the feeling that undertakings take but little interest in whether or no consumers derive full benefit from the use of electricity. This points to the need for considerably expanded activity on the part of consumers' departments in instructing the public in the many ways in which electricity can serve them and at what price.

Importance of Small Things

Public mention of the desirability of electrification is often accompanied by a reference to "labour-saving." Although this term certainly describes such heavy-current consuming apparatus as cooking, water heating and space heating, especially as compared with solid fuel, it is at least as applicable to numerous other appliances, in which electricity has no competitor, that have not been so vigorously encouraged, presumably because their energy consumption is relatively small. Dough mixing, clothes and dish washing, floor polishing, lawn mowing and hedge clipping were among those mentioned in the address. While the attention paid to the

former group has been justified in the provision of revenue to make a supply to the others economic, it does not go far enough. Neither the number of kWh sold nor the rate per kWh is the true criterion of efficiency, but over-all service given. To give full service, supply cannot wait upon demand, but must take the initiative in stimulating demand so that the requisite apparatus can be produced at prices that the multitude is prepared to pay. Experience has shown that what is most acceptable to consumers is most profitable to the electrical industry as a whole.

Rural Electricity

Too frequently the electricity supply industry has been accused of indifference to the desire of country dwellers for the benefits of electricity, unless they can make a comfortable profit. We have devoted a great deal of space to proving, by describing the work of supply companies (and municipalities), the falsity of this generalisation; most of the authorities will nowadays provide a supply on reasonable terms to any place within reasonable reach. Of course ideas will differ upon the interpretation of the word "reasonable," but resolutions which have been adopted by the Power Companies' Association put the matter in a clearer light. At all events they show the companies' good intentions and have been welcomed by the National Farmers' Union.

E.A.W.'s Twenty-first Birthday

ANY early doubts that there may have been as to the value of the Electrical Association for Women both to women themselves and to the electrical industry must surely have been dispelled by its record of achievements during the past twenty-one years. Its work in connection with electrical education, housecraft training, design of appliances, housing, health and the improvement of domestic conditions generally cannot be overestimated, and the Association has now come to be regarded as one of the most potent instruments for the future development of domestic electrification. A great debt of gratitude is owed to those individuals and organisations which had the foresight to establish and support the E.A.W., while to Miss Caroline Haslett, its director, must go a great deal of the credit for the energetic and enterprising manner in which the Association has more than fulfilled their expectations.

Large-Scale Developments

MR. W. DIXON'S address as chairman of the I.E.E. North - Eastern Centre amounted essentially to a comprehensive "progress report" on electricity supply with indications of trends of recent major developments. The author's account of the means adopted to overcome certain "teething troubles" was made the more valuable by comparison at first hand with experiences in the United States. More prolonged and closer contact with the war centre has made the provision of adequate plant capacity more urgent in Great Britain and this will no doubt influence generating practice here. Nevertheless the technical features of projects in hand seem likely to secure a correct balance (so far as this can be foreseen) between thermal efficiency and the cost of obtaining it. On the transmission side 264-kV cables and switchgear appear to be feasible.

Post-Office Achievement

As a record of steady progress in communications, made often under great stress, the chairman's address to the I.E.E. Radio Section was impressive on account both of the volume and diversity of the work carried out by Post Office engineers during the war. Full use was made of the opportunities provided, for example, by the necessity of applying voice-frequency telegraphy to radio circuits, as an improvisation in connection with D-Day, to explore its possibilities for ordinary operation. Of the very-high-frequency developments described by Mr. A. H. Mumford, most important in its ultimate influence on international communication appears to be the merging of line and radio techniques in bridging gaps in cable systems.

Call-up Continues

WE continue to hear of the ill-effects suffered by manufacturers by the calling up of their younger "key" men. The District Man-Power Boards have the very mistaken idea that with the cancellation of war contracts these men become surplus to requirements whereas the need for them during reconversion is greater than ever.

The E.A.W. Comes of Age

Women's First Electrical Exhibition

LAST week the Electrical Association for Women celebrated its twenty-first birthday. To mark the occasion and as a tribute to the eight million women mobilised for war the British Electrical Development Association is now holding the first Women's Electrical Exhibition at Dorland Hall, Regent Street, London, S.W.1. The exhibition was opened on October 11th by H.R.H. the Duchess of Kent. Later in the day Sir Stafford Cripps, President of the Board of Trade, was the principal guest at a luncheon held by the E.A.W., which also arranged a reception in the evening at Grosvenor House. This was followed on Friday by addresses at the Institution of Electrical Engineers by Sir Robert Watson-Watt, Sir Harry Railing and Mrs. Kathleen Lonsdale.

The Duchess of Kent signs the visitors' book at the E.A.W. stand

Welcoming the Duchess of Kent at the opening of the exhibition, Lord Brabazon, president of E.D.A., said that great advances had been made during the past six years and women had shown their value in a remarkable way. There were now thousands of women who were thoroughly electrically minded and we should now see that every electrical device was installed in their homes. It was to be hoped, too, that many women would adopt electrical careers.

Opening the exhibition, the Duchess of Kent referred to the invaluable part played by British women during the war and said that their efforts had not been excelled by those of any other country. The knowledge and skill they had acquired in electrical matters must not be wasted but must be adapted to meet peacetime requirements. Her Royal Highness evinced great interest in the exhibits and she was accompanied in her tour by Lord Brabazon, Lord Lytton (past president of E.D.A.), Lady Herbert (lady - in - waiting), the Lord Mayor of London (Sir Frank Alexander), Mr. V. W. Dale (general manager, E.D.A.), Miss C. Haslett (director of the E.A.W.), Mr. F. Newey (chairman, E.D.A. Council), and Capt. J. M. Donaldson (chairman, E.D.A. Exhibition Committee). Many other persons prominent in the electrical industry were present at the opening ceremony.

There was also a very comprehensive gathering of electrical personages at the

Mr. G. Tomlinson, Mrs. K. Lonsdale, Sir Stafford Cripps, Lady Swaythling and Mr. Herbert Morrison

birthday luncheon given by the E.A.W. at the Connaught Rooms. Sir Stafford Cripps, President of the Board of Trade, who proposed the health of the Association, was accompanied by Mr. Herbert Morrison, Lord President of the Council, and Mr. George Tomlinson, the Minister of Works. Congratulating the Association on attaining its majority, Sir Stafford said that there was not the slightest doubt that during the past twenty-one years the Association and its director, Miss Haslett, had made a very marked impact upon the development of the use of electricity in the home. The originators of the Association had seen that electricity could be used to do for the ordinary housewife a great deal she had hitherto had to do herself. It was a new universal servant which could be employed at very low cost provided the people responsible for it understood the housewife's needs and the housewife understood its possibilities.

Sir Harry Railing and Mr. H. Nimmo

Mrs. Kathleen Lonsdale and Sir Robert and Lady Watson-Watt

Sir Stafford regarded this organised effort to free the ordinary housewife from the unnecessary drudgery of domestic affairs as an absolutely necessary corollary to the granting of the vote to women. If therefore through the activities of the Association they could spread the use of convenient forms of power and heat in the home, they would be doing the most practical thing to give women of the country free time to interest themselves in outside affairs. The E.A.W.'s educational work also gave women an introduction to the knowledge of electricity which would help them to enter the electrical industries and make their careers there. He hoped the Association would continue its activities in connection with young people and so train more and more to take an intelligent interest in their scientific and technical surroundings.

Women who during the war had become acquainted in factories with modern materials and labour-saving methods would want some of these materials and methods applied to their domestic problems. He hoped too that they would have learnt something of the differences between rubbish and well-made and lasting domestic appliances. It was essential that some body such as the E.A.W. should study the problems of domestic electrical equipment and advise the manufacturers upon the best way of meeting the housewife's needs.

This country had long had the reputation for the soundness and solidarity of its mechanical and electrical construction. Indeed sometimes the complaint had been made of the over-solidarity of articles

Mr. H. J. Randall, Mr. E. R. Wilkinson, Mr. R. P. Sloan and Mr. P. V. Hunter

which were not really required to last so long. But as regards convenience and appearance in such articles as domestic appliances we had allowed ourselves too often to be dictated to by the technician and production engineer. This had resulted in our not having produced such attractive or convenient articles as our rivals in other countries. He hoped the E.A.W. would continue to press for articles it considered attractive and most convenient for the housewife, not for the production engineer. What the E.A.W. thought good, attractive and convenient for the British housewife would also appeal to housewives abroad and so help to develop our export market without which we could not get our food or raw materials. The electrification of our homes had hardly begun yet and the tremendous new programme of house-building was a great opportunity for introducing the electric servant to all of them.

Acknowledging the tributes paid by Sir Stafford, Miss Haslett thanked E.D.A. for its " birthday gift " of the exhibition.. The E.A.W., she said, owed much to the prominent men whose belief in its work had made it possible, the first among them being Sir Andrew Duncan, then chairman of the Central Electricity Board. The Electricity Commission, the Institution of Electrical Engineers and the great electrical organisations gave support and encouragement which enabled the Association to achieve maturity. Among names especially remembered were Dr. S. Z. de Ferranti, Col. R. E. B. Crompton, Sir John Snell and Lord Hirst. The Association had grown up in an atmosphere of healthy criticism and its own achievements were the vindication of its existence. This environment provided the stimulus and was a continual challenge to go ahead into new fields of work. The electrical industry had in its hand a great gift which would ameliorate the lot of the women of Britain by giving them labour-saving homes and surroundings and would do much to offset the strain of war. The provision of well-designed, well-equipped homes was a matter which the electrical engineer had to consider apart from his preoccupation with electrical

Top : Mr. J. R. Jones, Mr. W. J. Jones, Mr. J. Eccles and Mr. F. H. Pooles

Centre : The Duchess of Kent with Lord Brabazon and Mr. V. W. Dale, inspecting the "Perspex" cooker

Left : Miss Haslett shows Mrs. R. G. Casey, wife of the Governor of Bengal, the Ferranti stand

developments as such. The electrical industry must increasingly provide for the needs of the ordinary women and must increasingly

The new Bendix automatic washing machine

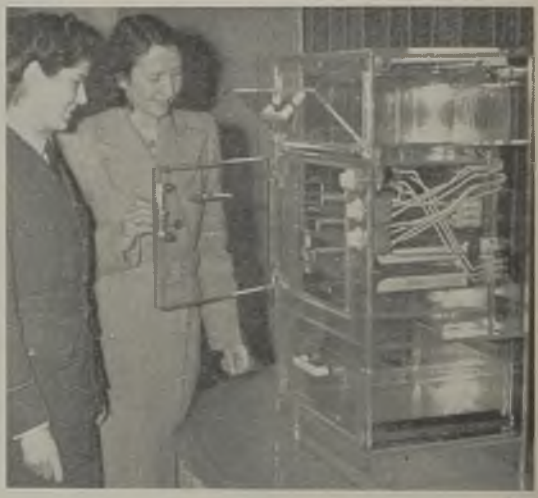
make use of the skilled services of women in its own developments.

At the reception held at Grosvenor House in the evening a presentation was made to Miss Haslett in the form of a jade and diamond ring. The presentation was made by Mrs. M. B. Jackson and Mrs. F. N. Rendell-Baker. An illuminated birthday greeting employing new devices of neon and fluorescent lighting was arranged by the Electric Lamp Manufacturers' Association.

Speaking on " Women and Wireless " at the Institution of Electrical Engineers on Friday afternoon, Sir Robert Watson-Watt said that women had not yet provided famous names in the science of radio as they had done in other spheres. The reason for this was to be found in unimaginative training and he hoped the Association would add to its objects the securing of improvements in this direction. There was, however, an important place for women in radio. Once a device had been originated there was a very important field open to their talents, especially on the pre-production and manufacturing sides. During the war women had played an important rôle in radio work in the Services, as well as the B.B.C., and had provided two-thirds of the radar operators who took such a decisive part in the Battle of Britain.

" A Woman Physicist Looks Back " was the title of the address by Mrs. K. Lonsdale, one of the first two women to be elected to membership of the Royal Society. She traced the course of electro-physics from the discovery by Madame Galvani of animal electricity to modern X-ray crystallography.

Sir Harry Railing, speaking on " After the Scientist, the Engineer," said that it was impossible to draw a clear distinction between pure and applied science, or for that matter between science and engineering. However brilliant the research work and the contribution to scientific knowledge of the leading university scientists, their efforts would have no industrial results unless there were scientific brains within industry to understand their work and its aims and which had the vision to see how these discoveries could be used for the benefit of industry and so the community generally. In due time the engineer would solve the problem of slowing down the energy released by the atomic bomb to manageable proportions; this would lead to practical applications which would displace other forces used at present. The man of science considered his work fulfilled when he had made a new discovery; the engineer rendered his service when he demonstrated how the discovery



A W.A.A.F. officer has the " Perspex " cooker explained to her

could be employed for the use of mankind. Before attending last Friday's meeting Lady Swaythling and Miss Haslett accompanied Her Majesty Queen Mary on a tour of the exhibition.

Women's Electrical Exhibition

The exhibition at Dorland Hall is remarkable for the way in which it indicates in a comparatively small space both the part played by women during the war and also the tremendous scope for electricity not only in our homes, but in our schools and health and public services. Radio communication is the side of their work shown by the A.T.S., who have also provided electrical and instrument mechanics, welders, etc. The W.R.N.S. are demonstrating the operation of the magnetic mine, while the W.A.A.F. show how radar assists in the interception of enemy aircraft. Various aircraft instruments such as the distant-reading compass, the master compass, variation setting corrector and pilot's repeater, produced by Ferranti, Ltd., indicate work done by women during the war, other aspects of their activities depicted being communications, medical services and civil defence.

Passing from the past and present to the future, the display gives glimpses into some of the opportunities now open to women, at the same time demonstrating progress already made or anticipated by electricity in the various spheres—the nursery, television, health, schools, housing, catering, and horticulture. The school exhibit, with a modern classroom, not only emphasises the importance of teaching electrical subjects but also points out some of the electrical aids to learning—radio, the cinema, the epidiascope, workshop apparatus, etc. Small models of cookers, potato peelers, mixers, vegetable boilers, fish fryers, etc., are employed in the catering exhibit, while the horticultural section includes electrical soil-heating apparatus and special convection heaters giving a humid or dry atmosphere.

The catering exhibit

A particularly attractive exhibit, in which the Electric Lamp Manufacturers' Association has co-operated, demonstrates by a series of foreshortened and wired miniature stage sets, depicting the chief rooms of the house, hall and stairway, dining room, lounge, etc., how light can be employed decoratively as well as for utility. The impressive results obtainable by the new lighting methods are not out of the reach of the average housewife. The shadowless high-intensity illumination provided throughout the exhibition is achieved


Some of the new cookers and washing machines

by the employment of fluorescent lighting.

Apart from a number of models, plans and photographs drawing attention to the importance of kitchen planning, there is also a full-sized model dining-kitchen completely equipped with the latest labour-saving electrical appliances—horizontal type cooker, water-heater, refrigerator, clothes-washer, airing cupboard, fan, clock, etc. with a plentiful supply of plug-points for various other kitchen aids such as kettle, iron, mixer, etc. The washing machine is making its first public appearance in this country. Washing 10 lb. of dry clothes, this Bendix unit is completely automatic. It fills itself with water, washes the clothes, triple rinses, damp dries them, empties and cleans itself and finally switches itself off. All the housewife has to do is to put in the clothes and soap and set a switch.

Other new apparatus typical of new designs just beginning to come on to the market include Jackson and English Electric cookers, Hotpoint and English Electric washing machines, a Jackson washing boiler, a Belling towel rail and various types of heating apparatus, including models of the convection type. A demonstration model cooker made of " Perspex " shows the visitor how simple the apparatus really is both in construction and operation. Another interesting exhibit is a " Redifon " radio-frequency heater, which with a loading of ¼ kW at 30 million cycles a second, can be used to make crustless bread for sandwiches, and cook meats evenly and thaw out frozen fruits in a matter of seconds. Films are used to show the way in which electrical methods can save energy and eliminate labour on modern motion-study lines.

PARLIAMENTARY NEWS

By our Special Reporter

Electricity Supply Re-organisation.—Upon the re-assembly of Parliament on October 9th, the Minister of Fuel and Power (Mr. Shinwell) told Mr. A. M. F. Palmer that he hoped to make a statement in the near future upon the Government's policy on electricity supply re-organisation.

Col. Thornton-Kemsley asked the Minister of Fuel and Power if he was aware that the electric power companies had set aside £100 million for post-war expansion, but that the Government's proposals for nationalisation of this industry had created an uncertainty which was unfavourable to industrial expansion; and what steps he proposed to take to ensure that cheap power was made available at the earliest possible date in all rural areas.

Mr. Shinwell said that he was aware of these post-war development schemes and in considering the re-organisation of the electricity supply industry he would not overlook them nor the necessity of improving electricity supplies in rural areas. In reply to a further question, Mr. Shinwell said that he was bearing in mind the desirability of avoiding dislocation of the supply to rural areas.

Asked by Mr. Butcher whether it was proposed to co-ordinate the gas and electricity industries, Mr. Shinwell said that he proposed to make a statement on the future of these industries at an early date.

Durham Power Station.—Mr. C. F. Grey asked the Minister of Town and Country Planning if he was aware that the proposal of the North-Eastern Electric Supply Co. to erect a power station at Kepier, Durham, had the support of all the local authorities and was only opposed by a minority; upon what grounds he was delaying his consent to the scheme; what independent investigations his Department had conducted in respect of the proposal; and if he would reconsider his position with a view to giving permission for the proposed development.

In a written reply, Mr. Silkin stated that after full consideration of all the representations made, his predecessor found the proposal open to objection on planning grounds and decided, in consultation with the Minister of Fuel and Power, that if the occasion arose he would be bound to refuse consent to the scheme. He had since been informed by the company that it was taking steps to meet the demand for additional power by the installation of plant elsewhere and in these circumstances the question of a decision on the original proposals did not now arise.

S. G. Brown, Ltd.—On October 10th Mr. Sparks asked the First Lord of the Admiralty whether S. G. Brown, Ltd., Acton, was to continue to be owned by the Government. Mr. Alexander replied that the future of the company was under consideration and he was not able to say what the ultimate decision would be.

Broadcast Relay Systems.—In a reply to Mr. Randall, the Assistant Postmaster-General (Mr. Burke) said that no decision had yet been reached on the questions whether the undertakings of broadcast relay companies should be acquired on the expiration of their licences, or whether the development of a Post Office service should be revived. The number of exchanges in operation was 274 and at June 30th last there were 584,018 subscribers.

Electric Motor Maintenance

Notes on Experience in a Large Factory

By D. T. Evans, A.M.I.E.E.

A PROPERLY-organised system of plant inspection can prevent breakdowns which are likely to occur where maintenance merely consists of attending to faults as they arise. When all factors are considered a planned maintenance scheme is economic. Some details of a preventive maintenance scheme at a large factory are given below.

Written reports are made out by the electricians in connection with breakdowns and an analysis is made of all faults. The electricians carry out inspections in accordance with printed instructions issued in the form of a booklet. Weekly reports are made on the inspection of important items of plant, matters requiring attention being noted, and on any faults that have occurred during the period. A record card is provided for each piece of apparatus, giving brief details of its history. Charts are used to ensure that maintenance is being carried out at the required times.

At six - monthly intervals, a detailed examination of all plant is made. For example, motors are cleaned out and tension and alignment of adjustable belt drives are checked; bearings are inspected for lubrication; brushes on DC and slip-ring motors are examined, contacts being renewed where necessary; connections are checked for tightness; oil in dashpots is checked for correct level. Resistance tests are carried out, and a special note made where readings are below 1 megohm.

Overload trips in motor circuits are given the lowest rating which will provide satisfactory service, *i.e.*, without tripping during starting or on short - time overloads. Generally the setting does not exceed 25 per cent. above the full-load current of the motor. In very exceptional cases, the over-current release is set above this value to avoid unnecessary tripping, but generally a suitable time lag overcomes this difficulty and at the same time allows the starter to trip on a sustained overload.

The majority of burn-outs on three-phase motors are caused by single-phasing and to prevent this starters must have over-current releases sufficiently sensitive to trip when the current rises to a dangerous value. In connection with thermal overloads, where starting and stopping are controlled by means of a float, pressure or thermostatic switch (as in pumps, refrigerators, compressors and heater fans) the starter is provided with a resetting device; otherwise the starter would continually switch in and out on a fault, and this would ultimately lead to the breakdown of the motor.

