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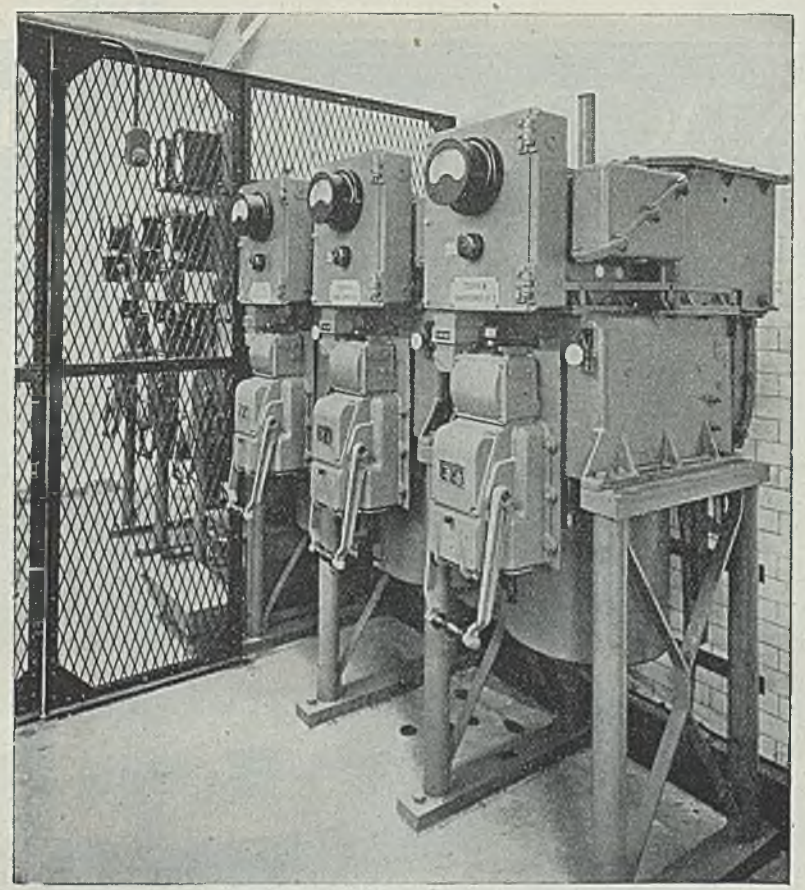

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CHIEF CONTENTS IN THIS ISSUE

Development

THE relaxation of some of the restrictions on electrical development, will have been received by everyone in the industry with feelings of pleasure, and the desire to make a start in overcoming the negativing effects of the war years, can now to some extent be satisfied. It was as long ago as April, 1942, that new or additional supplies were restricted to works in connection with the war effort or to domestic or other premises where serious or exceptional difficulties would arise if supply was not provided, and so the industry has now over three years' leeway to make good. Continuing limitations on the labour available and to a lesser extent on the amount of materials, will for some time dictate the volume of any development which can be carried out, while the industry is, too, still called upon to give prior attention to the Japanese war needs and the requirements of the food industries, such as farming and so on. Notwithstanding these limitations, however, the industry welcomes the opportunity to make the most of the situation.

It is understood that freedom to develop to the extent permitted the electricity supply industry has also been granted to gas interests, and so the field of competition is once again open. It is true that neither gas nor electricity is yet permitted to exploit the field to the full boundaries of its area, but sufficient ground is open to allow of an appreciable start being made with the resources available. What now housing there is, is on sites already on the routes of existing mains, while there are still many houses of pre-1939 vintage awaiting full conversion to electrical methods.

As the months go by and labour becomes more readily available, the number and variety of electrical appliances on the market will improve. The already electrically-minded public, starved for six years of the convenience and service which such appliances offer, will for some time deny the industry the opportunity of building up its stocks, and the needs of new consumer-connections will in consequence be difficult to cater for until that market is satisfied. In this connection it should not be overlooked that because the gas industry has a smaller variety of appliances to offer it may not take that industry so long as it will the electrical industry to get into its stride, and in order to meet that possible situation the resources of the electrical manufacturer will need to be used to their fullest capacity. Another point worth remembering is that whereas gas appliances are relatively simple to make, electric cookers, and the like, call for a certain amount of wiring skill, which tends to slow down the potential output relative to gas. Mindful of this fact we have

time and again pleaded that more skilled as opposed to unskilled, labour should be made available to the industry, and with the removal of some of the restrictions on development, the present position may be said to favour the gas industry; in that skilled operatives are in that industry less necessary for the manufacture of appliances. That being so we look to the authorities to make appropriate adjustment with as little delay as possible.

The E.I.B.A.

THE report of the Electrical Industries Benevolent Association which was presented at the annual meeting last week shows that the industry can congratulate itself upon the fact that its benevolent fund is in good health, and that by adopting approaches of its own making, the association has not only completed all the additional tasks which have fallen upon it but has been, too, able to make adequate provision for the future. The reserve fund stands at the satisfactory figure of £100 000, while the amounts paid out during 1944 totalled £10 803, an increase of £203 on 1943. The total number of cases dealt with in the year was 184, and taking into account wives, children and other dependents of the applicants, this resulted in 335 persons being assisted, of whom 103 were widows stranded as a result of the pensions of their husbands having died with them. Of this number 44 cases, involving 77 persons were new, having been accepted during the year under review. During 1944 the total contributions from members of the B.E.A.M.A. amounted to £4 200, an increase of £1 000, while the E.C.A. membership contributed nearly £1 000, and the E.W.F. again touched this latter figure as a result of the collection which it arranges among its members and their staffs. The Radio Industries Club collected the useful sum of £98. Altogether a very encouraging situation.

Cable and Wireless War-time Progress

AS vital as communications may be in peace, during conditions of war they become a major part of every defensive or offensive operation, and in the last six years the volume of work which has been thrust upon the resources of Cable and Wireless has been colossal. This is well illustrated by the fact that whereas in 1938 the traffic handled amounted to 231 000 000 words, in 1944 the company's system carried 705 000 000 words, in spite of the hazards and difficulties arising from war conditions, lack of manpower and shortage of equipment. In the next few years, intensification of trade competition will make both the efficiency and cheapness of communications exceedingly important, and the remarks of Sir EDWARD WILSHAW, chairman, last week, have therefore a special interest. It has been shown, claims Sir EDWARD, "that private enterprise in the right hands can achieve much." and it is to be hoped that the discussions which have been taking place recently in regard to the future of Empire telecommunications will not check progress by putting the service within a tightening Government control. The cheapening of service which Sir EDWARD is able to claim for his company may be contrasted with the all-round increase in charges for British postal and associated facilities. The fact that the advances were intended partly to restrict users does not redress the balance, nor does it weaken the Chairman's claim that, left to its own resources and given reasonable encouragement and good-will by the Governments concerned, Cable and Wireless will be able to provide still better and cheaper services.

Showrooms as Electrical Workshops

WHEREAS the industry accepts without question the electrical penetration of other industries, it may be news to many that trades far removed from those associated with electricity, have during the last five or so years, become allies in contributing to the manufacture of small motor parts and so on. An example of what has been done is described in this issue, and apart from the valuable manufacturing capacity which these firms were able to add to the war effort, it is reasonable to anticipate that their association with electrical matters will have made their operatives sympathetic to electrical ideas. The firm selected as representative of many, is engaged in the furniture trade, and though this trade is already a large user of fractional H.P. motors, power-driven tools, etc., it is anticipated that the war-time association with electrical manufacture will have brought about an even wider appreciation of the service, cleanliness

and convenience which electricity offers; an appreciation which, if expressed to the many trades allied to the furniture business, may do much to further brighten the good name of electricity and lead to its greater use in the sale of non-electrical goods.