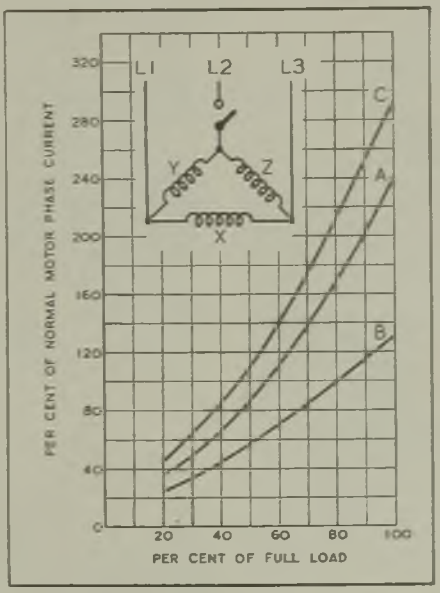


Fig. 1.—Currents at different loadings when one phase of a delta-wound AC motor is open-circuited

A = Current in lines; B = current in windings Y and Z; C = current in winding X

Circuit conditions in a normal three-phase delta - wound motor with one phase open are shown in Fig. 1. At full-load the opening of one of the supply leads causes the line current to rise to almost two and one-half times normal, and the current in the heavily loaded phase to rise to nearly three times normal. At 65 per cent. load the line current would rise to 120 per cent., and the current in the heavily loaded phase to 150 per cent. of its full-load value. An overload-release unit, set at 25 per cent. above full load, would permit one of the stator windings of the motor to

undergo 50 per cent. overload without protection. As the heating is proportional to the square of the current, the stator winding would probably burn out if single-phasing were prolonged.

For meeting these conditions, additional no-volt coils have sometimes been suggested, which would trip if the supply voltage were cut off in any phase. If the fault is on the motor side of the no-volt connection, however, the device fails to act, while if it is on the supply side, the motor itself will usually develop sufficient voltage to keep the trip from releasing. To meet such conditions, a "single-phasing preventor" has been used; this embodies three thermal strips (for a three-phase motor), which carry the main current, and an auxiliary switch for connection in the tripping circuit of the main control equipment.

Broadly speaking, fuse sizes are selected so as to provide for the following conditions: For squirrel-cage motors up to 40 HP, approximately three times full-load current; for slip-ring motors from 20 to 100 HP, approximately twice full-load current; for DC motors, approximately twice the full-load current. For other sizes the fuse size is individually selected, depending upon the type of motor and nature of drive.

Proper discrimination must be obtained between the fuses and starter overload protection. In all cases, the aim is to protect the motor from overload by the overload trips rather than by the blowing of fuses. Fig. 2 gives typical fusing and tripping times of cartridge fuses and thermal overload trips to suit a 7½-HP three-phase 400-V motor, having a full-load current of 11·5 A.

Correct Discrimination Obtained

The graph shows the result of using a 30-A fuse. With fuses and magnetic overloads set at 125 per cent. of motor full-load current, simultaneous operation occurs in about 57 sec. at 62 A, *i.e.*, about six times full-load current. Below this current, the overload trip operates first and correct discrimination is thus obtained, the overload trips dealing with any overload up to the current of the stalled motor (usually six to eight times full-load), the fuses clearing only short circuits. If a 25-A fuse were employed no discrimination would be secured up to the stalled current of the motor, the fuses blowing instead.

As the starting current of a motor is often considerably more than the normal full-load current, the fuses must be rated high enough to avoid blowing when starting up; they are thus rated far too high to provide any measure of protection for the motor windings. Since fuses must be large enough to ensure reasonable continuity of operation, their protective effect is negligible against anything but a dead short-circuit. The planned maintenance scheme referred to was devised by the consulting engineers, McLellan and Partners.

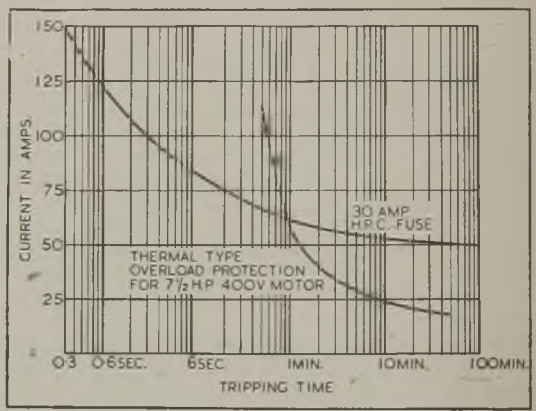


Fig. 2.—Comparative operating times of h.r.c. fuses and thermal overload trips protecting 7½-HP 400-V motor

United States "Cartel" Charge

ON October 10th the United States Department of Justice brought a civil action against the General Electric Co., the Westinghouse Electric Corporation, their two subsidiaries—International General Electric Co. and the Westinghouse Electric International Co.—the Electrical Apparatus and Export Association, which is jointly owned by the major companies, charging violation of the anti-trust laws in sales of electrical equipment for export. It was alleged that since about 1931, the five defendants "have been continuously and are now engaged in unlawful combination to restrain trade with foreign nations in electrical equipment," and that in 1930, the two subsidiaries and leading British, German and Swiss electrical equipment manufacturers formed an international cartel, with its headquarters in England, for the purpose of eliminating competition between themselves in all countries, except the United States, Europe, Russia, Japan, Canada, Newfoundland, Turkey, Spanish colonies and France. The cartel organisation allegedly functioned as a "bid depository," by means of which business was allocated and prices fixed.—*Reuter* (New York).

London Transport Board

Retirements and Appointments

IN our last week's issue we reported the retirement of Messrs. T. E. Thomas and J. H. Parker from the service of the London Passenger Transport Board and a number of new appointments. We now give some personal details of the officers affected by these changes which take effect on October 20th.

Mr. Thomas has been with the Board since its inception in 1933; he was appointed general manager of the tramways, having been general manager of the L.C.C. Tramways when the Board absorbed them. He commenced his career in 1899 with the London United Tramways and was resident district engineer when they were taken over by the Underground group in 1910; he was then placed in charge of publicity and development work. He joined the L.C.C. in 1917 as development superintendent and was successively traffic manager and (in 1930) general manager. After three years with the L.P.T.B. he was appointed general manager (road transport) in control

Mr. T. E. Thomas

Mr. J. H. Parker

of the Board's buses, trams and trolley-buses. He became general manager in 1943. Mr. Thomas was awarded the C.B.E. in 1941.

Mr. J. H. Parker, chief electrical engineer to the Board, is to retire on account of ill-health. He, too, was with the L.C.C. Tramways when the Board took them over. Upon leaving the Royal Technical College, Glasgow, Mr. Parker served an apprenticeship with Alley & McLellan and in 1904 went to the Greenock Corporation Electricity Department as a draughtsman, subsequently becoming chief assistant electrical engineer. In 1915 he was appointed deputy electrical engineer at Croydon and after ten years there he was appointed borough electrical engineer of West Hartlepool and later general manager of the Transport Department as well. While at West Hartlepool he was responsible for the change-over from trams to trolley-buses. He became electrical engineer of the L.C.C. Tramways in 1930 and when the L.P.T.B. took over continued as electrical engineer (tramways) subsequently becoming electrical engineer (distribution) and, in 1939, chief electrical engineer.

Mr. S. R. Geary, O.B.E., who is appointed to the post of general manager (road services),

Mr. S. R. Geary

Mr. G. F. Sinclair

began his transport career with the L.C.C. Tramways in 1905. He rose to the position of operating superintendent in 1919, and on the establishment of the Board he retained this position. In 1936, he was appointed operating manager (trams and trolley-buses) and in 1941 operating manager of the Board's central buses. He was awarded the O.B.E. in 1944.

Mr. G. F. Sinclair, C.B.E., M.I.F.E., who becomes deputy general manager (road services) received his engineering training with Dick, Kerr & Co., and during the 1914-18 war served with the R.A.F. in France. He later became general manager of the Kilmarnock Engineering Co. He was appointed assistant rolling stock engineer to the L.C.C. Tramways and soon after became rolling stock engineer. When the Board was formed he was appointed rolling

Messrs. P. Croom-Johnson and A. A. M. Durrant

stock engineer (trams and trolley-buses). He has been intimately concerned with the conversion of tramways to trolley-bus operation and has played an important part in the design of new trolley-buses.

Mr. P. Croom-Johnson, M.Inst.C.E., who is taking charge of the electrical engineering department as well as the civil engineering

department, with the title of chief engineer, was educated at Clifton College and in 1912 was appointed assistant engineer in the Liverpool Tramways and Highways Department. After war service in 1914-18 he returned to Liverpool, but in 1923 went to the Ministry of Transport. He became assistant permanent way engineer in the L.C.C. Tramways Department in 1924 and a year later was appointed permanent way engineer. He continued as permanent way engineer (trams) with the Board; in 1939 was appointed chief stores superintendent; and in 1943 chief engineer (civil).

Mr. A. A. M. Durrant, C.B.E., the new chief mechanical engineer (road services) was formerly with the London General Omnibus Co. He became engineer of the company in 1932 and on the formation of the Board was made engineer (central omnibuses). His appointment as chief engineer (buses and coaches) followed in 1935.

PERSONAL and SOCIAL

News of Men and Women of the Industry

ONE of the new members of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research is **Dr. C. C. Paterson,** O.B.E., F.R.S., head of the Research Organisation of the General Electric Co., Ltd. Among the members retiring upon the completion of their term of office is **Sir Felix Pole.**

Sir Guy Locock is resigning the position of director of the Federation of British Industries, which he has held for fourteen years, having joined the Federation as assistant director in 1918. The Grand Council of the F.B.I. has recorded its appreciation of the wisdom, ability and tact with which he has carried out his duties, and at its special request Sir Guy has agreed to continue in office until his successor is installed and thereafter to act in an advisory capacity. The Council has unanimously approved the appointment as director-general of **Mr. N. V. Kipping,** J.P., M.I.E.E., to take effect as early in the New Year as his release from Government duties can be arranged. During the war, Mr. Kipping was head of the Regional Organisation of the Ministry of Production. With the end of the war and the assumption by the Board of Trade of the continuing functions of the Ministry of Production, he was appointed as Under-Secretary of the Board of Trade and became responsible, *inter alia,* for the Regional Boards as a whole and for the Board of Trade's own Regional Organisation. Before joining the Ministry of Production Mr. Kipping was works manager of Standard Telephones & Cables, Ltd.

Mr. N. V. Kipping

Mr. Kipping was educated at University College School and London University and spent a period of two years in the Research Section of the G.P.O. Then for four years he was transmission engineer with the International Western Electric Co., being concerned mainly with the design of international telephone systems. During his service with Standard Telephones & Cables he was successively technical superintendent, engineer of manufacture and manager of the Southgate factory.

Mr. E. C. Willis, secretary and sales manager to the Bristol Corporation Electricity Department, has been appointed general manager of the undertaking, while **Lieut.-Commander H. E. Barrett,** who before the war was assistant manager to Central London Electricity, Ltd., and since 1939 has been serving in the Royal Navy, becomes chief engineer. Mr. A. J. Newman, who occupied the joint position of chief engineer and manager, retired at the end of last year, when his deputy, Mr. I. A. D. Pedler, who is now also retiring, was temporarily appointed acting general manager and engineer. Mr. Willis's salary will be £1,600 rising to £2,000, while Mr. Barrett's will be £1,500 rising to £1,800.

Major C. A. J. Martin, G.C., M.C., B.A., A.M.I.E.E., has been released from the Army and has resumed his position with Crompton Parkinson, Ltd., as sales manager for fractional-HP motors. For the past five years, Major Martin has served with the Royal Engineers on bomb disposal and he was awarded the George Cross in 1943. He won his M.C. in the 1914-18 war.

Lieut. J. F. Herbert, A.M.I.E.E., representative in Malaya of the English Electric Co., who has been a prisoner of war in Siam, is now on his way home in S.S. *Indrapoera.*

Mr. William Bird, managing director of the Engineering Lighting & Equipment Co., Ltd., is to be mayor of St. Albans. This will be his second term of office as mayor, the first being in 1934.

Mr. J. J. Ireland, mains superintendent of the Mid-Lincolnshire Electric Supply Co., Ltd., has been promoted to the position of assistant manager.

The first event arranged by the Social Committee of the South-East London Branch of the A.S.E.E. proved very successful; it took the form of a meal at a London restaurant, followed by a visit to the Cambridge Theatre to see "A

Night in Venice." At the restaurant Mr. A. D. Cullings, vice-chairman, spoke of the Branch's work during the war and Mr. E. H. Jesty outlined the plans of the Social Committee, of which Mr. B. H. Gurr is chairman.

Mr. Ian D. Campbell, B.Sc., M.I.E.E., A.M.I.Mech.E., generation engineer to the Hull Electricity Department, has been appointed deputy general manager and engineer to the Sheffield electricity undertaking. Mr. Campbell, who is a native of Darlington, is forty. He was educated at Darlington Grammar School and at the University of London, King's College. After serving as a college apprentice with Metropolitan-Vickers, he became junior engineer in the company's plant department in 1928, leaving a year later to become assistant switchgear engineer to the English Electric Co., Ltd., at Stafford. In 1934 he joined the Manchester Corporation Electricity Department as assistant electrical engineer in the construction department. From 1934-37 he acted as assistant and mechanical electrical engineer to the Air Ministry Works Directorate. He then spent two years as technical assistant to the Dundee Electricity Department, and in 1939 was appointed to a similar position at Hull, becoming generation engineer in 1943. He holds a first class honours degree in engineering and is an associate of King's College.

Mr. I. D. Campbell

Hull Corporation Electricity Committee has arranged to retain for another year the services of **Mr. Staniforth**, constructional engineer, in view of the extensions now in hand.

Mr. W. T. Andrews, chief engineering assistant in the Poplar Electricity Department, has been promoted to the position of deputy borough electrical engineer and manager.

Mr. P. T. Forth, district engineer with the North-Eastern Electric Supply Co., Ltd., has retired after nearly forty years' service with the company.

Mr. K. Sowerbutts, B.Sc., A.M.I.E.E., whose appointment as technical assistant and substation engineer with the Dover Corporation Electricity Department was recently approved by the Town Council, has withdrawn his application.

Among the awards made by the Junior Institution of Engineers in respect of papers and lectures delivered during the 1944-45 season is one (Tookey Award) to **Mr. H. K. Hewett** for a paper on "Electric Traction in Great Britain."

Alderman H. E. Rhodes, who is to be the next Mayor of Preston, has been chairman of the Electricity Committee for seventeen years.

Among recent promotions in the technical staff of the Bradford Electricity Department are the following:—**Mr. K. W. Coupe**, A.M.I.E.E., from second mains assistant engineer to first mains assistant engineer; **Mr. E. A. Gillett**, A.M.I.E.E., from third mains assistant engineer to second mains assistant engineer; **Mr. C. Ludlam**, from substations maintenance assistant to third mains assistant engineer.

Major W. H. Storey, television manager of Pye, Ltd., up to September, 1939, and thereafter on active service with the Royal Signals is expected to return to this country this week to take up an executive position with the Pye company. Major Storey has been in a prisoner-of-war camp since the fall of Singapore but is reported to be in good health. Before the war he was a member of the Television Development Committee.

Mr. Ernest Mutimer of the sales service section of Alliance Wholesale, Ltd. completd twenty-five years with the company on September 29th, and was presented by the directors with a cheque.

Mr. R. W. Field, illuminations engineer to the Blackpool Corporation is due to retire next month but he is to remain in the service for another year.

Mr. E. J. R. Kay, assistant mains engineer at Bedford, has been appointed mains engineer in the City of Oxford Electricity Department.

Major S. J. J. Vaughton, M.C., T.D., has been appointed a director of Higgs Motors, Ltd. He received his early education at King Edward's School, Birmingham, and joined

Major S. J. J. Vaughton

Mr. A. W. Fisher

Higgs Motors as a sales engineer over twenty years ago. From 1926 to the outbreak of war he was sales manager, and during this period made several business trips abroad. During the 1914-18 war he was with the Royal Tank Corps in France and Russia, and he has recently been released after six years with the Royal Warwickshire Regiment.

Mr. A. W. Fisher, B.Sc., A.M.I.E.E., has recently resumed his position as manager of the London branch of Higgs Motors and has been appointed a local director. He was educated at King Edward's School, Birming-

ham, and London University where he took the degree of B.Sc. (Econ.). Mr. Fisher joined the company in 1921 and after spending about two years at head office was appointed manager of the London branch, which position he has held continuously with the exception of a break from 1939-1945. From 1915 to 1920 he served with the Royal Engineers, being twice mentioned in despatches.

Mr. A. E. Tanner, says the *B.E.A.M.A. Journal*, has retired from the position of assistant managing director of W. T. Glover & Co., Ltd., owing to continued ill-health. Mr. Tanner has been connected with the Cable Makers' Association from its early days and acted as chairman in 1918, 1932 and 1938. Mr. Tanner has been with Glovers since 1897 when he joined the company as contracts manager and he has been on the board since 1907.

It is also reported that Mr. Tanner has resigned from the board of Enfield Cables, Ltd.

Mr. W. S. Poole has resigned his directorship of the Atlas Electric & General Trust, Ltd.

Mr. H. G. Richards, secretary of Tube Investments, Ltd., since the company's formation in 1919, has resigned on reaching the retiring age and **Mr. A. B. Innes Dick** has been appointed to succeed him as secretary.

Obituary

Mr. C. E. Fairburn.—We regret to report that Mr. Charles Edward Fairburn, chief mechanical and electrical engineer of the London, Midland & Scottish Railway Co. died suddenly in London on October 12th. Mr. Fairburn was educated at Bradford Grammar School and Brasenose College, Oxford, and then spent a short period in a small general engineering shop before becoming a pupil (1910-1912) at the Derby works of the then Midland Railway. In 1912 he joined the Railway Department of Siemens Bros. Dynamo Works, Ltd., and from 1913 to 1916 was assistant to the resident engineer on the erection of the overhead line between Newport and Shildon on the then North Eastern Railway, the first 1,500-V DC line in England.

The late Mr. C. E. Fairburn

Mr. Fairburn received a commission in the R.F.C. in 1916 and later was experimental officer in the R.A.F. eventually becoming major. In 1919 he joined the English Electric Co., to organise a heavy traction department for railway electrification and he held this position until 1926 when he was appointed general manager of the Dick Kerr works (Preston). In 1927 he was also given control of the car works of the English Electric Co. at Preston. He became general manager of the Stafford works of the company in 1928, retaining charge of the Preston works, and he relinquished control of the three works in 1931 to become chief engineer and manager of the Traction Department of the company. He spent much time abroad studying and advising upon electric railway schemes, including systems in Hungary, Egypt, Poland and Denmark.

He joined the L.M.S. Railway Co. in 1934 as chief electrical engineer; in 1937 he was in addition appointed deputy chief mechanical engineer; and he succeeded Sir William Stanier last year.

Mr. Fairburn was chairman of the Contractors' Committee for the Electrification of the Polish State Railways, and he was a member of the Institutions of Civil and Electrical Engineers, and of the Institute of Locomotive Engineers. He delivered the Faraday Lecture in 1941. He had also served on the London & Home Counties J.E.A. and the North Wales & South Cheshire J.E.A., and as a member of the E.R.A.

Mr. A. G. Cooper.—The death occurred on October 10th at the age of seventy-three of Mr. Alfred George Cooper, electrical engineer and manager to the Thornton Cleveleys Urban District Council. Mr. Cooper served his apprenticeship with Latimer, Clark, Muirhead & Co., Ltd., Westminster, and in 1892 was appointed shift engineer to the Bournemouth & District Electricity Co., later serving in the same capacity with the City of London Co. In 1895 he was appointed station superintendent to the Sheffield Electric Light & Power Co., and in 1899 became electrical engineer and manager to Colne Corporation where he served until his transfer to the Ministry of Munitions in 1918. After a few years in private business, he became the first electrical engineer and manager to the Thornton Cleveleys U.D.C. on its inauguration in 1926 and remained in this position until his death.

L.A.C. Sidney C. Angell.—The death occurred in Scotland recently of L.A.C. Sidney Clarence Angell who for about twenty years was attached to the Brighton office of Drake & Gorham Wholesale, Ltd., as outside representative.

Mr. C. A. Petty.—The death occurred at Eastbourne on October 9th, after an illness, of Mr. Cyril Arthur Petty. Mr. Petty was with the General Electric Co., Ltd., as London manager for fans and fractional-HP motors: he had had forty-two years' service with the company.

Mr. L. G. Carter.—Mr. Leonard George Carter, managing director of the Carter Electrical Co., Ltd., Romford, died on September 22nd, after a short illness.

CORRESPONDENCE

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

Chief Engineers' Salaries

MAY I be allowed to correct the untrue statement contained in the letter signed "Unsheltered" in the *Electrical Review* of October 5th.

The last paragraph shows that the writer has little or no knowledge of his subject, because neither the I.M.E.A. nor its Journal has any connection whatever with the question of chief engineers' salaries.

Fleetwood. W. P. LILWALL.

Cut-out Load Curves

I WOULD refer those interested in cut-out load curves to an article on the subject by F. H. Fullerton in the *Electrical Review* dated January 24th, 1930. In this a very good photograph of the graphic load curve was included.

Bedford. S. A. DAINES.

Meeting Consumers' Needs

THE inaugural meeting of the Installations Section of the I.E.E. was marked by a stimulating and provocative address by the chairman, Mr. Forbes Jackson, who addressed the meeting as a consumer. Mr. Jackson pointed out how little effort the industry and the trade make to find out what the needs of the consumer really are; nor are they apt to put before the consumer in an attractive manner the amenities and services which even now are available.