Cables and Exports

THE account which Sir MONTAGUE HUGHMAN was able to give, last week, in his chairman's address at the annual meeting of W. T. Henley's Telegraph Works Co., Ltd., was not only revealing of his company's contribution to the war effort, but also promising of an early return of at least some of the company's departments to normal peace-time production. War work is still occupying the organisation, but nearly 16½ per cent. of its activity is connected with overseas business. The name of Henley's has of late been associated with many of the "releases" made with regard to war-time secrets, not the least of which concerned Operation Pluto, and the buoyant cable used in connection with the defeat of the magnetic mine. The peak of war demands has now, however, been past and the time cannot be far distant when the company's activities will be more closely associated with post-war trade, both at home and abroad.

Condensers and the War Effort

ANOTHER example of the enormous part which the electrical manufacturing industry played in the European war effort, was given by Mr. W. H. MCFADZEAN, chairman, at the meeting of the Telegraph Condenser Co. Ltd. The work undertaken was mainly concerned with radio, and so closely engaged was the company, that in addition to their main plant, they have been operating four dispersal factories and several out-working units. As to the future, it is Mr. MCFADZEAN'S considered view that when the dispersal factories mentioned are returned to their rightful owners, the Acton works will need to be extended, for though some contraction in output as compared with that of the war years must ultimately be anticipated, the demands on the company's productive capacity will still be great. Over-riding this and all other problems is, however, the question as to the conditions under which industry is to be allowed to operate. This issue was, yesterday, put to the nation for its decision, and until this is known, one must be reserved about the future. Mr. MCFADZEAN, however, made two claims. The first—that his company has achieved its present position under the system of private enterprise, and in that achievement the benefits accruing have been equitably distributed between shareholders, customers, and employees. His second claim is—that the future prosperity of the country and, therefore, of each company and individual lies in a continuation of private enterprise.

Purchase Tax and Electric Cookers

INFORMATION in regard to post-war policy of the hire and hire-purchase of cookers—as revealed in answers to a questionnaire put out by the E.D.A.—seems to suggest that Purchase Tax is not likely to have as negative an influence on future arrangements as many might believe. One of the main questions asked was whether the settlement of post-war policy was in abeyance on account of the uncertainty of the future of Purchase Tax, and the indications are that no fewer than 140 undertakings will not be affected, though all stress the vital importance of the early removal of the tax. A summary of the response to the E.D.A. inquiry is given elsewhere in this issue, and the figures reproduced may serve as a guide to future trends. The problem brought about by the incidence of Purchase Tax is an aggravation —made more irritating by the uncertainty of its future—but it is pleasing to note that the supply industry does not, apparently, intend to let it influence the future unduly.

Canadian Water-Power

A REVIEW of the water-power resources of Canada, details of which will be found in this issue, shows that there is a total of 25 439 400 H.P. under conditions of ordinary minimum flow and 39 511 700 H.P. ordinarily available for six months of the year, which corresponds to a potential turbine installation of more than 51 350 000 H.P. The total turbine capacity as at January 1, 1945, was 10 283 763 H.P. and it is thus apparent that a large proportion of the water-power of Canada still awaits development. The war-time expansion in hydro-electric facilities was virtually completed in 1944, when the net increase for the year was only 69 250 H.P.; the smallest since 1939, and no large power projects are under construction.

Showroom Factories

Armature Coils Made in Retail Furniture Stores

OVER eight million armature coils have been produced in the furniture showrooms of John Perring, Ltd., at their various branches in London and the Home Counties, and the work has been done by volunteer women, many of whom were housewives without any previous industrial experience.

In 1942 the furniture trade was almost at a standstill, and Mr. Ralph Perring, son of Col. Sir John Perring, founder of the firm, came to the conclusion that the extensive floor space of the idle showrooms could be better utilised in making some contribution to the war effort; so in August of that year an experiment was made at the Staines branch with six non-directable workers, who were trained to make armature coils. After a short period 260 local women, who had volunteered for munition work, were engaged in the production of coils needed for use in the radio equipment of bomber and fighter aircraft, rubber dinghies and tanks, and also for radio-location.

By the following January, Mr. Perring had 300 women, part and full-time workers, winding armature coils in the firm's showrooms at Kingston-on-Thames, and in May 450 women similarly engaged at the Sutton branch. The operations were extended to Guildford and then Oxford until in the five showroom factories, 1 200 volunteer women, by the end of 18 months, were turning out every day 450 miles of wire wound into about 40 different types of armature coils. Finally, they were producing the complete armature from the core. All the women were trained from " scratch " and it was remarkable how readily the retail organisation of the firm was adapted to munition work.

The well-lit showrooms made ideal factory premises and working conditions were admirable. Frequently the women carried on while air-raids were in progress. In one day there were no fewer than 23 " alerts " at Sutton, but work continued without interruption, the operatives realising that any stoppages would hold up workers in other factories.

Parallel with this activity on the upper floors, the ordinary business of the firm was continued in the ground floor showrooms, but few customers realised that above them was a munition factory.

Sir Stafford Cripps, when Minister of Aircraft Production, sent a letter congratulating the firm and the workpeople on the contribution they had made towards victory in Europe.

Now that the need is not so great the firm is gradually changing over to its normal activities and one branch has already closed down its munition work, the women returning to their domestic duties with some knowledge and appreciation of the multifarious uses of electricity in modern warfare as well as in the home and factory.

Coil winding in progress at one of the Perring factories

The Industrial Film

By R. N. PATERSON

INDUSTRIAL and technical films have played such an important role in propagating the British war effort and in helping to train members of the Forces that, with the end of the war in Europe, the documentary type of film has quickly become a recognised medium for training newcomers to industry, as well as providing a " refresher course " for men and women returning to their peace-time work after a long absence from their civilian jobs.

Already the British Council have 50 short films ready for showing in this country and abroad, each dealing with the work of British industry, and from all over the country, particularly from the industrial north, come reports that more and more staple industries and trades are producing documentary films.

The allied electrical industries, who for years have been engaged in producing essential war products, have two basic problems to solve now that a gradual return is being made to normal production. Each problem can be helped towards its solution by utilising the short industrial film. First, all branches of the industry share with other big undertakings the problem of building up export trade, and, secondly, the electrical industry must foster the training of newcomers of school-leaving age who enter the trade, either straight from school or after preliminary training at technical colleges.

Several industries have achieved outstanding successes with films that combine both the properties of a propaganda film suitable for showing at home and abroad, and at the same time containing sufficient interest-value to influence newcomers entering the industries.

The Film as a Selling Medium

The electrical industry with its many vital branches could not possibly cover all its activities in one short film, but, as a preliminary effort, a film which gave pictorial details of the main sections of the industry would form a most valuable part of an overseas selling campaign. Incidentally, one must not confuse the short advertising film with the industrial documentary; the first is pictorial advertising copy, while the second is in every way a specialised form of pictorial journalism.

Educationally, films have come to stay, and already educational authorities are asking for all schools and technical colleges to be allowed to purchase 16 mm. sound film equipment for showing instructional films at the earliest opportunity. At the moment the manufacture of this equipment is controlled, but technical colleges will be the first to be equipped. As soon as the Services release their more general technical films, such as those used for instructing the various trades in the Royal Corps of Signals and the R.E.M.E., and they are made available for use in connection with the training of students and apprentices, the electrical trades will have immediately available a valuable source of instructional films.

Technical Instruction

A technical film with its close-ups and concise commentary can force home its lesson with far more effect that the best written text book or lecture, and for the returning Service man or woman who does not need a full course of training but merely needs bringing up to date with technical improvements, the film is a valuable medium of approach.

Service men and women are used to being instructed by means of films and by making full use of this new method of training a great deal of unnecessary lecturing and reading can be eliminated. Refresher courses can be carried out at the place of work or in the nearest technical school.

The servicing of electrical equipment, the theory, practice, and the various branches of routine electrical engineering are but a few of the subjects that have been explained and demonstrated by means of films. The film industry is well aware of the national importance of producing first-class instructional and industrial documentaries, and already producers have combined their resources and experience in order to keep a set standard and maintain constant touch with engineers, consultants and industrial chiefs so that these specialised films are backed by the knowledge of experts.