A striking example of the latter failing has recently come to my notice. A girls' school, returned from evacuation, is now being re-established in one of the Home Counties. The old buildings have been damaged and, having to re-equip them, the head mistress naturally wishes to have them fitted up with the most up-to-date electrical appliances; including a modern lighting installation. She has specified that the lighting of the classrooms should conform to the recommendations of the Illuminating Engineering Society for schools; but up to the present no one whom she has approached, including the local electricity authority, has been able to help her. She has not been able to find out how it will be possible to have this work done or who will do it.

I do not know of any contractor or manufacturer of electrical equipment who announces to the public that he has such specifications and is prepared to work to them, and I believe that there is a really serious lacuna in electrical services.

London, W.C.1. T. C. ANGUS, D.Sc., A.M.I.E.E., F.I.E.S.
Department of Applied Physiology,
London School of Hygiene.

Rural Supplies

Power Companies' Resolutions

THE National Farmers' Union announced last week that the Incorporated Association of Electric Power Companies has adopted three resolutions of considerable importance to farmers. The first of these points out that the Association represents nineteen member companies and five associate member companies whose combined areas cover about two-thirds of Great Britain. It goes on to say that these companies intend to intensify forthwith their policy of extending their distribution systems into remote rural areas and, in particular, isolated farms. They will also undertake to prepare schemes for individual farms in particular areas of the country.

By the second resolution the companies agree, as a principle of co-ordinated policy, to minimise and, wherever possible, to avoid capital contributions. In cases where such a contribution is necessary the companies will have regard to the estimated revenue from the connection, and if the consumer is prepared to guarantee an annual consumption of electricity the amount of the contribution will be reduced accordingly.

The third resolution confirms the principle of a Standing Liaison Committee working in conjunction with representatives of the N.F.U. to which either party may refer difficult cases for consideration and investigation. Individual companies will furnish to this Committee, on request, full particulars of such cases within their own areas of supply.

I.E.E. Western Centre

THE report of the Western Centre of the Institution of Electrical Engineers for the 1944-45 session records an increase in membership from 1,666 to 1,800. The average attendance at ordinary general meetings was 50 members and 25 visitors, making a total of 75 compared with 76 in the previous year and 41 in 1942-43. It is hoped that now the war is over a much greater proportion of members will attend.

Purchasers' Specifications

Stipulations That Should be Avoided

RELATIONSHIPS between the manufacturers and users, or purchasers, of apparatus pertaining to, but excluding, power lines and cables were commented on in the inaugural address in London of MR. E. T. NORRIS (Ferranti, Ltd.) as chairman of the Transmission Section of the Institution of Electrical Engineers.

It was pointed out that the incorporation of individual experience into specifications often resulted from a tendency to argue from the particular to the general. A common instance was the prohibition of particular materials, which was natural, but it ignored the probability that their apparent unsuitability was due to faulty use, or application, rather than to defects of the materials themselves.

Leave Details to Manufacturers

Specifications should therefore insist as little as possible on details of construction, and so avoid any implied request that the maker should guarantee the purchaser's design. Stipulations might complicate design and were frequently at variance with other requirements. For example, an exact value of reactance in a transformer was usually only needed for parallel operation; to fix its value exactly might conflict with desired efficiency and loss ratios, so in most cases an approximate value without tolerance limits should be allowed.

The common call for more onerous tests resulted from an erroneous belief that they ensured more reliable performance, whereas it was not possible to determine a stress equivalent of time. The actual factor of safety would ultimately be ensured not so much by tests as by the manufacturer's vital need to avoid failure.

Therefore specifications should state what the customer wanted, but not how it should be done, leaving design and constructional details to the manufacturer so far as that was possible. The common purpose of specifications (to enable the customer to purchase from any maker, regardless of the latter's reputation, with assurance of equally satisfactory operating performance) did not apply in general to engineering apparatus associated with the transmission of electric power.

Guarantee tolerances always had been, and still were, a vexed subject. Many manufacturers were in the anomalous position of having to insist upon tolerances through their standardisation committees and trade associations and, at the same time, were assuring their customers that they always designed well within their guarantees. That attitude was not only technically incorrect, but logically unsound and commercially unnecessary.

The chief justification for tolerance allowances was in relation to efficiency and loss guarantees but, since their proper use could not be controlled, they gave the maker latitude and were open to improper use. When the purchaser imposed penalties he introduced a commercial element, so that the risk then assumed both technical and commercial aspects.

The risk was one of incidence coupled with detection, involving consequential cost of correction. For example, a maker might not know as a technical fact that his product was surge proof; indeed he might be aware that it was not. But the chance of its having to withstand a severe lightning surge being so small, combined with likelihood of its failure, that the total risk might well be sufficiently acceptable to enable a guarantee to be offered, which might be misinterpreted by the purchaser.

First Cost and Performance

Another aspect of loss guarantees was the capitalisation of operating expenditure for determining the most economical relationship of first cost to technical performance. Although the importance of that procedure was generally appreciated, its application in practice seldom induced an initial expenditure exceeding the lowest offer. It seemed therefore desirable to consider not merely capitalisation values but also limitation of their application. Since they involved appraisement of future events in terms of the present, which could not be done with assurance, it was suggested that capitalisation be regarded as of broad significance generally rather than a specific calculation in detail. The final choice of equipment called for shrewd judgment and even political anticipation upon the part of the purchaser.

G.P.O. Developments

Progress During the War

SOME of the wartime radio station constructional work and equipment design carried out by the Post Office authorities were reviewed by MR. A. H. MUMFORD (G.P.O. Engineering Department) in his inaugural address in London as chairman of the Radio Section of the Institution of Electrical Engineers.

In 1940 it became desirable to set up a very low-frequency transmitter of high power on a new site to act as a reserve to the 16 kc/s telegraph transmitter at Rugby. Only three towers could be made available in time so they were erected on a plain in the West Country with anchorages for the aerial triatics on a hill of steeply sloping side some 800 ft. above the plain. The mean effective height of the aerial system which was initially 112 metres, or 67 per cent. of the physical height, appeared to have been reduced by 30 metres by the erection of two medium wave aerials from the same mast structures, but remote from the hill. The great urgency with which the plant was put into operation had prevented the investigation of the phenomena in any detail.

Although the standby station was on the point of completion when the Rugby transmitter was seriously damaged by fire early in 1943, restoration of the latter was deemed essential. The main indoor aerial-tuning coil had been completely destroyed; pending its reconstruction, for which special cable was needed, an outdoor coil was utilised (design and constructional details briefly outlined in the address) in the form of a cage of copper wires 65 ft. in diameter supported by wood pole structures 67 ft. above ground.

Study of Fading Phenomena

Turning to high-frequency developments Mr. Mumford outlined the design of equipment capable of reproducing fading signals of specified types at will by simulation in the laboratory, which had facilitated the design of short-wave receivers for long-distance radio circuits. By its use the study of fading phenomena had progressed much more rapidly than could have been the case if reliance had been placed merely on observation of actual circuits.

The value of that artificial test medium had been demonstrated in the course of investigations into the distortion resulting from the transmission of voice-frequency telegraph signals over a single-sideband radio-telephony channel, which development was also described in the course of the address.

The short-wave " Musa " receiving system (multiple unit steerable antenna) at Cooling in Kent came into commercial operation in July, 1942, signals being received from Lawrenceville, New Jersey, U.S.A., on one of a group of five frequencies. Comparison made by observers at the London radio-telephony terminal showed that for 75 per cent. of the time " Musa " reception was distinctly better than by the normal kind of single sideband equipment, which was less acutely directional.

Addition of V.F. Telegraph Channels

To guard against loss of transatlantic cables before the invasion it was decided to apply several voice-frequency telegraph channels to radio-telephony circuits in a similar way to land-line practice. Experience of typical short-wave radio circuits operating on a single sideband basis with triple-spaced aerial diversity had shown that for the bulk of any 24-hour period the errors attributable to the radio circuit did not exceed 1 in 5,000 to 10,000 characters, which standard approached the limits set by the teleprinters and the operatives. The policy of utilising a given frequency band to transmit several relatively low-speed channels rather than one of high speed (1,000 words per minute) had been demonstrated to be technically sound.

In conclusion Mr. Mumford referred to the growing use of very-high-frequency radio links, operating on a multi-channel basis with either amplitude or frequency modulation and carrying twelve speech circuits, for bridging gaps over river estuaries and between islands and the mainland. That development was indicative of the merging of line and radio systems, which was so essential to the effective exploitation of the communication art nationally as well as internationally. Since such radio links were incorporated as repeaters in the trunk network, it was necessary to appreciate how that factor affected the design of the very-high-frequency portion of the equipment.

Views on the News

Reflections on Current Topics

ARRANGEMENTS for inspection by British industrialists of German works proceed at an unhurried pace. The Americans have, of course, already had a good look round and so, I suppose, have the Russians. But so far as British visitors are concerned, transport difficulties are said to be causing delay. Eight " teams " representing various branches of British electrical industry have been formed and are " standing by "; a ninth is in process of formation.

* * *

In some directions it seems that the British Government and the Control Commission are operating quite separately. I hear of a party of industrialists for whom the Commission had made all arrangements—except for departure from this country. Months elapsed, when out of the blue a Government Department rang up the organiser of the party and said it was thought that a visit to Germany by representatives of his branch would be a good idea. In vain, was the caller told that everything had already been fixed up. He had been given the job and could not believe that it was not an original thought.

* * *

I am told that some people from this country who have managed to pay " unofficial " visits to German works that they have actually been looked upon as prospective buyers by the Germans. The latter have proudly displayed examples of their products and promised delivery within quite a reasonable time.

* * *

I did not agree entirely with the remarks made by Sir Stafford Cripps at the Electrical Association for Women's twenty-first birthday luncheon last week regarding the design of domestic electrical appliances. British manufacturers have certainly built up a reputation for soundness and solidarity of their products; in fact they may, as Sir Stafford said, have gone too far in this direction but I doubt if their best designed apparatus — after years of " utility " goods we may have forgotten what that is like—is to any very great extent inferior in the matter of convenience and appearance to that of other countries. In any case it is my impression that manufacturers' technicians and production engineers are only too anxious to obtain the views of users of their products as to any improvements that can be made. Sometimes they pay too much attention to the individual requirements of their principal customers, the supply undertakings.

Although few of those who listened to Dr. Dunsheath's presidential address at the I.E.E. could have been aware of all the achievements of electrical engineers during the war, I suppose it is true to say that most of them had some knowledge of some of these achievements. But it was the sort of address that deserved a wider public, to impress upon that public what they owe to the profession. I was therefore glad to see in last week's *Spectator* an article by Dr. Dunsheath somewhat on the lines of his address but placing particular stress upon the possible peacetime benefits to be derived from these wartime developments.

* * *

I referred last week to the relaxation of the evening dress rule for the occasion of the Victory Ball in aid of the Electrical Industries Benevolent Association. This relaxation is emphasised in a leaflet which I have had from the E.I.B.A. depicting the probable state of a dress suit after six years of disuse and suggesting, also pictorially, possible alternative garbs. It is to be hoped that none of these suggestions will be taken seriously, but the leaflet serves as an effective reminder that the Ball is at Grosvenor House, Park Lane, on November 9th, and that tickets (25s. each) may be obtained from the Electrical Industries Benevolent Association, 32, Old Burlington Street, W.1.

* * *

Presumably because the electric iron is comparatively simple to make and requires only a small quantity of material and labour, its production seems to have become the recognised means of entry of many new firms to the electrical market. I say " comparatively easy to make " and this is true inasmuch as that practically anyone with a small workshop can produce something that looks like an electric iron (it may in fact look quite attractive), but is nevertheless shoddily made with scant regard to insulation or earthing, reliability or safety. There are, of course, a number of excellent new makes of irons now coming on to the market, but the enormous pent-up demand for irons does provide a great source of temptation to unscrupulous manufacturers to scamp their work. Unless the high repute of electrical apparatus is to be besmirched, the public must be warned of the unreliability and perhaps even danger of such poor quality irons. It will not be long before irons of high quality will be available in good quantities at prices usually no higher than those of the inferior articles.—**REFLECTOR.**

Improving Power Supply

Generation and Transmission Trends

CERTAIN trends in the generation and transmission of power which had come to the fore during the war period were commented on by MR. W. DIXON (Merz & McLellan) in his inaugural address as chairman of the North Eastern Centre of the Institution of Electrical Engineers. Having recently visited the United States, Mr. Dixon was able in some instances to compare British and American power station experience.

The author said that the maximum demand in December, 1944, reached 8,351,000 kW, 25 per cent. more than the 1938 figure. During the 1944 m.d. period 18 per cent. of the installed plant capacity was out of service for one reason or another as compared with 6 per cent. before the war. When it subsequently became necessary to shed load in the southern areas the plant capacity out of service from all causes amounted to 2,657,000 kW, over one quarter of the total (11,250,000 kW).

The availability of plant in the near future was not likely to be much improved by the considerable extension programme that had been authorised because of probable manufacturing delays. Suitable sites for new power stations were scarce and the number of official bodies whose approval must be obtained was growing, so that the programme of extensions was likely to be at least a year late in reaching completion.

Steam Pressure and Temperature

Most major stations now under construction had been designed to contain 50,000-kW sets to operate at 900 lb. per sq. in. and 900 deg. F., approximately to 29 per cent. efficiency. But one station was to operate at 1,250 lb. and 950 deg. F. and another at 1,235 lb. and 825 deg. F. with reheating to 825 deg. F., both estimated to be 30·5 per cent. efficient. At one American station certain units were operating at 2,500 lb. and 940 deg. F. with reheating to 900 deg. F., resulting in an overall efficiency of 34 per cent., which was believed to be highest achieved in any condensing steam station in the world. It was doubtful whether it would be economical to aim at so high a figure in this country.

In America there had been definite standardisation of turbo-generators on a "wholesale" scale with hydrogen cooling for sizes of 20,000 kW upward. It was now being provided for many plants in course of manufacture in this country, being definitely advantageous for machines above 50,000 kW at 3,000 RPM. Price and maintenance considerations would govern its adoption for smaller sets. Interest in generator standardisation was now being aroused in this country with hope of manufacturing advantage. Every endeavour made during the past eight years to improve overall thermal efficiency had to a large extent been defeated by the increasing cost of coal.

Rotor-Winding Distortion

Distortion of the windings of alternator rotors had caused a good deal of "outage." Something better than the palliatives so far tried was needed in view of the definite requirement in this country for two-shift operation, involving large and frequent temperature variations. A good deal of the trouble was due to rotors being designed for too high a working temperature. Less flexible copper strip hardened by a definite amount of cold rolling to raise its elastic limit was claimed to permit differential expansion without permanent deformation. But the consequent need for more rotor current would mean a larger commutator on the exciter, which would be undesirable on directly-driven machines.

The objection would be removed by lowering the speed of the exciter, say to 1,000 RPM for 50,000-kW sets needing excitation of 180 kW at 450 V. For that purpose gearing of 3 to 1 ratio would appear to be preferable to a separate driving motor, although investigations were by no means complete.

Turning to distribution aspects, Mr. Dixon said it was becoming increasingly evident that the grid system would have to be reinforced in order to cope with growing difficulty of bulk transfer of large blocks of power, circuit protection, varying power factors in different areas and the decreasing possibility of siting power stations at theoretical load centres. Developments were actually in hand in respect of transformers and cables for 264-kV transmission and a

sample 264-kV circuit-breaker had been constructed; while it could not yet be described as a production type, its general design and arrangement showed distinct promise.

The performance of small-oil-content breakers had been very good and a limited amount of air-blast switchgear for 132 kV would shortly be in commission. Comprehensive tests had been carried out at various short-circuit testing stations to "prove" ratings up to 2,500 MVA. British and American switchgear development had been on much the same lines. No particular design could be said to put the United States outstandingly in the lead, but in 1942 the General Electric Co. of America had in commercial service on a 138-kV system two air-blast circuit-breakers of 3,500-MVA breaking capacity.

Cadmium-copper and steel-cored copper overhead conductors had been successfully used on standard towers to extend the main grid, but they were more expensive so that steel-cored aluminium would undoubtedly be used again when available. Toughened glass insulators continued to grow in popularity up to 132 kV. They tended to be slightly cheaper than porcelain, had greater surge strength and were more resistant to mechanical damage and power-arc heating.

It was universally agreed that, in peacetime, concrete poles could not compete in cost with wooden ones for 11- and 20-kV overhead lines.

Lighting Practice

I.E.S. Presidential Address

IN his presidential address to the Illuminating Engineering Society in London MR. H. C. WESTON pointed out that in the writings of the Roman poet Lucretius, who described the atomic theory of matter formulated by Greek philosophers, occurred what was probably the earliest description of glare. Yet, two thousand years afterwards glare remained one of the most common faults of lighting; rules of practice for its avoidance were features of the new I.E.S. Code which was about to be issued.

There had been a steady rise, during the past twenty-five years, in the values of illumination recommended for most purposes, which had been facilitated by the falling running cost of artificial lighting. But the upward trend of recommended standards was justified by accumulating evidence of the effects of conditions of lighting upon human efficiency. Personal efficiency was one of the indices of good health and that was the proper objective for which conditions of lighting should be prescribed.

The new fluorescent lighting, which had proved such a boon to so many people in war factories, had not altogether escaped adverse criticism. Much of it was misconceived and some due to installation faults and neglect of maintenance. No satisfactory evidence that it had any ill-effects upon the eyes had yet been brought forward.

Indifferent lighting was still widespread and responsible for much discomfort, strain, irritability and loss of efficiency. Just because they were commonplace, these supposedly minor ill-effects of improper lighting were important. There was no need to look beyond them to find justification for the efforts of their Society to secure better lighting in every field.

The Society's Task

The development of electric lamps was described in some detail by MR. F. F. MIDDLETON in his inaugural address as chairman of the Birmingham Centre of the Society. In Mr. Middleton's opinion members of the Society had a tremendous task to perform; the community must be educated to appreciate how, why and where to see well; the masses must be made conscious of the many benefits available to them and the claim that adequate lighting was a profitable investment must be proved by facts and figures. The main thing the Society had to fight for was recognition of illuminating engineering as a valuable addition to the already established professions.

Export Inquiries

WE have received the undermentioned inquiries from firms and individuals overseas who wish to secure agencies for British electrical equipment and appliances or to import them into their territories. We shall be glad to pass on to them replies received from readers which should be addressed to the Editors, quoting the number given in parentheses. We cannot vouch for the standing of inquirers and manufacturers replying to them will no doubt require the usual references:—

France.—The Société Civile pour l'Etude d'Equipements de Matériels de Transport, 155, Boulevard Haussman, Paris, 8e, which, as its name implies is principally concerned with all classes of special equipment for transport purposes, informs us that it is also interested in patented mechanical apparatus, as seller or agent for France and her colonies and protectorates. It is prepared to adapt equipment for the French market or to arrange for its complete or partial manufacture in France.

Netherlands.—A Rotterdam firm with connections in the Netherlands, Belgium and France wishes to import washing machines and wringers, refrigerators, vacuum cleaners, radio sets and electric cookers and heaters. (X.121.)

Palestine.—Agencies required for makers of electrical materials and appliances. (X.122.)

COMMERCE and INDUSTRY

Two Months' Trade Figures.

Overseas Electrical Trade

IN its endeavour to speed up the publication of overseas trade statistics the Board of Trade has now issued summarised particulars of imports and exports during July and August this year. These show that exports of electrical goods and apparatus were valued at £1,332,758 in July and £1,350,653 in August, which compares with a monthly average of £1,119,200 in 1938.

The total for the first eight months of the year was £8,758,753, against £8,953,603 as two-thirds of the 1938 total. Electrical machinery is not separately shown but exports of all classes of machinery were valued at £2,859,900 in July and £5,468,804 in August, against the 1938 monthly average of £4,822,297. For the first eight months of the year machinery exports totalled £30,377,710, against £38,578,377 for two-thirds of 1938.

Electrical goods and apparatus were imported to the value of £1,912,201 in July and £2,130,689 in August (1938 monthly average £258,900.) The total for the first eight months of the year was £17,081,985 against £2,071,203 for two-thirds of 1938.

Greenwich Exhibition

Electrical firms figured prominently in an exhibition held last week at Greenwich Town Hall in connection with the local Thanksgiving Week. Three of the companies who contributed to "Operation Pluto" by producing the "Hais" cable were represented:—Johnson & Phillips, Ltd., who also showed a series of photographs of other products, transformers, welding sets, radio and radar equipment, and sub-station plant, as well as standard and special cables; Siemens Bros. & Co. Ltd., who displayed specimens of telecommunication and power cables, dry cells and batteries (of which 200 million were produced), waterproof portable telephones, rare gas canisters, "Sieray" fluorescent lighting, etc.; and the Telegraph Construction & Maintenance Co., Ltd., which included on its stand "Telcon" metals, plastics and cables for radar, "Telcothene" sleeving (30 million yd. supplied), telephone and telegraph cables (12,000 nautical miles made) and grapnels.