Yes, films have already done much to help the electrical industry, and with the gradual lifting of controls on small cinema equipment and an increase in the ration of raw film stock, every trade and industry will be able to build up its own library of films for educating its students and apprentices, and for displaying the results of British industry to the world's markets.

Flower Telegrams.—The transmission of " flower telegrams " to America has been stopped since war began. Cable and Wireless Ltd., announce restoration of the service except that the kind, colour and quantity of flowers desired cannot be mentioned.

Post-War Electronics

By HENRY A. MILLER, A.M.I.E.E.

THE many technical problems involved in the prosecution of total war have led to the rapid development of electronic devices, both in design and application. Their potential scope has, in point of fact, increased so enormously that they will unquestionably take a prominent place in peace-time industry, commerce, and domestic life.

In so far as vacuum amplifying valves are concerned, a new field has been opened up by the recent introduction on a fairly large scale of high frequency dielectric heating. Prefabrication, which is likely to be a prominent feature of our post-war reconstruction, will, no doubt, foster the use of laminated materials and plastics manufactured in this way.

The generation by valve oscillators of high frequency current for heating, although an established concept, is still in the process of development.

High frequency eddy current heating, based on the use of valve oscillators, is utilised in the manufacture of the electronic devices themselves, and also for the surface heat treatment of metals.

The use of a vacuum triode circuit for control and recording is well known. In the case of welding equipment, the circuit can be modified to act either as a constant current or a current-time timing device. With current-time welding control, the time is automatically adjusted in accordance with the current passing. This has been found particularly useful in war production factories where various thicknesses of metal have had to be welded successively. Here is an instance in which electronics could be applied to the peace-time motor and possibly shipbuilding industries.

Thyratron Control

Thyratron control has undergone several developments. Gas-filled tubes enable the device to be used in situations where the ambient temperature varies over a wide range. In pre-war days much interest was shown in two instances of thyratron control installed on the Cunard-White Star liner "Queen Mary." A small motor-generator set was voltage-regulated in this way, and the ballroom lighting—three banks of red, blue, and green lamps—was thyratron reactor controlled. A rather novel feature of the ballroom installation was that the lighting could be varied according to the frequency of the orchestral sounds, enabling the appropriate atmosphere to be created in sympathy with the music. The cessation of hostilities will in all probability allow the threads of this technique to be picked up once again.

Fluorescent lamps and their application to war industry need no introduction. Experiments with mixtures of luminescent powders have already resulted in the introduction of the "warm white" lamp, and there is no real reason why smaller adaptations of this lamp, with a modified form of ballast, should not become the domestic light source of the future.

Neon Light and Agriculture

In the field of agriculture, too, electronics will probably have its part to play. Shortly before the outbreak of hostilities neon tubing, similar to that used so extensively for sign purposes, was developed for the irradiation of hot-house plants. Under the influence of orange light, the growth of plants—particularly seedlings—is vigorously stimulated.

Cold-cathode (neon tube) interior lighting is now used a great deal in the United States. The latest tubes require only 720 V for striking, and operate on 430 to 460 V: they can be connected in a "Twin Tube" circuit in the same way as hot-cathode fluorescent lamps. The flexibility and long life of this type of illuminant may well lead to its adoption here soon after war-time restrictions are relaxed.

In so far as exterior lighting displays are concerned, high voltage neon signs will no doubt re-establish their former popularity. Here, too, the development in fluorescent coatings will show an improvement in colour range, and the introduction of coated cathodes and innovations in processing should extend the technique.

Photo-electric cells, used in conjunction with amplifying vacuum valves, are being found many new applications. In addition to automatic counting, smoke detection, and scores of control and alarm devices, photo-cell relays are now employed in large-scale engineering structures, from the docking of a swing bridge to the indication of unsafe vehicle heights at the entrance to a tunnel.