Another cable maker, the Saxonia Electric Wire Co., Ltd., which during the war has made 82 million yd. of insulated wires and cables, displayed flexible cables, copper strands and "Insu-glass" heater wire used for heating a penicillin tank.

Parts of jet engines, aircraft components, gears, incendiary bombs, ships' propellers, headlamp switches, pressure die castings in magnesium, generator exciters for searchlights, voltage regulators for gunsight controls and torpedo firing mechanism were among the items exhibited by J. Stone & Co., Ltd., Samples of welding repairs as undertaken on boilers, pressure vessels and heavy machine parts were shown by Anglo-Swedish Electric Welding Co., Ltd., while G. A. Harvey & Co. (London), Ltd., showed examples and photographs of special metalwork.

Besides being responsible for maintaining its fleet of trams and trolley-buses, the Charlton works of the London Passenger Transport Board produced shells, incendiary bomb parts, sections of Bailey bridges, visor parts for tanks, machine gun components, etc.

First Trolley-buses for Brazil.

Call-Up of Young Technicians

The Engineering Industries Association, which represents more than 2,000 firms in all parts of the country, has sent a strong protest to the Government against the call-up of tool makers and other young technicians needed for the re-equipment of industry who cannot be replaced in any reasonable period.

Electrical Engineers' War Work

During the whole of the war Cooke & Ferguson, Ltd., were engaged in air-frame manufacture, aircraft machining and welded equipment for warships. The company began the manufacture of major components for the "Manchester" bomber early in 1939 and later for the "Lancaster." The components made were one-piece bomb doors, 35 ft. long, the outer wing trailing edges and ailerons. At the Victoria Street works the company produced a three-blade hydraulic airscrew hub, later supplemented by an electrical type. In the latter variation of pitch is accomplished by means of an electric motor. For welding the two half pressings forming the hubs a flash butt welding machine was developed with a rating of 1,200 kVA and capable of dealing with 40 sq. in. Further machining work was undertaken on the "Lancaster" undercarriage support beam.

In addition the company carried out a good

Low-pressure arc-welded turbine cylinder for a warship

deal of welding work for the Admiralty mainly in connection with the main propulsion machinery for various types of vessel. Among this work was the fabrication of l.p. turbine cylinders, in some cases weighing as much as 14 tons, necessitating the use of special manipulators. Gear cases and turbine cylinders for thirty-nine warships were provided.

R.E. Officers' Release

According to the Berlin correspondent of *The Times*, it has been found possible to release over 60 per cent. of the Royal Engineer transport officers in the British Army of the Rhine in Groups 15 to 18. For other R.E. officers release dates have been fixed for Groups 17 to 20, the average period of detention beyond the normal release date being twenty-six days. It is said that it may be necessary to hold other R.E. officers much longer.

Simplex-Creda Expansion

The Tube Investments group announces that £200,000 is being spent on new equipment for the Simplex-Creda electrical appliance works, Oldbury, near Birmingham. Mr. A. G. E. Briggs, formerly deputy steel controller, who was recently elected to the board of Tube Investments, Ltd., with the appointment of assistant managing director, is in charge of the developments, which will not interrupt existing production. The plan will result in an increased supply for the home market of electric cookers, fires, wash-boilers, kettles, irons, etc.

Strike at Neasden

Last week 150 men at the L.P.T.B. generating station at Neasden went on strike over, it is stated, a grievance dating back to 1933 when Greenwich power station workers were paid higher rates. The strike is unofficial. All Underground services have been running normally. According to a report in the daily press, about twelve administrative staff accustomed to light clerical duties have been doing the work of the 150.

Trolley-buses for Brazil

Among recent overseas orders received by the Associated Equipment Co., Ltd., is one from the Sao Paulo Tramways, Brazil, for the supply of four A.E.C.-English electric trolley-buses. These vehicles will be of the post-war, two-axle large capacity, single-deck type specially designed by the joint manufacturers for overseas operation. They will be used by the Sao Paulo Municipality on an experimental trolley-bus route which, if successful, will lead to an extensive system.

The order was obtained in the face of severe competition from American manufacturers through the persistent efforts of the English Electric Co's Brazilian distributors. This trolley-bus system will be the first to operate in South America.

Swiss Imports from Germany

Details of imports into Switzerland from "Greater Germany" are given in the *Board of Trade Journal*. The tables show that during 1943 imports of goods of an electrical nature were as follows:—Dynamo-electric machinery, 1,513,000 francs; hydro-electric machinery, 540,000 fr.; electricity meters, 1,014,000 fr.; electrical instruments and apparatus, 1,367,000 fr.; telephone and telegraph apparatus, 1,328,000 fr.; radio apparatus, 4,916,000 fr.; incandescent lamps, 866,000 fr.; electrodes, 4,602,000 fr.; and porcelain insulators, 2,641,000 fr. It is thought that these figures may be of interest to British exporters as showing the lines in which there is likely to be a market when the supply and transport position permits them to resume trade. The exchange rate during 1943 averaged 17·35 francs to the £.

Proposed Anglo-Australian Exchange

The city electrical engineer of Melbourne, Australia, has written to the Liverpool Electric Power and Lighting Committee suggesting an exchange of officials. The Committee proposes that facilities should be granted for two members of the electrical engineering staff from Melbourne to visit Liverpool to gain experience but has deferred consideration of the question whether personnel from Liverpool should go to Melbourne for the same purpose.

South African Telephone Requirements

According to the Capetown correspondent of the *Chamber of Commerce Journal*, the South African Post Office authorities hope next year to spend a large sum on telecommunications, most of which will be devoted to telephone development. It is estimated that the Department will have to spend at least £2,500,000 every year until 1951 if it is to meet applications for telephone service with a delay of not more than a few months. It will be almost impossible to overtake the accumulated arrears for about five years and the public may expect no relaxation of restrictions for a long time. In 1938 there were 1,000 people awaiting telephones and in 1939 there were 2,700. By 1944 this figure had risen to 22,000 and is now 31,000. In addition 7,500 farmers are waiting for service and 4,000 for extensions.

Safety in Engineering Construction

The Ministry of Labour and National Service has just issued a pamphlet which contains a preliminary draft of regulations under the Factories Act, 1937, as to safety, health and welfare in connection with work of engineering construction. Copies can be obtained from H.M. Stationery Office, price 9d.

Lamp Publicity

"Ekco" lamp publicity for the new season has been planned to give dealers the widest measure of support within present restrictions. Large painted posters on prominent sites in key towns throughout the country, are being accompanied by Press advertisements in national magazines, etc. Although paper regulations prohibit the production of normal display material a number of sales aids including posters, window bills and window stickers, will shortly be available. All are printed in full colours and although they have been printed on reclaimed paper little is lost in this unusual method of reproduction. Literature and price cards for dealers' use are available and public literature will be reintroduced as soon as regulations permit. E. K. Cole, Ltd., are prepared to help dealers on a 50/50 basis with the cost of local newspaper advertising and a range of

colourful cinema slides is available. These slides, incorporating dealers' names and addresses, will be prepared free of charge if required.

Similar publicity arrangements are being made by the associated company, Ensign

" Ekco " window bill and Ensign poster

Lamps, Ltd., whose range of sales aids will shortly include posters, window corner pieces, window bills and stickers, etc.

Diesel-Electric Locos for Egypt

The English Electric Co., Ltd., is to supply twenty-seven Diesel-electric locomotives to the Egyptian State Railways for use in speeding up the express service between Alexandria and Cairo. The contract was obtained in face of strong opposition from Sweden.—*Reuter.*

Persia Buys Communication System

The Persian Government has bought for £300,000 all the British telephone and telegraph installations set up in Persia during the war at a cost of £1,500,000.—*Reuter.*

The Future Coventry

An attractive 44-page brochure illustrated largely in colour has been published by the Coventry Corporation entitled " The Future Coventry " (price 2s. 6d.). It covers housing, industry, roads and transport and amenities generally.

Apparatus for the Services

Between 1939 and 1941 Erskine Laboratories, Ltd., was mainly concerned with the design and production of communications receivers for the Admiralty and the " Y " Service, but thereafter concentrated on the provision of special radar test gear and certain airborne equipment. The diversity of this test gear was considerable, but the more important items were signal generators for " G. & G.H."; signal generators, wavemeters, modulators, etc., for " Oboe "; special apparatus for testing American radar altimeters and other instruments for " C.H.L." " A.S.V." " A.I." and " Rebecca-Eureka." The main equipments developed and produced by the company included P.R.F. selectors Mark I and III with ancillary equipment for the " Oboe " aircraft installation, experimental anti-submarine apparatus and the Mark III G.H. receiver. At the present time the company is developing several new instruments for the peacetime Air Force and the Inter-Services Radio Measurement Committee.

Trade Publications

British Thomson-Houston Co., Ltd., Rugby.—Illustrated list (No. 5620-1) descriptive of cubicle-mounted type G.M.C. grouped motor control for power station auxiliaries, material-handling plant, pumping stations, etc., the gear within individual motor components being safely accessible without shutting down the whole installation.

Consolidated Pneumatic Tool Co., Ltd., 232, Dawes Road, London, S.W.6.—Coloured folder (S.P. 271) dealing with special applications and sizes of straight-lift hoists, illustrating how the air-operated ram can often relieve manual effort.

Applicants for copies of these publications should write on their firms' business notepaper.

Trade Announcements

Enfield Cables, Ltd., has transferred its Leeds branch office and stores to larger premises at 28 York Place. The telephone number is unchanged.

To provide sales and service facilities in the northern area Marconi Instruments, Ltd., has established an office at 30, Albion Street, Hull (telephone: Hull 16144) with Mr. D. J. Taylor, northern representative, in charge.

Bullers, Ltd., have returned to their London office at 6, Laurence Pountney Hill, E.C.4 (telephone: Mansion House 9971; telegraphic address: Bullers, Cannon, London).

The Talbot Tool Co., Ltd., has appointed Norman Kinnersley & Co., 3, John Street, Bristol, as its agents for the West of England for " Grip " brand drill jig bushes.

The Northern Aluminium Co., Ltd., has reopened its London sales and inquiry office at a new address:—11, Bruton Street, W.1. The manager of this office, which will cover the whole of South-Eastern England, is Mr. E. V. Hill. A similar office, to cover South-West England and South Wales, is being established at Rogerstone, Newport, Mon., where the company has a large works.

The temporary head office at Reading of Watson & Sons (Electro-Medical), Ltd., is to be closed on October 31st. All correspondence should then be addressed to " Sunic House," Parker Street, Kingsway, W.C.2.

The Electroplant Co. has appointed the Anglo-French Distributors, Ltd., its sole agents for the whole of the French Empire.

Morphy-Richards, Ltd., have opened offices at 121, Victoria Street, Westminster, S.W.1, to which all matters relating to sales and sales accounts should be addressed.

Predico, Ltd., has moved to 38, Barretts Grove, Stoke Newington, N.16.

Change of Name

The Nico Light Co., Ltd., has changed its name to the Nico Light Engineering Co., Ltd.

Registration of Contractors

Need for Support of Voluntary System

By A. H. Dykes, M.Inst.C.E., M.I.E.E.

THAT half a loaf is better than no bread is an old and wise saying that might well be borne in mind by those who are agitating for the compulsory registration of electrical contractors and operatives.

In 1921 the Institution of Electrical Engineers called a conference of interested parties to consider the registration of electrical contractors as a means of indicating to the public the status and competence of firms engaged in installation work. It was decided that such a register would be of assistance if it included all contractors who carried out their business on satisfactory lines, as it would enable the general public to place their orders for work knowing that if they should have any cause of complaint, either of bad workmanship or breach of contract, they could look to an official independent body to investigate the matter.

Mr. Dykes has been vice-chairman of the Registration Board since 1925

A voluntary Registration Board was formed of representatives of the following bodies:—The Institution of Electrical Engineers; the Institution of Electrical Engineers (Irish Section); the Incorporated Municipal Electrical Association; the Electrical Contractors' Association; the Electrical Contractors' Association of Scotland; the British Electrical and Allied Manufacturers' Association; the Association of Consulting Engineers; the Electrical Wholesalers' Federation; the London and Home Counties J.E.A.; and the Central Electricity Board.

A licence was obtained from the Board of Trade as a company not operating for profit, and at the beginning of 1924 the Register commenced work. Since then, for over twenty-one years, the Board has worked through its Executive Committee of ten of its members investigating all applications for membership and being helped by 122 Local Advisory Committees set up all over the United Kingdom.

Each applicant receives a copy of the rules and conditions of membership, and if, after full investigation and an examination of some of his recent work by one of the Board's inspecting engineers, he is approved, he pays an entrance fee of five guineas. Certificates of registration are renewable yearly on an annual payment of two guineas (which constitutes the normal income of the Register). Before renewal of the certificate is granted each year the Register communicates with the appropriate Local Advisory Committee and, if necessary, another inspection is made to see that the proper standard of work is being maintained and that any faults pointed out by the inspector have been remedied.

All firms or individuals doing good work and honourably fulfilling their obligations are eligible for registration irrespective of whether they are members of any trade association or not, and whether they are large or small, the sole object being to help the public and the industry.

Up to December 31st, 1944, 3,752 applications for admittance had been received, and at the same date 1,329 firms were on the Register; on December 31st, 1938, the number on the Register was 1,723, the falling-off being due to wartime causes.

Demand for Compulsion

Objection has been taken to the Register because if a contractor is struck off for good cause, or his original application is not approved he can still carry on business for whoever cares to employ him. Those who raise this objection might equally well object to the Medical Register because a doctor struck off the roll can still practise, even if he cannot sign a death certificate.

The Register was constituted on a voluntary basis, in accordance with the long-established British custom, which has served us so well in the past, but an outside committee has now for some time been agitating for Government registration of contractors and operatives on a compulsory basis. As an original member of the Board, and since 1925 its vice-chairman, I have naturally had to consider very carefully the present

situation. Whilst the nation is crying out for the relaxation of restrictions on trade and individuals I doubt very much whether Parliament is likely to pass an Act now to make registration compulsory. If, however, all contractors desiring compulsory registration will support the Register by applying for admission, and if all those employing contractors will go only to those on the Register, their object will soon be obtained, as only a small field of work will be left for unregistered contractors.

When the present paper shortage is ended the Register will return to its pre-war practice of circulating each year a full list of those on the Register to Government Departments, engineers of supply authorities, consulting engineers, architects and other interested parties all of whom could do great service to the Register. In the meantime full information can always be obtained from the Secretary, 13, Victoria Street, S.W.1. It is hoped also that the Press will lend its powerful aid by giving the work of the Register the fullest publicity.

If and when, however, Parliament should pass a compulsory registration Act the question of the examination and registration of operatives will be carefully studied and I have no doubt that the then members of the Register will be able and willing to undertake any further responsibilities imposed on them.

I was glad when a representative of the Electrical Trades Union stated at a recent meeting that "the Union is prepared to withdraw the trade cards of operatives who have been found to be incompetent." No doubt the members of the Electrical Contractors' Association will note this and report all such cases to the E.T.U. Committee. I would much prefer disciplinary action to be taken by the operatives' own union rather than by an outside authority.

In the meantime it seems a pity that a full discussion of the problem cannot be held by the Institution of Electrical Engineers, the mother of the present scheme, and also by the Royal Institute of British Architects, which is also vitally interested.

ELECTRICITY SUPPLY

Change-over at Hove. New Plan for Glen Affric.

Blackburn.—SALES AND DEVELOPMENT.—The Corporation has agreed to the establishment of a sales and development section of the electricity undertaking.

Bradford.—HOUSING PLANS.—The Electricity Committee is to provide supply to housing estates at a cost of £44,000.

SUBSTATION.—A site for a substation has been obtained at Buttershaw.

Cardiff.—NO FURTHER EXTENSIONS YET.—The Central Electricity Board has intimated that owing to the shortage of plant it is not in a position at present to authorise a further extension of the Roath power station but has promised that the claims of Cardiff will not be overlooked in the Board's plans for the future.

HIRE-PURCHASE SCHEME. — The Electricity Committee has asked a sub-committee to consider a proposal by the city electrical engineer that a limited hire-purchase scheme for cookers and wash boilers should be restarted on revised terms.

Cheltenham.—SUPPLY TO ESTATE.—Sanction has been obtained to borrow £11,405 for mains and substation for the supply to the Lynmouth Farm estate. It is stated that the complete scheme for the provision of a supply to all houses, a total of 5,000, will cost £80,000.

Chesterfield.—PROPOSED AREA EXTENSION.—The Corporation's scheme to extend its electricity supply over a large area of N.E. Derbyshire, for consent to which application has been made to the Electricity Commissioners, will, if approved, involve an expenditure of over £322,000. This was announced by Ald. H. Varley, chairman of the Electricity Committee, at a recent meeting of the Town Council.

TARIFF FOR WELDING.—In view of the likelihood of a general demand for the installation of welding plants in small workshops and garages, the Electricity Committee has adopted the following tariff : £1 per annum per kVA of the continuous rating of the plant, with the same running charge as is applicable to small power consumers, the tariff to be subject to power factor correction devices being installed by the consumer so that the overall power factor shall not be less than 0·8.

COLLECTION ARRANGEMENTS.—The property manager is to collect from the tenants of temporary houses the 7d. weekly electricity standing charge and 1s. on account of electricity consumed.

SUPPLY TO PUMPING STATION.—The Electricity Committee has obtained sanction to afford an additional supply to the pumping station at Whispering Well and is to proceed with the requisite works at a cost of £1,700.

Gateshead.—STREET LIGHTING.—The North-Eastern Electric Supply Co., Ltd., has been asked by the Town Council to prepare a scheme for lighting all the streets by electricity.

Hove.—CHANGE-OVER.—Application is being made for sanction to borrow £105,225 for the completion of the change-over scheme and to utilise £30,000 from the reserve fund for changing consumers' appliances. The Electricity Committee states that it is most desirable to commence this work as soon as labour and materials are available.

Hull.—RESTARTING HIRE SCHEMES.—The Electricity Committee is seeking permission to borrow £50,000 to finance the resumption of the cooker hiring scheme and £25,000 for the water heating schemes.

ELECTRIC PUMPING.—The general manager has reported upon his negotiations with the city engineer with regard to bulk supplies for the pumping station, stating that after consideration of the relative costs of Diesel oil and electricity it had been decided to recommend electricity.

OIL ACIDITY.—In order to cope with trouble due to acidity of oil in transformers and switchgear, the Electricity Committee is to provide equipment, including three-wheel runabout, tanker, filter and vehicle, storage tanks, etc., at an estimated cost of £3,000.

LOANS.—Sanction has been obtained to borrow £46,816 for distribution extensions and £1,000 for consumers' apparatus.

Nelson. — SUPPLY TO ROUGHLEY AREA.— The Electricity Committee is to extend supplies to the Roughley area.

Newcastle-on-Tyne. — INSTALLATIONS IN NEW HOUSES.—The City Council is obtaining tenders for electrical installations in 182 American houses in Eastfield Avenue, Walker.

Newport (Mon.).—JUBILEE.—The Corporation Electricity Department is this week celebrating its jubilee.

Scotland. — GLEN AFFRIC PROJECT. — The North of Scotland Hydro-Electric Board states that two schemes are being considered in the neighbourhood of Inverness, namely, Affric and Findhorn-Duntelchaig. In its examination of the Affric scheme the Board had had particularly in mind the scenic beauty of Glen Affric and the proposals for making a national park there. One of the principal amenity objections to schemes for water-power in Glen Affric in the past has been the large fluctuation which would occur in the level of the raised Loch Affric and Loch Beneveian. The Board expects, in due course, to promote a scheme in which the rise and fall in the levels of these lochs will be restricted within limits considerably less than were proposed in 1941.

Watford.—CHARGES IN RURAL AREA.—A request by the R.D.C. that charges in the rural district should be at the same rates as those in the borough is being considered by the Electricity Committee.

LOANS.—The Electricity Committee has obtained sanction to borrow £2,614 for supplying the Bushey Hall estate and is seeking sanction to borrow £10,000 for substations and distribution plant.

Westbury (Wilts).—"ALL-ELECTRIC" HOUSES. —At its last meeting the Urban District Council decided to install only electricity on the new housing estate.

West Midlands.—DEVELOPMENT IN SHROPSHIRE.—The benefits which electricity had brought to town and country and future developments which it was hoped to make were dealt with by Mr. C. Heathcock, chairman of the West Midlands Joint Electricity Authority, when addressing representatives of local authorities in Shropshire at Wellington. He said that only very small centres of population and isolated farms remained without a supply. There were, however, stretches of Shropshire very thinly populated to which a supply could only be given at a heavy initial loss. These were dealt with as profits from other parts of the area permitted, and in this connection £80,000 had been voted to develop a new area of 86 square miles from Wellington in the north to Rushbury and Stanton Long in the south, and from Shirett in the east and Leebotwood in the west. A canvass would be made as soon as possible and work would begin as labour and materials were made available. Referring to housing, Mr. Heathcock said that of 81 local authorities of which records had been obtained, 39 were arranging for their temporary houses to be "all-electric," and 29 were electrifying to the extent of 50 per cent. or more.