The outbreak of hostilities put an end to the development of cathode-ray tubes for television, but was responsible for new lines of research in the same device. Fresh applications of the tubes are found on board ship and in aircraft observation on the ground. In the future, it would appear that the tubes will be much in evidence as a means of navigation, medical investigation, and, of course, television reception.

These few examples indicate that electronic engineering, already established as an independent vocation in the U.S.A., will be a vitally important factor in our post-war electrical development.

Earth Leakage Protection

By "SUPERVISOR"

FINALLY, in this brief consideration of regulations concerning voltage-operated earth leakage protection, the matter of adequate test of mechanism and the protective circuit must be taken into account. As is well known, the standard leakage circuit-breaker incorporates a test key, the operation of which disconnects the earth electrode from the protected equipment and connects the former through the trip coil to the supply phase. If the protective circuit—between the circuit breaker and the electrode—is sound, and the mechanism in order, this imposition of an artificial fault will trip the breaker.

It must be emphasised, however, that this test, valuable as it is, checks but a small portion of the protective circuit, and that the least vulnerable section. It will be agreed that the connection between the circuit breaker and the electrode will be that least liable to disturbance, will be reasonably robustly constructed, and will, in most cases, be in full view. It is the remainder of the protective circuit, especially any flexible cords and connections in the circuit, that are likely to suffer disturbance and in which faults will occur, and means must be devised whereby this section also will be subject to easy and immediate test for effectiveness of protection.

A Serious Criticism

One of the most serious criticisms levelled at solid earthing is that the protective circuit is, to all intents and purposes, untestable. Continuity tests, or even ohmic measurements, indicate precisely nothing of any value; neither gives any indication as to the current-carrying capacity of the protective circuit under fault conditions. In both cases the protective circuit, probably consisting of steel conduits or lead sheaths, may be shunted by a hundred contacts with extraneous metal, indicating a misleading low resistance; as has been pointed out, the removal of a section of conduit and the substitution of a short length of fuse wire will not affect the reading of the testing ohmeter, but the efficacy of the circuit for protective purposes is obviously destroyed.

The point has already been advanced that in any installation with metal-clad wiring systems, the probability of contacts between conduits, etc., and earth connected non-electrical metal work is ever-present. In fact, it does not seem possible to avoid them. It therefore follows that it is not possible to segregate portions of the conduit system in order to apply selective leakage protection, as has been proposed. The conduit system therefore becomes one whole for the extension of leakage voltages; a heavy fault on the main conduit results in a potential upon the most remote point in the building.

Fault Current Circulation

In addition, the possibility of heavy fault currents circulating on the distribution system being introduced into the installation must be taken into account, and fires have been suspected from this cause. This risk is, of course, enhanced when supply cable sheathing is used as an earth electrode; it is encouraged when solid earthing is resorted to in addition to the use of leakage circuit breakers. With the use of the earth leakage circuit breaker alone, however, immediate isolation would occur with the application of the minimum operating voltage.

On all counts, therefore, it would appear that the protective circuit must be as short as possible before any adequate means of test can be devised—if only to eliminate the possibility of fortuitous earth contacts on the protective circuit. It has been suggested in a previous article that in the case of cooker protection the leakage circuit breaker must be in the control unit; in the case of washing machines in the socket outlet, or control gear. Similarly, all equipment requiring protection must have its protective gear close by, and in addition, if possible, the earth electrodes should be of a simple nature, preferably not water supplies or conduit of the main installation. It should not be difficult in most cases to provide small local driven electrodes for these purposes.

If this be done, an immediate test of the whole protective circuit, including any three-pin sockets and especially connecting flexible cords, can be made by the simple shorting-over of phase to earth on the appliance itself, preferably by means of a test key. Alternatively, this complete test can be considered as a routine periodical test, and the half-way-house of a test between the leakage circuit breaker and electrode be made semi-automatic. This can be done by making the normal test key the means of switching off the circuit; any failure becomes immediately apparent. This was done already in one type of cooker control panel on the market prior to the war, and an additional means of breaking the circuit was incorporated.