Woolwich.—SHORTAGE OF LABOUR.—It is reported that the Electricity Committee, "gravely perturbed at the present state of affairs," is asking the Ministry of Fuel and Power to grant the highest possible priority in the provision of labour for extensions at the Globe Lane generating station.

Overseas

Australia.—STRIKE AT BUNNERONG.—Union men have threatened a complete stoppage of electricity supplies to Sydney following a statement by a County Council official that discharged soldiers would be employed to replace 600 strikers at the Bunnerong power station. The power station dispute has already lasted for a month because 600 strikers, against the advice of their union leaders, refused to do shift work under the terms of an arbitration court award.—*Reuter.*

Eire.—NEW POWER STATION.—A reservoir and power station between Celbridge and Leixlip form part of the Liffey hydro-electric scheme, the estimated cost being £315,000. The construction plans have received official approval but the work is unlikely to start until early next year, probably in April or May. No tenders have yet been invited by the Electricity Supply Board. The new station will have a capacity of 4,000 kW. About 400 yd. above Leixlip a dam and fish-pass will be erected. Above the former the reservoir will extend for about two miles in a south-westerly direction. The scheme will flood about 150 acres.

TRAINING SCHEME. — The E.S.B. has established a two years' training course for which applicants must be under twenty-six years of age on January 1st, 1946. The course is open only to graduates in mechanical and electrical engineering of universities or recognised institutions.

TRANSPORT

Glasgow.—REPORT ON TROLLEY-BUSES.—The transport manager has prepared a report on the advisability or otherwise of making provision for the use of trolley-buses in the post-war programme for the replacement of the Transport Department rolling stock.

Southend-on-Sea.—YEAR'S WORKING.—A gross profit of over £30,000 was made on the Corporation's transport system during the year 1944-45, a surplus of over £19,000 remaining after meeting debt charges. A total of over 17 million passengers was conveyed.

Power and Prosperity

The Task Now Facing Industry

METHODS of ensuring national prosperity formed the theme of the address given by MR. E. R. WILKINSON (commercial manager, C.E.B.) as president for the second year of the Association of Supervising Electrical Engineers.

One of the principal barriers to the proper understanding of immediate national problems, said Mr. Wilkinson, was the changing value of money. He used a series of graphs to indicate why and how public and private "doing without" had failed to create "any draft on the future." The manufacture of goods for civilian use had been reduced to a much greater extent than civilian expenditure thereon. Therefore during the transitional years many millions over and above normal current private expenditure, would have to be spent to restore the situation to what it would have been without wartime limitation.

The graphs were further used to impart some meaning to the annual adverse balances on income account by analysing national transactions on capital account. They illustrated the cumulative extent to which the net provision of new capital had fallen short of the pre-war standard amount. Thus to make good war arrears the pre-war rate of capital formation would have to be immediately doubled.

Why Increased Output is Necessary

The enormous expansion, even on pre-war values, of foreign indebtedness incurred during the war was pointed out and an attempt was made to assess post-war production needs in terms of quantity of goods and services required. It was thus indicated that there was a national need for an output at least 25 per cent. greater, and possibly as much as 40 per cent. greater, with a labour force that could not effectively rise very much above the 1938 level and might easily fall below it by from 5 to 10 per cent. A very much larger average output per worker would be required to prevent the national position deteriorating very rapidly.

There was nothing daunting in the magnitude of the task. Productivity per man-hour increased by 30 per cent. between 1924 and 1935, but an exacting "time and progress schedule" would need to be adhered to in order to "complete the job by the contract date." There could be no waste of man-power on non-productive work. There was an obvious need for thorough investigation into the whole process of distribution, which bulked so largely in the man-power budget. The problem could be solved by substitution of more machine methods for manual work.

25,000,000 HP of Motors Wanted

There was nothing new in mechanisation, but Mr. Wilkinson believed the stage to be now set for an advance of that kind on a quite unprecedented scale. There should be exacting and co-ordinated scrutiny of all industrial processes to ensure that at every link in the industrial chain electricity was substituted for manual labour if there was any prospect of even a fractional gain in productive efficiency. An overall total of something like 25 million HP of electric motors would be required in the factory trades of this country alone, apart altogether from the extractive industries, before the American scale of utilisation in comparable industries could be approached.

The HP of equipment of this country's industries must be doubled to obtain the increased productivity that was vital to national future welfare; it would be a race against time and not less urgent than the war effort had been. That must be the keystone of national reconstruction. The relative importance of all other factors could be gauged from the fact that the energy requirements of industry per worker employed increased by something like 35·5 per cent. between 1924 and 1935. In the same period the net output per worker at a common price level rose by 37·5 per cent. In other words greater utilisation of power accounted for nineteen-twentieths of the enlarged productivity achieved in that period.

George Ellison Picture at Glasgow

The picture "Skill," painted in the works of George Ellison, Ltd., by Dame Laura Knight, R.A. (and reproduced in the *Electrical Review* of May 11th, p. 678), has been transferred from the Royal Academy to the Royal Glasgow Institute of Fine Arts Exhibition, Kelvingrove Art Galleries, Glasgow and will remain there until January.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Dubilier Condenser Co. (1925), Ltd.—After dealing with the accounts and referring to the strong balance sheet which justified the doubling of the ordinary dividend, the chairman (Mr. W. H. Goodman), who presided at the annual meeting, alluded to the company's wartime activities. He said that there was considerable co-operation with other manufacturers in this country and in the United States to whom they were asked to supply much technical and manufacturing information which, but for the war, would have remained their own confidential property. Apart from their normal products, such as condensers and resistors, they had designed and produced in very large numbers certain special items, one of which was the "delay-network" component of radiolocation apparatus. As to the future, he said that the change-over from war to peace production entailed considerable factory reorganisation which was well under way. They had already received substantial orders from overseas.

The Adelaide Electric Supply Co., Ltd., proposes to pay a final dividend of 3½ per cent. on the ordinary stock (against 5 per cent.).

A Bill has been introduced in the South Australian House of Assembly for the establishment of a South Australian Electricity Trust, which the Government will appoint to take over the Adelaide company in accordance with the recommendations of the Royal Commission (*Electrical Review*, October 5th). Debentures which the Trust will be able to issue to shareholders instead of cash will bear interest at 4 per cent.

The Cables Investment Trust, Ltd.—Income for the year ended June 30th last amounted to £341,983 (against £344,902), the net revenue being £220,579 (£223,032). As reported last week, the ordinary dividend is maintained at 5 per cent. by a final payment of 3 per cent.; £288,729 (£258,150) is carried forward.

Britannia Electric Lamp Works, Ltd.—The dividend of 7 per cent. recommended is in respect of the eleven months to March 31st, when the net profit was £8,101. Last year a similar dividend was paid for the twelve months ended April 30th, the net profit being £8,433.

The London Electric & General Trust, Ltd., by a final payment of 3 per cent. is maintaining the year's distribution on the ordinary stock at 5 per cent.

The British Thermostat Co., Ltd., proposes to pay an interim ordinary dividend of 7½ per cent. (same).

The River Plate Electricity & Other Securities Corporation, Ltd., is again paying an interim dividend of 2 per cent.

The Ever Ready Trust, Ltd., has again declared an interim dividend of 3 per cent. on the ordinary and deferred shares.

Cinema-Television, Ltd., records a net profit of £50,372 for the year to April 30th last (against £42,177).

The Calcutta Electric Supply Corporation, Ltd., is paying an interim dividend of 3 per cent. tax free, the same as last year.

The Cawnpore Electric Supply Co., Ltd., has announced an interim dividend of 3 per cent. (same).

New Companies

J. A. Brown & Partners, Ltd.—Private company. Registered October 5th. Capital, £5,000. Objects: To carry on the business of electrical contractors, manufacturers and repairers of, and dealers in, electrical plant, equipment and signs, electro-medical work, radio and television systems, etc. Directors: J. A. Brown, 281, Lyndon Road, Sheldon, Birmingham, 26: J. W. Parkes, 3, The Mount, Gravelly Hill, Erdington, Birmingham, 23 and G. H. Baster, Lincoln House, Pershore. Secretary: J. W. Parkes. Registered office: 110a, Dale End, Birmingham, 4.

W. J. Allsop & Son, Ltd.—Private company. Registered October 6th. Capital, £5,000. Objects: To carry on the business of refrigeration and electrical engineers and contractors, cold storage warehousemen and contractors, etc. Permanent directors: W. J. Allsop, and Mrs. B. Allsop, both of The Cottage, Newton Road, Torquay: S. W. E. Allsop and Mrs. Violet A. Allsop, both of 156, Windsor Road, Torquay. Solicitors: Hooper & Wollen, Torquay. Registered office: 36, Torwood Street, Torquay.

Manifold Machinery Co., Ltd.—Private company. Registered October 6th. Capital, £5,000. Objects: To carry on the business of manufacturers of, and dealers in, electrical machinery, plant and apparatus, lamps and fittings, wireless apparatus, valves and fittings, etc. C. C. Poole, M.P., Caverswall, Streetly Lane, Four Oaks, is the first director. Solicitors: Wallace Robinson & Morgan, Birmingham. Registered office: 21, Hermitage Road, Birmingham.

Varilectric, Ltd.—Private company. Registered October 5th. Capital, £100. Objects: To carry on the business of manufacturers of, and dealers in, engineering products, electrical appliances, domestic and wireless requisites, etc. Directors: F. W. Davis, 24, Ravensmead Road, Bromley and T. J. Gilbert, 86, Addington Road, West Wickham. Registered office: 46a, Finsbury Square, E.C.2.

Electrical Appliances Manufacturing Co., Ltd.—Private company. Registered in Belfast September 29th. Capital, £20,000. Objects: To carry on the business of electrical, radio and mechanical engineers, etc. Subscribers: R. Neilson and W. S. Park, both of 53, Chichester Street, Belfast.

Whittington & Son, Ltd.—Private company. Registered September 18th. Capital, £500. Objects: To acquire the business of radio, electrical and general engineers carried on as "R. Whittington & Son," at Corner Shop, Ewhurst Road, Cranleigh, Surrey, etc.

Directors: W. Whittington, Heatherlea, St. Nicholas Avenue, and R. W. Whittington, Glendoone, Guildford Road, both Cranleigh. Registered office: Corner Shop, Ewhurst Road, Cranleigh, Surrey.

Charlton Electrical Appliances, Ltd.—Private company. Registered September 27th. Capital, £1,000. Objects: To carry on the business of electrical engineers, etc. Directors: C. P. Charlton, 28, Lavender Road, Leicester; and F. H. Farmer, 55, Humberstone Gate, Leicester. Registered office: 55, Humberstone Gate, Leicester.

Hope Jones (Lighting), Ltd.—Private company. Registered October 1st. Capital, £1,000. Objects: To carry on the business of electrical engineers, etc. First directors: S. E. Hope Jones, 10, Carlton Crescent, Southampton, lamp shade manufacturer, and three others. Secretary: J. Barr. Registered office: 43, Bedford Place, Southampton.

Bryterlite Electrical Supplies, Ltd.—Private company. Registered in Dublin September 24th. Capital, £100. Objects: To carry on the business of manufacturers of, agents for, and dealers in all kinds of electric lamps, shades, fittings, etc. Subscribers: A. J. Short, 37, Dartmouth Square, Rathmines, and A. E. Ashton, 6, Westmoreland Street, Dublin.

Wise Products (London), Ltd.—Private company. Registered September 25th. Capital, £500. Objects: To carry on the business of manufacturers of, and dealers in, machinery, electrical and radio appliances, etc. Subscribers: B. Beaton, 6, Goulton Road, E.5, is the first director. Registered office: 146, Bishopsgate, E.C.2.

Elstone Electronics, Ltd.—Private company. Registered September 25th. Capital, £500. Objects: To carry on the business of manufacturers of, and dealers in, electronic appliances, etc. Subscribers: G. C. Sager, and M. L. Cliffe, both of City Chambers, Leeds, 1. Directors: E. H. Elstone, A. C. Farnell and A. Wolfenden.

Kay Trading Co. (Manchester), Ltd.—Private company. Registered October 4th. Capital, £100. Objects: To carry on the business of manufacturers of, and dealers in, electric lamps, reflectors, bells, fires, cookers, fans, insulators and accessories, etc. Directors: E. Herz, 21, Belvedere Court, Lyttelton Road, N.2, and H. B. Alexander, 6, Elmfield Avenue, Manchester, 8. Registered office: 11, Albert Square, Manchester, 2.

Dexters (London), Ltd.—Private company. Registered October 6th. Capital, £1,000. Objects: To carry on the business of electrical, wireless, mechanical and general engineers, etc. Directors: F. W. Dexter, 30, Greenhill Avenue, Caterham: F. C. Dexter and Mrs. M. K. Dexter, both of 1, Tillingdown Hill, Caterham. Registered office: Commonwealth House, High Holborn, W.C.1.

Pilkingtons Plating (Cardiff), Ltd.—Private company. Registered October 6th. Capital, £2,500. Objects: To carry on the business of electricians, electrical contractors, electro-platers, radio and electrical engineers, etc. Directors: J. Pilkington and Mrs. I. Pilkington, both of 14 Cyncoed Crescent, Cardiff. Registered office: 29a, Atlas Road, Canton, Cardiff.

Companies' Returns

Statements of Capital

H. J. Cash & Co., Ltd.—Capital, £25,000 in £1 shares. Return dated April 11th. 20,000 shares taken up. £15,000 paid. £5,000 considered as paid. Mortgages and charges: Nil.

Automatic Internal Telephones, Ltd.—Capital, £5,000 in £1 shares. Return dated May 1st. All shares taken up. £5,000 paid. Mortgages and charges: Nil.

Sussex Electricity Supply Co., Ltd.—Capital, £197,000 in £1 shares. Return dated May 2nd. All shares taken up. £197,000 paid. Mortgages and charges: Nil.

Seaton & District Electric Light Co., Ltd.—Capital, £50,000 in £1 shares. Return dated May 2nd. All shares taken up. £50,000 paid. Mortgages and charges: Nil.

Salisbury Electric Light & Supply Co., Ltd.—Capital, £125,000 on £1 shares. Return dated May 2nd. All shares taken up. £122,500 paid. £2,500 considered as paid. Mortgages and charges: £15,700.

Vincent Switchgear Manufacturing Co., Ltd.—Capital, £10,000 in £1 shares. Return dated December 31st, 1944 (filed May 17th, 1945). 7,948 shares taken up. £7,948 paid. Mortgages and charges: £3,000.

Electric Service Co. (Birmingham), Ltd.—Capital, £2,500 in £1 shares. Return dated August 15th. All shares taken up. £1,250 paid. £1,250 considered as paid. Mortgages and charges: Nil.

Bolton Electrical Traders, Ltd.—Capital, £1,500 in £1 shares. Return dated July 10th. 1,000 shares taken up. £1,000 paid. Mortgages and charges: Nil.

Rotapex, Ltd.—Capital, £5,000 in £1 shares. Return dated April 23rd. 101 shares taken up. £101 paid. Mortgages and charges: Nil.

Mortgages and Charges

Keller Electrical Industries, Ltd.—Satisfaction in full on September 29th of series of debentures registered July 8th, 1940, securing £1,800.

Receiver Released

Hamrad Wholesale, Ltd.—J. W. Lewis, 181, Kensington High Street, W.8, ceased to act as receiver on September 28th.

Bankruptcies

H. Beaumont, electrical engineer and radio dealer, 207, Luck Lane, Paddock, Huddersfield.—Application for discharge to be heard on November 7th at the County Court House, Queen Street, Huddersfield.

P. C. Pinney and **A. E. Miller**, electrical dealers, trading as "Granby Service Co." 4, Granby Street, Littleport.—Proofs for dividends by October 31st to the trustee, Mr. T. Pollitt, 41, Sidney Street, Cambridge, Official Receiver.

J. Boult and **J. H. Bolt**, electricians, trading as "John Boult," 3, Grosvenor Street, Chester.—Supplemental dividend of 2s. in the £ payable at the offices of the Official Receiver, Hunter Street (Friends' Meeting House), Liverpool, 3.

STOCKS AND SHARES

TUESDAY EVENING.

THE new session of Parliament soon started to make its influence felt in Stock Exchange markets. By announcing its terms for nationalising the Bank of England, the Government gave a lead to the direction in which this process might be related to industries coming within the scope of the Labour Party's intentions. The policy of repayment applied to the Bank cannot justly be considered as likely to affect other companies and industries. Nevertheless, the indirect result has been a hardening of values in the electricity supply market, and also to shares in companies engaged in the heavy branches of industry. Home Railway stocks at first went ahead, but soon lost part of their burst of brightness.

Electricity Supply

The prospect of nationalisation as it concerns the electricity supply industry continues to exercise some restraint upon prices. From the slump that overtook them at the time of the Labour Government's return to power, there was a fairly substantial recovery, but the effects of the uncertainty are still apparent in to-day's prices. It is worth recording that although these have come down, the actual amount of stock on offer in the market is comparatively meagre. Buyers will take stock that comes to market at current prices without, however, bidding for it in such a way as will cause material recovery in quotations. Amongst other shares to show rises this week are Bournemouth & Poole 58s., British Power & Light 28s. 6d., Yorkshire Electric and Electrical Distribution of Yorkshire, both £2, County of London 40s. 6d., Clyde Valley 39s., and North Eastern 32s.

Fluctuations in Prices

Revo shares at 47s. are 1s. 6d. higher. H.T.A. rallied $\frac{1}{16}$, to 27s. 6d. after their recent fall. Ever Ready are a good market at 43s. Brush Electricals at half a guinea show a modest gain. On the other hand, British Aluminium have declined to 39s. 6d. and Vactrics are 6d. lower at 22s. Ransome & Marles hold their improved price of 92s. 6d. Enfield Cables at 63s. 6d. are better; Switchgear & Cowans, the price of which rarely changes, have moved up to a guinea. Strand Electrics at 10s. 3d. have risen 3d. Electric Constructions are again within a few pence of £3. Chloride Electric Storage at 83s. 9d. are $\frac{1}{16}$ better. J. & F. Stone went back a trifle to 14s. 9d.

Overseas Shares

Cawnpore Electrics have put on a florin, at 63s. 6d. Calcutta Trams receded 3s. to 74s. 6d. Other Indian issues are uninteresting. Tokyo Electric sixes are two points down at 54¼. The Palestine unrest led to a fall of 1s. 6d. to 35s. 6d., in Palestine Electric "A." South American stocks are rather better. Anglo-Argentine Tramways Incomes strengthening to 7, and Brazilian Tractions to 30. Atlas Electrics hold their rise to 8s. 3d. Cable stocks are steady and Great Northern Telegraphs rose to 36½ and reacted to 35. Marconi Marines at 36s. 6d. have eased off and Canadian Marconi are unaltered after their reaction to 18s. 3d.

Equipment and Manufacturing

For investment that is not particular about receiving a 5 per cent. rate of interest on its money, the group of electrical manufacturing and equipment companies offers attractions which appeal. Some people prefer to have their money in a company that possesses promising prospects, the current rate of dividend being disregarded in view of possibly increased distributions to come. Johnson & Phillips, for example, at 80s. pay 3¾ per cent. Henley's Telegraph Works give 3½ per cent. Telegraph Constructions now up to 60s. 5d., pay 3½ per cent. Siemens at 40s. return 3¾ per cent. on the money; so do London Electric Wire & Smiths, standing at 40s. Ericssons at 50s. yield the equivalent, gross, of 4 per cent. Automatic Telephone "B" deferred shares can be bought at 67s. at which the return is hardly 3¾ per cent. These yields are based upon the last-paid dividends, which are, of course, liable to variation.

Oriental Telephone

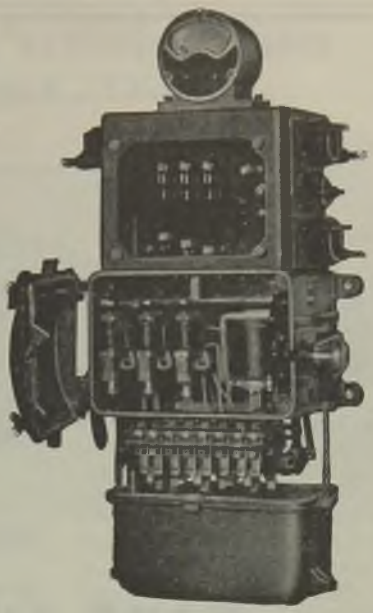
To give the yield on British Insulated Callender's is not yet possible, the first year of the working agreement has yet to be completed. While on this subject, it may be of interest to point out that Oriental Telephone & Electric ordinary at their advanced price of 64s. 6d. pay 1¼ per cent. The reason is, of course, a general expectation that with the Japanese beaten, the company will be able to resume before long its previously profitable operations.

Philco

A fall in Philco shares is the principal movement in the radio section. This followed last week's announcement by the company of two years' results. For the earlier year, a dividend of 25 per cent. is declared, but for the year recently ended the dividend is 10 per cent., and on disappointment with this declaration, the price of the shares fell from 15s. to 13s. The reduction is stated by the directors to be due partly to cancellation of war contracts. The board still has in prospect the possibility of distributing a bonus payment. The company made a new issue of shares last August. In March this year, the company announced that plans were afoot for a closer working arrangement in the electro-mechanical field with Aero Engines, Ltd. E.M.I. shares remain at 33s. 6d., E.K. Cole at 37s. 6d. and Pye deferred at 32s. 6d. Cinema Television deferred are a trifle better at 4s. 6d. for the 1s. shares.

Control for squirrel-cage motors

by



TYPE E STAR DELTA, or DIRECT ON

Available up to 50 H.P. 400-440 V

- Robust construction.
- Correct sequence device.
- Overloads—Solenoid type —cut-out in the starting position.
- Triple Pole Isolator, when required, incorporated in same casing.

THE VERITY RANGE

WORKS : ASTON, BIRMINGHAM 6

Sales Headquarters : BRETTENHAM HOUSE, LANCASTER PLACE, W.C.2

Turbine-Oil Purification

Types of Equipment and Method of Operation

CONTINUOUS operation and ultimate life of a steam turbine depend upon the efficiency of its lubrication and, in some designs, of the oil used in the hydraulically operated governor gear. Higher steam temperatures and pressures and increased bearing loads due to heavier rotating masses impose an even heavier duty upon the oiling system. An important factor in securing reliability is *continuously* maintaining the oil in first-class condition.

Moisture cannot be entirely prevented from entering the lubricating system through the glands, etc., and experience proves that, even with enclosed systems, small particles of solid impurities find their way into the oil stream. The centrifuge type of filter alone meets these requirements and has therefore been used exclusively for many years for turbine-oil purification. It utilises the difference in specific gravities between oil, water and solids to effect separation and does not rely on the physical dimensions of the particles, as do ordinary and magnetic filters, which are consequently ineffective since water is not removable in that way. The magnetic type moreover cannot cope with non-ferrous impurities.

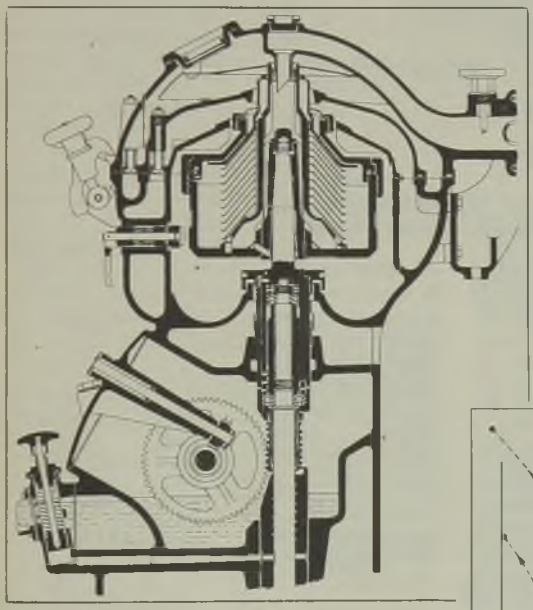


Fig. 1.—De Laval type B.1529 turbine oil purifier

The type of purifier now generally standard (Fig. 1) employs the continuous by-pass system in which the purifier is connected to the oil reservoir as an independent circuit. As it usually incorporates pumps and an oil heater, it can be in operation whether the turbine is or not. When the turbine incorporates a settling tank as well as the main oil tank, the purifier draws the dirty oil from the lower part of the settling tank and delivers the clean oil to the main oil tank.

Water and oil have the common characteristics of fluids that particle size does not have to be taken into consideration. Consequently normally immiscible fluids having different specific gravities are easily separated and under good conditions the water content can be reduced to 0·02 per cent.

A common misconception is that, as the centrifuge bowl is of constant diameter and rotates at constant speed, thus giving constant centrifugal force, solid particles that are not extracted from the oil during their first passage through the bowl cannot be differently affected during any subsequent passages. That this is incorrect is shown by Fig. 2, illustrating a section of a simple centrifuge bowl. Particles with a specific gravity different from that of the oil are

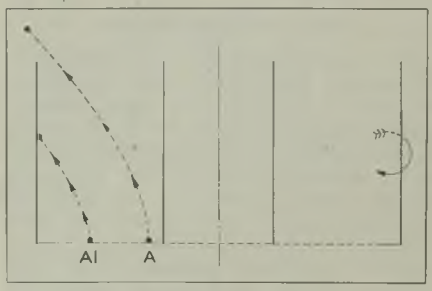
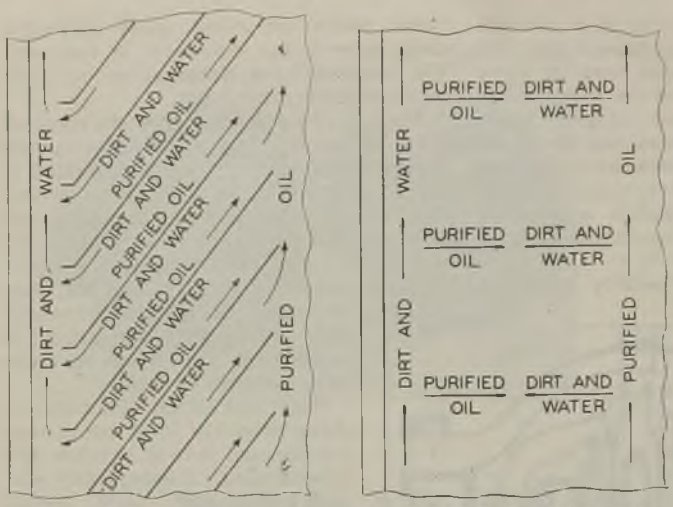


Fig. 2.—Possible paths of solid particles during centrifuging

affected by centrifugal force due to rotation.

The behaviour of the heavier particles is apparent. What is not so clear is the action of the smaller particles. Speed of rotation



Figs. 3 & 4.—Fragmentary cross-sections of (left) De Laval disc bowl showing the complete absence of re-mixing, and (right) "hollow" bowl showing the constant conflict and re-mixing of purified and dirty liquids

and the upward rate of flow of dirty oil in the bowl are constant. The smallest size of particle will move outwards through the oil; the amount of departure from vertical movement depending upon the difference in specific gravities.

Path of a Small Particle

Thus a small particle "A" admitted to the rotating bowl at the inside diameter of the wall of oil does not travel outwards quickly enough to reach the inside surface of the bowl before it has travelled to the top and is discharged with the oil. During its second journey, however, it may enter the bowl at a point "A1" nearer the inside surface of the bowl, and following a similar path as it did when entering at "A" gets "home" before reaching the top of the bowl. Thus there is no practical limit to the smallness of the solid particles which can be removed by a centrifuge.

Separating efficiency can be greatly increased by placing in the separating zone a pack of conical discs which divide the liquid into a number of thin layers (Figs. 3 and 4). Centrifugal force moves the heavy particles outwards by at most 0·02 in., when they reach the underside of the disc immediately above and are thus freed from the stream of oil. They then slide along the underside of the disc into the sediment space. The purified oil flows inwards along the top surfaces of the discs and is finally discharged through outlets at the top of the bowl.

The disc type bowl is of constant efficiency. One of the factors governing centrifugal force is the radius of action. In the disc-type bowl separation takes place between the discs. The space between the outer edge of the discs and the inner surface of the bowl is merely a receptacle for holding the extracted solids. Without the discs the effective radius for separation decreases as the bowl fills with solids and efficiency falls off. As the point of "split" or separation is at a radius smaller than the outside diameter of the discs, the efficiency of the disc type is not affected by the volume of solids contained in the sediment space but remains constant until the sediment space is filled.

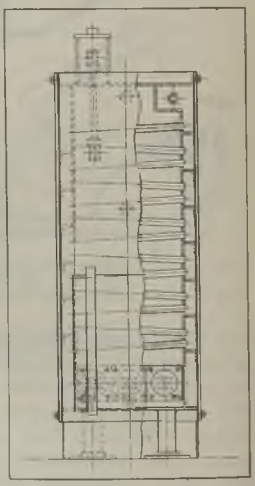


Fig. 5.—Modern indirect type electric oil heater

Throughput capacity of the centrifuge does not depend upon the kW rating of the turbine. It should be chosen according to the rate of addition of impurities to the oil, which varies with the mechanical condition of the turbine. A widely adopted relationship is that the centrifuge should be capable of handling the total oil once in six

to ten hours, that is, a centrifuge rated at 100 gallons per hour would be suitable for a turbine having from 600 to 1,000 gallons in its oil system.

Lubricating oil temperature is normally too low to give the highest efficiency of purification. The higher the temperature, the lower the viscosity and the less the resistance offered to outward movement of solids; also any tendency to emulsification is dealt with more easily.

Consequently, preheating to about 140 deg. F is recommended. For abnormal water contamination, an even higher temperature is desirable before purification, but this can be obtained by reducing the rate of flow through the heater. An indirect type of electric heater (Fig. 5) having immersion elements in the water jacket surrounding the oil-carrying tubes is commonly employed. The temperature of the water jacket is controlled by adjusted thermostats but in any case cannot exceed 212 deg. F, as it is at atmospheric pressure so risk of burning the oil is eliminated.

New Cleaning Set

A recent development is a self-contained equipment incorporating devices to prevent loss of oil and reduce the amount of attention required (Fig. 6). The drive is by a horizontal endshield-mounted motor, with an automatic centrifugal friction clutch. The transfer pumps are gear driven from the cross-shaft. Ball bearings are used throughout and lubrication is automatic. The oil inlet and discharge pipes are permanently connected to the lower stationary parts of the separator, so that no joints have to be broken when the covers are opened.

The baseplate contains a 22-gal. de-aerating tank with a float-control valve, to ensure that the clean oil remains in the tank for a predetermined time, and a compartment to receive separated water. In the tank-top immediately above this chamber is a large drainage hole protected by a gauze strainer through which any surplus oil collecting on the tank-top drains. The contents of the bowl are emptied into this tank before the cleaning operation. The water tank is fitted with an oil-level pipe through which a continuous discharge of the water occurs, whilst any oil floating on the water is periodically taken through the separator and thus recovered. An extension to the baseplate

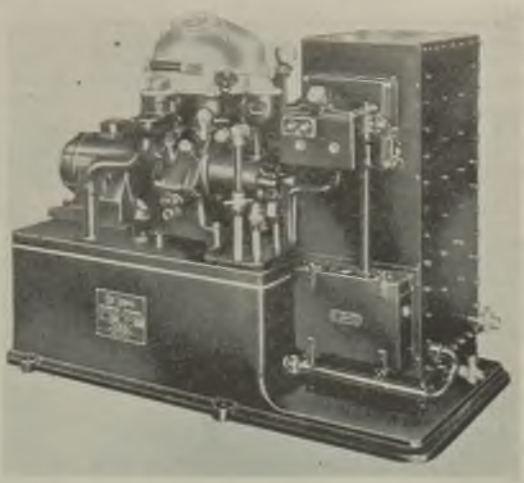


Fig. 6.—De Laval special self-contained power station type equipment

of the equipment contains an oil heater of the indirect type.

We are indebted to the Alfa-Laval Co., Ltd., for providing the information on which this article is based.

Ineffective Earthing

A RECENT issue of the *Industrial Accident Prevention Bulletin* reports a fatal accident in a factory in the following terms:—On the ground-floor of a certain factory there was a sack-cleaning machine driven by its own electric motor. On the first floor there were several light machines driven by another motor which had its own starter. The wiring on both floors was in screwed steel conduit, bonded together, so that there was electrical continuity throughout. The electrical system seemed to be entirely satisfactory but, as events were to show, it was not efficiently earthed. Reliance had been placed on a 3 ft. length of conduit driven into dry ground *inside* the factory. This was not sufficient to prevent danger when there was a current leakage.

One day a spring on the starter on the first floor broke. This, when the starter was in the "off" position, made contact with a conductor inside the casing and caused all the metalwork to become live. So long as the machinery was operating the danger was not apparent, but when the first-floor motor was stopped just before mid-day the earth was not adequate to discharge the leakage of current. As a result the whole of the metal work—starter, conduit and even the machine on the ground-floor—became live. The operator of the sack-cleaning machine touched the spout and received a shock which killed him.

NEW PATENTS

Electrical Specifications Recently Published

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

M. L. ALKAN.—"Soluble electrolytic anodes." 10627. June 30th, 1943. (572168.)

H. Aron.—"Control of electrical billet heating machines." 18020. November 1st, 1943. (572177.)

British Thomson-Houston Co., Ltd.—"Organo-silicon resinous materials." 6539/42. May 16th, 1941. (572230.) "Resinous polymerisation products." 10035/43. June 23rd, 1942. (572272.)

British Thomson-Houston Co., Ltd., and T. H. Kinman.—"Crystal detectors." 2992. March 6th, 1942. (572138.)

Cinema-Television, Ltd., and S. S. West.—"Valve circuits for amplifying alternating currents or voltages." 21110. December 16th, 1943. (572214.)

Compania para la Fabrication de Contadores y Material Industrial, and P. Viteau.—"Electricity meters." 3066. February 18th, 1944. (572285.)

Marconi's Wireless Telegraph Co., Ltd.—"Arrangements for detecting and measuring modulation of carrier oscillations." 5459/44. March 24th, 1943. (572259.)

Mullard Radio Valve Co., Ltd., and C. L. Richards.—"Thermionic valve circuits." 21756. December 28th, 1943. (572216.)

Mullard Radio Valve Co., Ltd., O. Pressel and A. M. Diepstraten.—"High tension rectifier anodes." 3313. February 22nd, 1944. (572257.)

Neosid, Ltd., and M. Grenly.—"Electromagnetic coils with iron dust cores." 5433. March 23rd, 1944. (572220.)

Plessey Co., Ltd.—"Electric power supply system supplying DC voltages from an AC source." 422/44. April 2nd, 1943. (572252.)

Radio Corporation of America.—"Bonding sheet material by high frequency electrical energy." 13139/45. July 31st, 1942. (Divided out of 11370/43. (572292.)

P. W. Rosenfeld.—"Electrically operated winding means for spring actuated clocks." 15749. September 25th, 1943. (572207.)

G. R. Shepherd (Westinghouse Electric International Co.).—"Cooling of gases in recirculating gas systems." 2591. February 11th, 1944. (572284.)

Standard Telephones & Cables, Ltd.—"Supporting device for vacuum tubes." 17460/43. June 24th, 1942. (572161.)

Standard Telephones & Cables, Ltd. (International Standard Electric Corporation).—"Remote control and indicator equipment." 17421. October 22nd, 1943. (572208.)

Standard Telephones & Cables, Ltd., and S. H. Towner.—"Remote control or indicating systems." 18379. November 5th, 1943. (572163.)

H. H. Thompson and A. E. Davies.—"Magnetic separators." 17060. October 18th, 1943. (572159.)

E. Wright.—"Thermally operated electric switch suitable for fire detection." 16382/45. December 1st, 1943. (Divided out of 571959.) (572228.)

Amended Specification

555645. British Insulated Cables, Ltd., and others.—"Apparatus for compressing and electrically heating thermo-plastic materials."

Forthcoming Events

Saturday, October 20th.—*Leeds.*—Electricity Offices, Whitehall Road, 2.30 p.m. I.E.E. North Midland Students' Section. Lecture on "Colour" by Dr. Mole, G. H. Foot and K. A. Milligan.

Bridgend.—Mining and Technical Institute, 6 p.m. Association of Mining Electrical and Mechanical Engineers (South Wales and West Wales Branches). Visit of national president (Mr. A. Hepburn) and discussion on "Electrical and Mechanical Aspects of the Reid Report."

Monday, October 22nd.—*Birmingham.*—Grand Hotel (Grosvenor Room), 6 p.m. I.E.E. South Midland Centre. Chairman's address by F. J. Elliott, reunion and visit of the president, Dr. P. Dunsheath.

Newcastle-upon-Tyne.—Neville Hall, 6.15 p.m. I.E.E. North-Eastern Centre. "Steel Tower Economics," by P. J. Ryle, B.Sc. (Eng.).

London.—At Royal Society of Arts, Adelphi, 5.30 p.m. Institution of Electronics. "Electron Tubes for Pulse Generation," by Dr. F. J. G. van den Bosch.

Bristol.—Small Physics Lecture Theatre, Bristol University, 5 p.m. I.E.E. Western Centre Installations Group. "Electrical Problems Associated with Aero-Engine Testing," by A. N. Irens.

Tuesday, October 23rd.—*Glasgow.*—Royal Technical College, George Street, 6.15 p.m. I.E.E. Scottish Centre (jointly with Illuminating Engineering Society). "Some Factors Affecting the Design of Electric Lighting Installations," by R. O. Ackerley.

Wednesday, October 24th.—*Edinburgh.*—Heriot-Watt College, 6 p.m. As for October 23rd.

Friday, October 26th.—*London.*—Institution of Electrical Engineers, 5.30 p.m. Measurements Section. Inaugural address of S. H. Richards, chairman.

Aberdeen.—Caledonian Hotel, 7.45 p.m. I.E.E. Scottish Centre. Chairman's address by R. I. Kinnear.

Monday, October 29th.—*London.*—Institution of Electrical Engineers, 5.30 p.m. Informal discussion on "Should Engineering Concerns be Managed by Engineers?" to be opened by the president, Dr. P. Dunsheath.

Tuesday, October 30th.—*Manchester.*—Engineers' Club, 6 p.m. I.E.E. North-Western Centre. Transmission Group. "Operation, Maintenance and Testing of Overhead Lines and Associated Outdoor Equipment on AC Systems," by R. C. Halton and Dr. J. McCombe.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

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

Alloa. — October 24th. Town Council. Electrical work in connection with the erection of twenty Swedish houses at Hutton Park: burgh architect, Municipal Buildings.

Australia.—QUEENSLAND. — December 10th. State Electricity Commission. Boilers, main sets and house sets. (October 12th.)

Burnley.—October 31st. Education Committee. Equipment for Burnley Technical College. (October 12th.)

Blackpool.—November 12th. Electricity Department. Cable, fire-extinguishing system and transformers. (See this issue.)

Dollar (Clackmannanshire).—October 24th. Burgh Council. Electrical work in connection with the erection of 26 houses at Manse Road: John Melvin & Son, architects, Mar Street, Alloa.

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

Gainsborough.—October 29th. Electricity Department. One 500-kVA, 3-phase static transformer. (October 12th.)

Hackney.—October 26th. Electricity Department. Six 500-kVA transformers. (October 5th).

Manchester.—October 26th. Electricity Committee. Ventilating plant for No. 2 boiler house, etc., Stuart Street generating station. (October 5th.)

Scotland.—November 6th. North of Scotland Hydro-Electric Board. 11-kV distribution lines, Morar area, Inverness-shire. (October 5th.)

Sheffield.—November 5th. Electricity Committee. 20-MVA. 33/11-kV transformer. (October 5th.)

Orders Placed

Birkenhead. — Electricity Committee. Accepted. 300-kVA outdoor type transformer and two 500-kVA transformers.—Bryce Electric Construction Co.

Bradford.—Electricity Committee. Accepted. Extension of ash plant system.—International Combustion Co. 400-V switchgear for No. 2 boiler.—Brookhirst Switchgear. 6·6-kV switchgear for No. 5 generator and 6·6-kV feeder panel for Odsal substation.—A. Reyrolle & Co. Passenger lift.—Fred Ellison & Co. Emergency battery.—Chloride Electrical Storage Co.

Bury.—Electricity Committee. Accepted. Switchgear for twelve months.—G.E.C.

Cardiff.—Electricity Committee. Accepted. Four 250-kVA (£1,034); six 500-kVA (£2,436) and four 1,000-kVA transformers (£2,808).—Bryce Electric Construction Co.

Poplar.—Electricity Committee. Accepted. 200 meters (£686).—Ferranti.

Sheffield.—Electricity Committee. Accepted. Three 1,000-kVA transformers (£2,250).—Bonar Long & Co.

Torquay.—Electricity Committee. Accepted. Switchgear for extensions at Newton Abbott power station (£30,064).—B.T.H. Co.

Contracts in Prospect

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

Alnwick.—Water supply scheme for U.D.C. (£43,000): D. Balfour & Son, 43, South Street, Durham City.

Barrow-in-Furness.—Junior school, Ormsgill estate, and extensions to Boys' Grammar School: borough engineer.

Birkenhead. — Extensions to Municipal Orthopædic Hospital: B. Robinson, borough engineer, Town Hall.

Birmingham.—School of Art, Station Road, Erdington: city architect.

Bolton.—Works additions, Duckworth Street: National Utilities, Ltd.

Bonnyrigg.—Houses (18), with electrical work: H. A. Brechin & Co., quantity surveyors, 13, Great King Street, Edinburgh, 3.

Bradford.—Nurses' home, Grassington Sanatorium: city architect.

Brighouse.—Factory extensions: Geo. Turner & Sons, Ltd., Owler Ings Mills.

Doncaster.—Works extensions: International Harvester Co. of Great Britain, Ltd., Wheatley, Doncaster.

Drayton.—Houses (30) for R.D.C.: Hind & Brown, architects, 22, Glebe Street, Stoke-on-Trent.

Ellesmere Port.—Houses (120), Wolverham estate: T. Warrington & Sons, builders, 82, Station Road.

Felling (Co. Durham).—Additions to factory for the International Paint & Composition Co., Ltd.: L. J. Couves & Partners, architects, Carliol House, Newcastle-on-Tyne.

Glasgow.—Houses (2,000) for Scottish Special Housing Association: Corporation housing director.

Hull.—Rebuilding Bankside Works: Blundell Spence & Co., Ltd.

Jarrow.—Trading estate at East Jarrow: J. S. Weir, borough engineer.

London. — Housing estates at Loughton (£4,800,000) and Romford (£250,000): L.C.C. architect.

Workshops and laboratories: Borough Polytechnic, Southwark.

Macclesfield.—Works extensions; Barracks Printing Co., Ltd., Lower Heys Mill, Macclesfield.

Four-bedroomed houses (34), London Street site; Macclesfield & District Association of Building Trade Employers, Union Bank Chambers.

Newcastle-on-Tyne. — Further facilities for classes in workshop technology (£12,000); education architect, Northumberland Road, Newcastle.

Offices for the Model Milk Co., Coutts Road; W. Riddle, 33, Jesmond Park West.

Rochdale.—Memorial Sunday Schools; Rev. W. A. Edge, St. Clement's Vicarage.

Salford.—Rebuilding box and case works, joinery department and saw mill; Mallinson & Eckersley, Ltd., timber importers, etc., Worsley Street, Salford, 3.

Sunderland.—Houses (300); L. W. Evans, 18, Norfolk Street.

Factory extensions for Northern Traders, Ltd.; J. Huntley & Sons, Marion Street.

Factory extensions for King & Co.; W. & T. R. Milburn, 17, Fawcett Street.

West Riding.—School, Hemsworth; A. Booth, acting county architect, County Hall, Wakefield.

Lutterworth. — Works extensions; Wycliffe Foundry Co.

Manchester. — Prefabricated building for nurses' home; L. C. Howitt, acting city architect.

Morley.—Houses (60), Fairfax estate, Drighlington; borough engineer.

Northumberland. — Additional temporary accommodation at schools (£50,000); county architect, County Hall, Newcastle-on-Tyne.

Portsmouth.—Reinstatement of nurses' home, etc., at Royal Portsmouth Hospital; A. E. Cogswell & Sons, architects, Prudential Buildings.

Rickmansworth.—Houses (64), as first development of 234 houses at Mill End site, for U.D.C.; Richardson, Son & Knowles, architects, 52, High Street.

Stalybridge. — Works additions, Bennett Street; Futura Rubber Products.

Wallsend.—Development of the Station Road estate (2,000 houses); W. C. Leech, builder, Clayton Street, Newcastle-on-Tyne.

Westmorland.—County School, Milnthorpe; L. H. Crompton, county architect, Kendal.

Weston Favell.—Houses (450), Westone estate; Gilbert Cole, Ltd., builders, 14, Market Place, Northampton.

Municipal Reports

Ipswich

DURING March the fuel stock at Ipswich power station was reduced to 710 tons—less than a week's supply. The chief engineer and manager of the Electricity Department (Mr. G. A. Vowles) mentions this in his annual report. Surveying the difficult fuel situation during the war years, he says that in order to economise coal both coke and sawdust have been used as fuels. The coal-handling plant was modified to enable an intimate coal-coke mixture to be obtained and a considerable quantity of coke, in varying proportion up to 22·5 per cent. of the mixed fuel, has been successfully consumed. Sawdust as fuel was introduced in August, 1942, and after some experiment two boilers were equipped to consume sawdust while also burning coal; in this way approximately 800 tons of coal had been saved up to March 31st last.

In 1944-45 a total of 28·5 million kWh was generated compared with 24·5 million kWh in the previous year. It was necessary to shed load on five occasions, in each case at the breakfast-time peak between 8.25 and 10 a.m. In December, 1942, a 12,500-kV set broke down through blade failure, causing partial wrecking of the machine; this set was brought back into commission last January, resulting in an improved thermal efficiency.

Excluding bulk supplies of 18·1 million kWh to East Suffolk and Felixstowe, a total of 68·8 million kWh was sold (against 66·4 million); power supplies decreased by 1·5 million kWh, but under the combined tariff there was an increase of 3·3 million kWh. Income from the sale of electricity, including bulk supplies, was £393,160 (£359,381), equivalent to 1·086d. (1·068d.) per kWh sold, and total revenue from all sources was £442,050 (£404,482). Working expenses were £363,533 (£334,682) and there was a gross profit of £78,517 (£69,800). Interest charges were about the same as in the previous year, but taxation and reserve for income tax (for which there was no provision in 1943-44) required £8,241, and the net surplus for the year was £11,486 (against £11,455).

Cannock

The Cannock undertaking (engineer, Mr. P. Wardle) reports an increase in sales from 24·1 million kWh in 1943-44 to 25·1 million last year. Income rose from £111,577 to £118,735 and working expenses from £76,084 to £89,737. After accelerating loan repayments and providing £3,000 for income tax there was a net profit of £159 (£4,608). Revenue from the sale of electricity averaged 1·032d. (against 1·016d.) per kWh sold..

Winchester

An increase from 1,562 to 1,752 kWh in sales per consumer is reported by the Winchester Electricity Department (engineer, Mr. R. Ayton). Altogether 10·1 million kWh was sold in 1944-45 compared with 8·9 million in the previous year. Total revenue was £90,039 (£81,826), working expenses amounted to £61,173 (£53,651) and there was a net surplus of £6,164 (£5,076).

CLASSIFIED ADVERTISEMENTS

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

THE CHARGE for advertisements in this section is 2/- per line (approx. 7 words) per insertion, minimum 2 lines 4/-, or for display advertisements 30/- per inch, with a minimum of one inch. Where the advertisement includes a Box Number there is an additional charge of 6d. for postage of replies.

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

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

Original testimonials should not be sent with applications for employment.

OFFICIAL NOTICES, TENDERS, ETC.

COUNTY BOROUGH OF BLACKPOOL

Electricity Department

TENDERS are invited for the following works:—

1. To supply, lay, joint and connect:
   Approx. 22,080 yds. 0.25 sq. in. H type screened 33-kV. 3-core cable.
   31,440 yds. 7/.029 L.T. twin and 3-core pilot cable.
   12,860 yds. 12-pair, 20-lb. dry core telephone cable.
   8,760 yds. 0.2 sq. in. 6,600-v. 3-core cable.
   4,000 yds. 0.1 sq. in. 6,600-v. 3-core cable.
2. To supply and instal at one substation:
   An automatic fire extinguishing system.
3. To supply and deliver to site:
   2 10,000-kVA. 33-kV/6.6-kV automatic on-load ratio change transformers.

Forms of tender and specification may be obtained by recognised manufacturers from the Borough Electrical Engineer, Shannon Street, Blackpool, at whose office plans may be inspected. Tenders, in plain sealed envelopes, endorsed

"Tenders for Underground Cables,"
"Tenders for Fire Extinguishing Equipment,"
"Tenders for Transformers,"

must be delivered to the undersigned not later than noon on 12th November, 1945.

TREVOR T. JONES,
Town Clerk.

Town Hall,
Blackpool, Lancs. 3089

SITUATIONS VACANT

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

GENERAL SALES MANAGER

JOHNSON & PHILLIPS LTD. are prepared to receive applications for the position of General Sales Manager (Home).

Apply by letter only, giving particulars of age, education, qualifications, training, experience and salary required, to General Manager, Charlton, London, S.E.7.

3077

A company in the London area requires a first-class Technical Sales Representative to sell fractional horse power motors in this country. Sound knowledge of matters essential. The product is a precision instrument of the highest quality. The position calls for drive, energy and vision, and offers considerable scope. Age between 35 and 40. Replies to Box 3088, c/o The Electrical Review.

BOROUGH OF HESTON AND ISLEWORTH

Electricity Department

Shift Charge Engineer

APPLICATIONS are invited for the position of Shift Charge Engineer. Applicants must have a sound theoretical knowledge and considerable practical experience in the operation, running and maintenance of water tube boilers, reciprocating and turbine D.C. and A.C. generating plant, E.H.T. and L.T. switchgear, motor converters, rotary converters, rectifiers, 3-wire D.C. balancers, large secondary batteries, booster charging equipment, etc.

Applicants must be capable of carrying out running repairs, tests and overhauls to all station plant.

The salary will be in accordance with Grade 8, Class E, of the National Joint Board Schedule. The commencing salary at present is £389 11s. per annum.

The appointment is subject to the Local Government and Other Officers (Superannuation) Act, 1937, and the successful candidate will be required to undergo a medical examination.

The person appointed will be required to carry out such duties as may be assigned to him, to devote his whole time to the duties of his office, and to reside within the Borough.

Form of application may be obtained from Mr. S. H. Fowles, M.I.E.E., M.I.Mech.E., M.Inst.B.E., Borough Electrical Engineer and Manager, Electricity Offices, 11, Staines Road, Hounslow, Middlesex, and must be forwarded, together with copies of not more than three recent testimonials, enclosed in a plain sealed envelope endorsed "Charge Engineer," to me at the Council House, not later than 12 noon on Saturday, 27th October, 1945.

Canvassing any member or officer of the Council, either directly or indirectly, will be deemed a disqualification.

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

HAROLD SWANN,
Town Clerk.

Council House,
Hounslow. 3061

BOROUGH OF MORLEY

Electricity Department

Appointment of Demonstrator and Showroom Attendant (Female)

APPLICATIONS are invited for the above appointment at a salary in accordance with the Corporation's Scale, Grade D, £195-£15-£225, plus war bonus, which at present is £48 5s. per annum.

Candidates must have a good general education and hold a recognised diploma in Domestic Science, be competent to conduct lecture-demonstrations both in the showrooms and on consumers' premises, and to advise customers on the selection and use of electrical appliances.

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

Applications, stating age, qualifications and experience, together with copies of recent testimonials, to be sent to the undersigned not later than Friday, 9th November, 1945.

W. H. METCALFE,
Engineer and Manager.

Electricity Works,
Morley, Yorks. 3106

COUNTY BOROUGH OF ST. HELENS

Electricity Department

Appointment of Junior Mains Assistant

APPLICATIONS are invited for the above position with salary and conditions in accordance with Grade 9a, Class G, of the National Joint Board's Schedule, at present £307 per annum.

Candidates must be experienced in the operation of high and medium voltage A.C. distribution and D.C. systems, and must possess theoretical qualifications at least equivalent to the Higher National Certificate in Electrical Engineering.

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

Applications, accompanied by copies of not more than three testimonials, must be made on the form obtainable from the address given below, and be received not later than 5th November, 1945, endorsed "Junior Mains Assistant."

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

P. BREGAZZI, A.M.I.E.E.,
Electricity Works, Electrical Engineer and Manager.
Carlton Street,
St. Helens, Lancs. 3113

CITY OF BRADFORD ELECTRICITY DEPT.

Substations Maintenance Engineer

APPLICATIONS are invited by the City of Bradford Electricity Department for the appointment of a Substations Maintenance Engineer.

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

The salary and conditions will be in accordance with the N.J.B. Agreement, the present salary being £295 per annum (Class H, Grade 10).

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

Applications, stating age and giving full particulars of training and experience, are to be endorsed "Substations Maintenance Engineer," and must reach the undersigned not later than Tuesday, the 6th November, 1945.

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

T. H. CARR, A.M.Inst.C.E., M.I.Mech.E., M.I.E.E.,
Electrical Engineer aand Manager.
27, Bolton Road, Bradford.
October, 1945. 3094

COUNTY BOROUGH OF WALLASEY

Electricity Department

Appointment of Assistant Station Superintendent

APPLICATIONS are invited by the 5th November for the above appointment at a salary in accordance with Class G, Grade 7, of the National Joint Board Schedule—at present £445 £472 p.a. Applicants must be corporate members of the Institution of Electrical Engineers, with sound practical experience in the operation and maintenance of high pressure plant in a modern power station.

A form of application and further particulars will be supplied by the Electrical Engineer and Manager, Wallasey Road, Wallasey, on receipt of a stamped and addressed foolscap envelope.

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

EMRYS EVANS,
Town Clerk.
10th October, 1945. 3097

BOROUGH OF BECKENHAM

Electricity Department

Appointment of Charge Engineer

APPLICATIONS are invited for the position of Charge Engineer. Candidates should have experience in boiler house control, operation of steam-raising plant and switchboard work.

The salary will be in accordance with the National Joint Board Schedule, at present Class D, Grade 8.

The successful candidate will be required to pass a medical examination by the Medical Officer of Health or an independent Medical Referee appointed by the Council, and contribute to the Superannuation Scheme.

Applications must be made on the prescribed form, which is obtainable from the Borough Electrical Engineer and Manager at the Town Hall, Beckenham. The form, when completed, to be enclosed in an endorsed envelope and delivered at the Electrical Engineer's Office not later than Tuesday, 30th October, 1945.

Canvassing in any form will disqualify.

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

C. ERIC STADDON,
Town Hall, Town Clerk.
Beckenham, Kent.
13th October, 1945. 3102

BOROUGH OF HARROGATE

Appointment of Deputy Borough Electrical Engineer, Electricity Undertaking

THE Council invite applications for the position of Deputy Borough Electrical Engineer of their undertaking from applicants who are Corporate Members of the Institution of Electrical Engineers and experienced in the management and administration of an electricity undertaking. The salary for the position will be £723 per annum, inclusive of cost of living adjustment.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and to determination by the giving of three months' notice in writing on either side. The successful candidate will be required to pass a medical examination.

Applications, on the forms provided, enclosed in an envelope endorsed "Deputy Borough Electrical Engineer," should be forwarded to the Borough Electrical Engineer, Municipal Offices, Harrogate, and received not later than Monday, 12th November, 1945.

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

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

J. M. DODDS,
Municipal Offices, Harrogate, Town Clerk.
12th October, 1945. 3092

BOROUGH OF DOVER

Electricity Department

Junior Mains Assistant

APPLICATIONS are invited for the appointment of a Junior Mains Assistant. Candidates must have had a sound technical training and experience in the operation of high voltage and medium voltage A.C. and D.C distribution systems.

The salary and conditions will be in accordance with the N.J.B. Schedule, the present salary being £283 per annum, Class D, Grade D9.

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

Applications, stating age, and giving full particulars of training and experience, are to be endorsed "Junior Mains Assistant," and must reach the undersigned not later than Wednesday, 31st October, 1945.

This advertisement is published by permission of the Ministry of Labour and National Service (Technical and Scientific Register) under the Control of Engagement Order, 1945.

R. G. WIDGERY, A.M.I.E.E., A.I.E.E.,
Engineer and Manager.
Ladwell, Dover. 3103

BOROUGH OF STAFFORD

Electricity Department

Appointment of Senior Mains Assistant

APPLICATIONS are invited for the above appointment at a salary in accordance with the N.J.B. Schedule, Class F, Grade 8b, commencing at £346 per annum.

Applicants must have had a sound technical training and practical experience in the laying, maintenance and operation of E.H.T. and L.T. underground cable systems, including the erection and maintenance of substation equipment.

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

Applications, endorsed "Senior Mains Assistant," stating age, training, qualifications and full details of experience, and accompanied by copies of not more than three testimonials, should be forwarded to the Borough Electrical Engineer and Manager, Electricity Department, Gaolgate, Stafford, to reach him not later than Saturday, 27th October, 1945.

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

T. BROUGHTON NOWELL,
Town Clerk.

Borough Hall,
Stafford. 3063

A Company manufacturing wide range electric heating equipment (industrial, commercial, etc.) have several vacancies for Class A ex-Servicemen (or otherwise exempt from M.O.L. control) with suitable experience for the following: (a) Storekeeper; (b) Charge-hand Electrical-Fitter for special plant section; (c) Foreman for small appliance section, all round experience and initiative essential; (d) Assistants for electrical testing, repairs and development; (e) Turner-machinist (centre lathe, shaping, milling, etc.); (f) Fitters, preferably with experience of angle-iron and sheet metal construction; (g) Electrical-fitters, preferably used to control panel and equipment wiring, etc. Positions offer good opportunities for keen reliable men in progressive concern. District, N.W London. Details of experience, etc. to—Box 3107, c/o The Electrical Review.

APPLICATIONS invited from men becoming available for civilian work on Class A demobilisation, for positions as experienced practical Model makers, in the Instrument Department of a large electrical manufacturer in the Midlands. Only men with previous experience in this class of work need apply. Applicants should state age and previous employer, with details of work in each case, to—Box 2980, c/o The Electrical Review.

ARMATURE Winders, experienced all classes A.C. and D.C. jobs. Class A ex-Servicemen or otherwise exempt M.O.L. control. Permanencies for suitable men. —Service Electric Co. Ltd., Abbey Mfg. Estate, Alperton, Telephone, Wembley 0194. 49

ARMATURE Winders, experienced in A.C. and D.C. work. Permanent jobs for suitable men with firm having good post-war future. Class A ex-Servicemen or otherwise exempt Ministry of Labour control.—Southern & Redfern Ltd., Woodhead Road, Bradford. 3066

ASSISTANT-cum-Traveller required. To assist small firm rapidly expanding. Electrical Accessories. Good prospects to reliable man. Able to drive car. East London. Class A ex-Serviceman, or otherwise free. Apply in first instance to—Box 3047, c/o The Electrical Review.

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

CABLE Maker requires first-class Head Foreman, age 30-45, with good general experience T.R.S. synthetic braided cables, good organiser, able to handle labour. Good opportunity for advancement right man. Apply, giving full particulars.—Aerialite Ltd., Stalybridge. 3071

CAPABLE Manager to take charge of and develop electrical dept. of soundly established London retail business. State age and full details of experience.—Box 7799, c/o The Electrical Review.

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

DEPARTMENTAL Manager required by company, West Country area, to take charge of large-scale Loud Speaker production. Applicants must have extensive experience in similar capacity. Write details of qualifications, past experience, etc. to Box 3115, c/o The Electrical Review.

DOMESTIC electrical appliances. North London manufacturers require Manager capable of control. Must have first-class technical and practical knowledge from design to production. Good opening for fully experienced man. Write fullest particulars in confidence.—Box 2943, c/o The Electrical Review.

ELECTRIC Traction Engineers (two) required by British company in Far East. Practical experience in overhead equipment, mains and trackwork essential. Substation experience would be additional qualification. One required as Assistant Engineer at equivalent of £700 p.a., the other as Junior Assistant Engineer at £500 p.a., both receiving house allowance in addition. Write, stating age, training, qualifications and experience, to—" P. A.," c/o Streets, 110, Old Broad Street, E.C.2. 3072

ELECTRICAL Designer for small rotating and static electrical machines and apparatus, motors, generators, alternators, etc., A.C. and D.C., mainly of a special nature. Over 51 or Class A ex-Serviceman. Salary about £600, according to qualifications. London area.—Box 3003, c/o The Electrical Review.

ELECTRICAL Engineer required for large industrial concern in London. Applicants, who should be between 35 and 40 years of age and of good personality, should be fully qualified and preferably corporate members of the Institution of Electrical Engineers. Applicants should have had first-class practical experience in the operation and maintenance of A.C. and D.C. generating plants, factory distribution systems, motors and automatic control gear, lifts, etc., and would be required to manage a staff of electricians. Duties would also include the preparation of specifications, the ordering of equipment and material, and its installation in a large factory plant. Salary £600-£800, depending upon qualifications. Applications should give full particulars of education, technical training, experience and positions held. Write—Box 3033, c/o The Electrical Review.

ELECTRICIAN required immediately by Electrical Contractors, London, permanency to suitable man. Class "A" ex-Serviceman or man over 51. Apply, giving full particulars, to—Box 2945, c/o The Electrical Review.

ELECTRICIAN-Wiremen for installation and maintenance work. Class A ex-Servicemen or otherwise exempt from Ministry of Labour control.—C. F. Parkinson, Electrical Contractor, 114, West St., Boston, Lincs. 7763

ELECTRICIANS accustomed to industrial installations, screwed conduit work, etc., also Electricians for plant maintenance. Class A ex-Servicemen or otherwise exempt M.O.L. control. Permanencies for suitable men.—Service Electric Co. Ltd., Abbey Mfg. Estate, Alperton. Telephone, Wembley 0194. 48

ELECTRICIANS and Assistants required for London and Provinces. Class A ex-Servicemen or over 51.—Geo. E. Taylor & Co. (London) Ltd., 36, Denmark Avenue, Wimbledon, S.W.19. Wim. 5021. 3062

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

ELECTRICIANS and Assistants wanted, Class A ex-Servicemen or over 51. Permanency to right men.—J. H. Plant Ltd., 99, St. Martin's Lane, Charing Cross, W.C.2. 7798

ELECTRICIANS, Class A ex-Servicemen or over 51, required by electrical contractors, near City. Permanency to right men. Best conditions.—Box 3084, c/o The Electrical Review.

ELECTRICIANS wanted immediately. A priority work. Class A ex-Servicemen or men otherwise free. Applications from demobilised pre-war employees especially appreciated. Apply—Holliday Hall & Stinson Limited, 36, Victoria Street, Westminster, S.W.1. 7732

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

EXPANDING Company requires experienced Female Book-keeper, Shorthand-Typist with a view to taking over complete control of office. Reply stating age, experience and salary required to—Visolite Ltd., 98/98a, Soho Road, Handsworth, Birmingham, 21. 3105

EXPERIENCED Armature and Stator Winders, good opportunity for right men, over 51 or from Class A ex-Servicemen only. Write, giving details of past experience, to—Vickalectric Engineering Co., 503, Walsgrave Road, Coventry. 7804

EXPERIENCED Estimator required for industrial installation work in the Midlands, Class A release or over 51.—The Midland Electric Installation Co. Ltd., Cyprus Works, Upper Villiers Street, Wolverhampton. 3005

FIRM of electrical engineers and contractors shortly opening business in the South Scottish area invite applications from Electricians and Wire-men experienced in the highest grade domestic and industrial installations. Permanent positions with good prospects and conditions are offered to suitable applicants over 51 years of age or Class A ex-Servicemen. Men expecting release from the Services in the near future are particularly invited to apply. All applications will be considered and acknowledged. Reply giving full particulars of age, training and experience, and when disengaged, to—Box 144, Phillips Advertising Ltd., 15, Wilton Road, London, S.W.1. 2986

FOREMAN Armature Winder, experienced all sizes A.C. and D.C. motors. Class A ex-Serviceman, or otherwise exempt Ministry control. Good wages, small Nottingham firm. State full particulars of training and experience, age.—Box 3111, c/o The Electrical Review.

FOREMAN-Electroplater, to take charge of small plant working chiefly nickel, with barrelling, rumbling and polishing, in Felixstowe. Applicants must have sound knowledge and experience of the trade, and a good opportunity is provided. State age, experience and rate expected. Applicants must be free from restrictions of the Control of Engagement Order.—Box 3021, c/o The Electrical Review.

HEAD Foreman for Coil Winding Department required by company engaged in large-scale manufacture of light to medium electrical products, West Country area. Applicants must have extensive experience similar capacity with firms of repute. Write full details of qualifications, past experience, to—Box 3114, c/o The Electrical Review.

LADY required to take charge of Electrical Contractors' Showroom (London). Apply, giving full particulars, to—Box 2946, c/o The Electrical Review.

LONDON electrical power engineers have vacancies for Armature Winders, also Electrical Fitters, experienced in assembly of A.C. and D.C. motors, 1 to 50 h.p. Class A ex-Servicemen only. Good conditions of employment. Letters only giving details of experience to—The Managing Director, Industrial Electrical Co. Ltd., Offord Street Works, London, N.1. 3073

MANAGER for electrical department of an established business. Must have good credentials and experience, be able to estimate, take complete control and obtain the business. Good opening for progressive man. Write, stating age, experience and salary required, to—Box 3775, Frost-Smith Advg., 64, Finsbury Pavement, E.C.2. 2998

MANAGER required for Winding Dept. of electrical engineering co. in East London. Applicants must be good organisers with thorough practical winding experience of all sizes A.C. and D.C. motors, and be used to controlling and training mixed labour. Applicants should state concise particulars of training and subsequent experience, age, and salary required.—Box 2965, c/o The Electrical Review.

MANAGER required to take charge of technical development and research in the design and production of small electric motors. Please send full details of experience and salary required.—Box 3099, c/o The Electrical Review.

MANUFACTURER of electrical transformers in London has vacancies for men with some electrical knowledge in the Winding and Assembly Departments. The company is prepared to give the specialised training necessary to approved applicants, with a view to permanent employment at good rates of pay. Semi-skilled rates would be paid initially, to be increased to full-skilled rates immediately it is clear that the applicant will become a satisfactory tradesman. Five-day week of 47 hours with occasional overtime. Applications from Class A ex-Servicemen and others exempt from M.O.L. control only.—Box 3068, c/o The Electrical Review.

OVERHEAD Linesman/Electrician for electricity undertaking. Wages and conditions of employment in accordance with Schedule of West of England No. 6, N.J.I.C. Rate of wages at present 23.13d. (Linesman's rate) or 25d. (Electrician's rate) per hour for a 47-hour week, £4 10s. 8d. or £4 17s. 11d. Applications to the—Ministry of Labour and National Service, 1-2, Kingsbury Street, Marlborough. 3112

MEDIUM size firm specialising in variety of special small electric motors require Production Engineer, over 51 or Class A ex-Serviceman, for batching up work and issuing shop orders and general progress planning. Full particulars of age, qualifications and experience to—Box 2962, c/o The Electrical Review.

REPRESENTATIVES required by firm of Scientific and Electrical Instrument manufacturers to cover London area. Remuneration by commission and expenses. Apply in writing, giving full details, to—Box 3080, c/o The Electrical Review.

REQUIRED, Two Junior Electrical Draughtsmen, transformer experience essential, permanent position, good post-war prospects. Applications from Class A ex-Servicemen only.—Box 3087, c/o The Electrical Review.

SKILLED Draughtsmen required by transformer manufacturers in London. Preference will be given to an applicant who has had experience of transformer design, but applications from draughtsmen skilled in other branches of electrical industry will receive full consideration. Five-day week. Association rates offered. Class A ex-Servicemen and others exempt from M.O.L. control only.—Box 3069, c/o The Electrical Review.

SUPERVISING Electrical Engineer required to take charge of department, having good experience of electrical sub-contract work, designing all kinds of electric lighting and power installations, taking off quantities and estimating. Position is one of responsibility with plenty of scope and prospects of advancement for the right man. Apply, giving full details in writing, to—Matthew Hall & Co. Ltd., 26/28, Dorset Square, N.W.1. 3079

SWITCHGEAR Sales Representative required for South Wales and West of England. Sound electrical engineering technical training necessary. Apply, stating full details of experience and salary required, to—Box 2964, c/o The Electrical Review.

TEST Room Assistants (Male), age over 51 or Class A ex-Servicemen, with experience on moving coil instruments, preferably Pyrometers, London district. State age, experience and rate required. Replies to—Box 3042, c/o The Electrical Review.

TESTING Engineer required for large modern factory in North of England to take complete charge of department testing A.C. induction motors up to 250 h.p., and all associated plant. Age 30-40. Must have sound technical training and experience, be strict disciplinarian, and be capable of dealing with inspection tests for Government departments, etc. Apply, stating age, experience and salary required, to—Box 3065, c/o The Electrical Review.

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

WANTED an experienced Toolmaker-Designer for Bakelite Moulds. Applications from those over 51 or Class A ex-Servicemen only. Write in first instance to—Box 3057, c/o The Electrical Review.

WIREMAN for general factory work. Only those who have knowledge of A.C. and D.C. motors and wiring need apply. Permanent and progressive job to good reliable man. Applications from Class A ex-Servicemen or those over 51.—Cox & Danks Ltd., Plant & Machinery Dept., Faggs Road, Feltham, Mdx. 3059

WORKING Director. London firm of electrical contractors, established reputation, large Government contracts recently completed, organisation ready for post-war contracts, requires qualified Working Director. Excellent opportunity for energetic and capable man.—Box 3081, c/o The Electrical Review.

WORKS Manager. Small factory (50), rapidly growing, producing domestic electric equipment, fires, irons, kettles, water heaters, etc., requires Works Manager with practical experience of machine shop, press shop, tool room and spinning shop processes. Will act as own buyer initially and operate a costing system. Works are being extended, and must be qualified to put down plant for producing electric kettle bodies in aluminium and copper. Must be a friendly but strict disciplinarian. Works situated in East Coast seaside town. A generous salary and prospects offered to assist and work directly under managing director. State in time order past experience, present occupation, salary expected and age.—Box 2993, c/o The Electrical Review.

YOUTH with some knowledge of electrical goods required as Warehouse Assistant, good prospects. Apply—Mr. Fisher, Farmer, Stedall & Co., 145, St. John Street, Clerkenwell, E.C.1. 3038

APPOINTMENTS FILLED

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

BOX 2402—Electrical Plant Engineer; Box 2401—Mechanical Plant Engineer; Mersey Power Co. Ltd.—Technical Assistant and Assistant Switchboard Attendant. Applicants are thanked.

SITUATIONS WANTED

ADVERTISER desires post as Manager or Supervisor to electrical contractor or installation engineer, or as Works Engineer on maintenance. Over 40 years' experience in lighting and power installation work, with 20 years in business on own account; last 4 years in Air Ministry employ at R.A.F. stations.—Box 7818, c/o The Electrical Review.

ADVERTISER (40), seeks situation as Mains Assistant or Foreman, 19 years' experience of corporation and contracting work; past 3 years full control supervising complete installation of L.V. and H.V. distribution, up to 11 kV on R.A.F. stations. Further details supplied.—Box 7822, c/o The Electrical Review.

ADVERTISER (53), offers very wide experience all branches, Sales Office Administration, Home and Export. Efficient and economical controller. Details, salary, etc.—Box 7820, c/o The Electrical Review.

A.M.I.E.E., Int.A.M.I.P.E. (30) desires position as assistant works manager in progressive electrical company. Design, D.O., estimating, workshop and executive experience. Remuneration £600 p.a.—Box 7749, c/o The Electrical Review.

BSc., age 38, designer of transformers, motors, relays, rheostats, free.—Box 7830, c/o The Electrical Review.

DISTRIBUTION Engineer (37), A.M.I.E.E., B.Sc.(Eng.), seeks post with company developing rural area. Experienced 33-kV, 11-kV and 400-volt overhead and underground systems. Reasonable salary. Own car.—Box 7807, c/o The Electrical Review.

DRAUGHTSMAN-Designer, age 33, exp. small mech. and elect. components, works app. and 10 years D.O., desires position with reputable firm, London area.—B. H. D., 18, Kempsford Gardens, S.W.5. 7811

DRAUGHTSMAN, with 10 years' experience in design and production of domestic and industrial cooking and heating equipment, seeks position with firm interested in the development of above apparatus.—Box 7792, c/o The Electrical Review.

ELECTRICAL and Mechanical Engineer, M.A.S.E.E. Age 34. 17 years' experience. At present Station Engineer, Air Ministry. Desires to settle in any one location seeks position with Works, Corporation or Supply Co. Mains or Assistant Engineer; similar, Manager of Works.—Box 7750, c/o The Electrical Review.

ELECTRICAL Designer of rotating electrical machinery, 25 years' experience, requires responsible position with reputable firm. Salary £1,000 approx.—Box 7808, c/o The Electrical Review.

ELECT. Eng., Class A release, med. cat. A1, age 40, 22 yrs.' experience all branches, estimating, three-phase overhead and underground distribution, etc., requires suitable position.—Box 7797, c/o The Electrical Review.

ELECTRICAL Engineer (33), with National Certificate and a wide experience in maintenance and installation work, seeks a position of responsibility.—Box 7725, c/o The Electrical Review.

ELECTRICAL Engineer (35), B.Sc. (Hon.), A.M.I.E.E., release October, desires permanent progressive post with consultants or contractors dealing with power installations and electrical equipment buildings. Wide practical and commercial experience.—Box 7788, c/o The Electrical Review.

ELECTRICIAN, disengaged, all-round exp., able to interview and supervise if required, free of national service. Electrician, 1a, Sheldon Road, Chippenham, Wilts. 7796

ENGINEER, A.M.I.E.E., skilled in installation and maintenance transmitting receiving gear, good general knowledge office routine, desires change.—Box 7790, c/o The Electrical Review.

ENGINEER (Mechanical), age 37, seeks post in South. 18 years' experience on design-development of electro-mechanical apparatus, including television and radio equipment. Present salary £500.—Box 7745, c/o The Electrical Review.

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

EXECUTIVE, 20 years' experience in telephone industry, office and shops control, seeks post as Manager, technical or non-technical, or similar executive position in London area. Age 40. Salary approx. £450. Box 7831, c/o The Electrical Review.

FIRST-class Electrician requires position which entails experience, trust and responsibility. Age 34.—Box 7801, c/o The Electrical Review.

GRADUATE I.E.E., wide technical and representative experience, desires progressive post, preferably on export work. Knowledge of French and Spanish.—Box 7813, c/o The Electrical Review.

HIGHLY-trained Secretary seeks permanent post-war position. Experienced minuting of meetings, Trade Association work, full statistical knowledge and general confidential secretarial work.—Box 7794, c/o The Electrical Review.

M.Sc. Honours degree electrical engineering, 16 years' experience, generators, motors, electrical instruments and electronics, own patents, wants to change position.—Box 7791, c/o The Electrical Review.

MANAGER, methods and design, A.M.I.P.E., age 36, wide experience high grade electro-mechanical apparatus, telephone, radar, etc., tactful administrator and disciplinarian, good organiser, proven production engineer, mass production, tools, presswork, etc., seeks progressive senior post. Available November.—Box 7761, c/o The Electrical Review.

METER Engineering Advertiser (32), first-class experience D.C., single and polyphase meters, instrument and clockwork, with manufacturer and supply authority. M.A.S.E.E.—Box 7824, c/o The Electrical Review.

OPTICAL and Electrical Foreman Instrument Maker, age 35, seeks progressive situation in South Africa. Excellent refs. Release obtainable.—Box 7832, c/o The Electrical Review.

POST-war. Advertiser desires change, wishes represent manufacturers producing good class Electrical Water Heating Apparatus, etc. All-round knowledge technical and commercial, extensive connection, guarantee business, Midlands preferred.—Box 7730, c/o The Electrical Review.

PROGRESSIVE young man with 14 years' experience in the vacuum industry requires position as Manager or Assistant Manager in large neon sign company on salary, plus 1,000-ft. run bonus, basis. Expert knowledge of glass working, pumping and neon installations. Able to install and equip complete neon sign factory and control all processes to make neon tubes. Alternatively would consider working partnership with small electrical concern, very limited capital.—Box 7768, c/o The Electrical Review.

RESPONSIBLE executive position required, offering attractive prospects. Present Sales Manager (30), with good connections and wide experience of sales, production, staff control and administration. Midland area preferred. Please indicate salary and position in full.—Box 7723, c/o The Electrical Review.

REPRESENTATIVE (Wholesalers'), solid connection S.W. London, East Surrey, seeks change. Could treble present turnover with right backing. Commission basis, would open branch if necessary and drive light van. Exceptional opportunity to wholesalers desiring new accounts.—Box 7800, c/o The Electrical Review.

REPRESENTATIVE (48), with London wholesaler, desires change. Would consider taking financial interest in small wholesale business.—Box 7823, c/o The Electrical Review.

SOUND Engineer. American and English reproducing systems. Disc, tape, film (non-photo) recording. P.A., Design, Construction, Installations. Desires change where above experience can be used.—Box 7828, c/o The Electrical Review.

STAFF Foreman and Supervisor (43), able to control labour and execute large contracts, drawings, wages, etc., desires change. At present and for number of years staff foreman for well-known electrical contractors. Would consider practical assistant to consultant.—Box 7753, c/o The Electrical Review.

SUPERVISOR Foreman (38), with technical and practical knowledge of distribution, construction and maintenance, requires position in Southern area. Genuine. Box 7816, c/o The Electrical Review.

TECHNICAL Sales Engineer (39) desires appointment with manufacturer, London and Southern area; 20 years' experience motors, control gear and switchgear. Past 6 years in charge London office.—Box 7814, c/o The Electrical Review.

TECHNICAL Sales Engineer (40), A.I.E.E., and Central Register, desires appointment with manufacturer. Over 15 years' experience L.T. power distribution equipment, industrial lighting and heating schemes. Established connection wide area Midlands public utility undertakings and important industrial concerns. Own car and telephone.—Box 7744, c/o The Electrical Review.

WAYLEAVE Officer, now free (47), active, 12 years' experience. Familiar with statutory procedure, having supervised some seven hundred miles of overhead and underground cable construction, wayleave acquisition and records. Experienced in engineering requirements for overhead line work, access routes, crop damage, timber valuations and fencing. Preparation and presentation of cases for inquiry and arbitration. Trained surveyor, estate agent and property valuer.—Box 7795, c/o The Electrical Review.

WILLING to travel. Particularly interested in South America. Electrical Maintenance and Installation Engineer, age 27, secondary education, London apprenticeship. 11 years' experience Diesel alternators, distribution, etc. Due for "A" release, February, 1946.—Box 7789, c/o The Electrical Review.

YOUNG Electrical Engineer (24), student apprenticeship, 7 years' experience installations and switchgear manufacture, Matriculation, Ordinary and Higher National Certs., desires interesting post, London area.—Box 7787, c/o The Electrical Review.

FOR SALE

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

GEORGE COHEN, SONS & CO. LTD.

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Telephone: Northern 0898.

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1,400 ft. Humbarton T.P. ¾" Busbars, open type, in 12 ft. lengths. Each length with 2-30-amp. T.P. Fuse Boxes.

1 100-kW Steam Generating Set, Belliss & Morcom/E.C.C., 475 r.p.m., 160 lbs. per sq. inch, 230 volts D.C., direct coupled on bedplate.

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(*Continued on page* 58)

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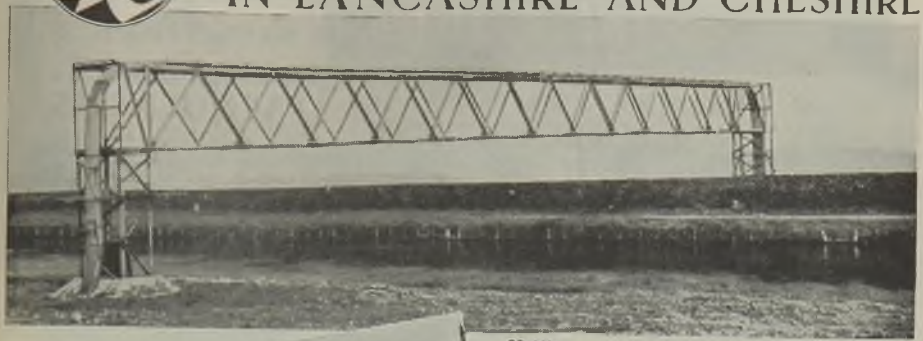

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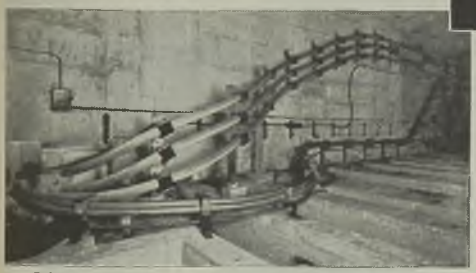

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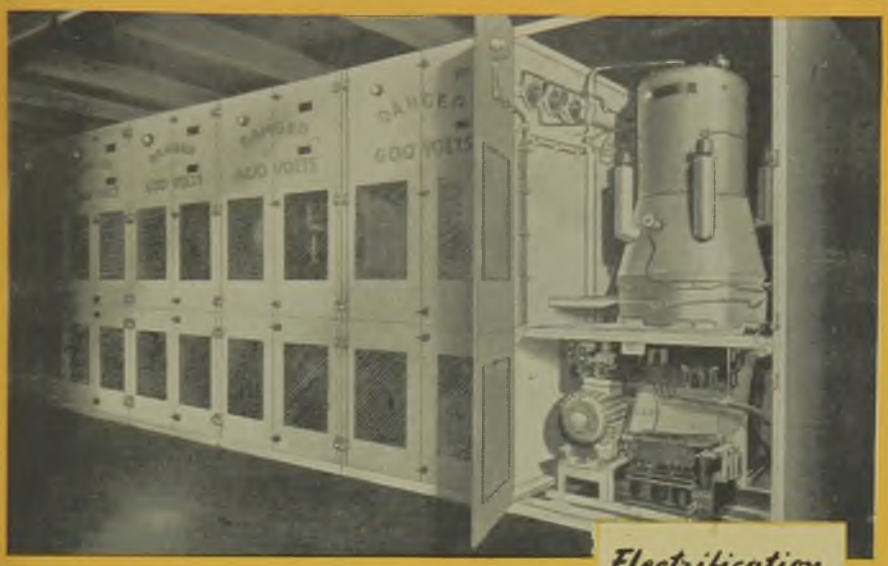

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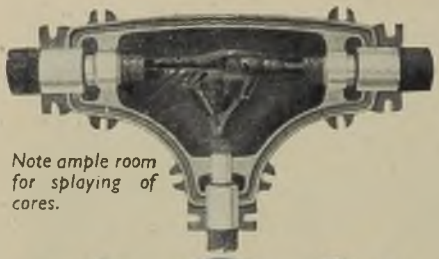

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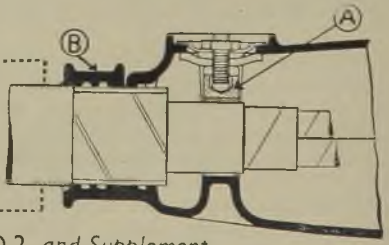

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