The same effect can be obtained, of course, with the use of an all-insulated wiring system with protective devices at the distribution board position, as by this

means the bugbear of fortuitous earth contacts is avoided. It has the drawback, however, that the protective device is remote from the user of the equipment, and thus will not receive the constant check so simply applied when the protective device is near-by; with most users the pressing of the test key to cut off the supply becomes second nature. On all counts, the location of the circuit breaker near the equipment to be protected, and within easy reach of the user, has decided advantages over the locations suggested in Regulation 1006—at the main switch position or at sub-circuits.

Farm Wiring

This advantage can be extended to farm wiring, a direction in which all possible economies must be exercised in the post-war era. With the protective device near the motor, or other equipment, control gear, and a simple driven electrode near by, there is no need for a continuous earth circuit throughout the building, or group of buildings. All that is necessary is to provide the single- or three-phase supply to any building—without earth circuits this is simple with overhead lines—the protective circuits and equipment being confined to a few feet round the equipment and the user. Not only is considerable economy in wiring thereby obtained, but leakage protection is selective, operation of the leakage device being confined to the equipment affected by fault.

Although the facility of test from the appliance itself, by the simple means of shorting-over phase to earth, has been claimed for the earth leakage circuit breaker, it is clear that this can only be fully substantiated where no fortuitous contacts exist between earth and the protective circuit. It cannot be enjoyed where direct earthing is used in addition to leakage circuit breakers, as the likelihood of heavy currents flowing is too apparent. As mentioned above, however, insulated wiring systems get over the difficulty of test, but it is still thought that the device should be located at the equipment, if only to ensure that the test is made.

One is rather perturbed by the fact that, with the advent of all aluminium or other metal kitchens, sufficient attention to earth leakage protection is not being given. There is every likelihood that the metal work will be in close contact with earth, intentional or fortuitous, and considerable risks may be run by housewives unless protection is adequate. It is suggested that provision should be made in the average kitchen for at least three leakage circuit-breakers—one in the cooker control panel, one on the refrigerator motor, and the third connected to the earth pins of all appliance sockets. The devices should be readily accessible, in order to facilitate replacement after operation, or after test. Better still, the device should form the controlling switch for the equipment in question; the writer would also recommend the use of independent earth electrodes, if only to prevent the extension of leakage potentials from outside sources on to the equipment, via any common earth circuit afforded by conduits, etc.

These notes are not written in any alarmist spirit, as after all earth faults are few and far between on good-quality equipment; when they do occur, however, it is comforting to think that a well-tested and effective method is in existence to take care of them. To take care, too, of the user, who may be of tender years; to say nothing of the equipment, which will survive many earth faults isolated by earth leakage circuit breakers, but may easily succumb to the very first one, isolated only by means of a heavy-capacity fuse. Polished aluminium benches will soon lose their first beauty when pitted with evidence of earth faults on equipment. We undoubtedly need better protection for the workshop of the home than we have hitherto provided.

The I.M.E.A.

LIVERPOOL Electric Power and Lighting Committee last week gave a luncheon to members of the I.M.E.A. who attended the annual meeting of North West England and North Wales Centre. Ald. A. Critchley, who presided, referred to the publication "Free Enterprise and the Electricity Supply Industry" by the Incorporated Association of Electric Power Companies and took exception to the statement that over 60 per cent. of municipalities had increased their tariffs during the war. Most municipalities, he declared, had kept their tariffs down to pre-war rates; only in a few cases had there been increases. The company undertakings admitted that 40 per cent. of their number had advanced their prices since the outbreak of war.

Mr. J. Eccles (chairman of the Centre) stressed the duty of seeing that the rights of local authorities in the electrical sphere were maintained and to ensure a cheap and abundant supply of electricity for all industries. Failure to accomplish this would handicap this country in the development of British trade and the quick recovery of export trade.

Ald. Sir William Walker spoke of the contribution of the electrical industry and the grid to the war effort. By producing power at a reasonable cost, British industries would be enabled to work off the gigantic burden of debt which the war had placed upon them.

Electrical Personalities

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

At the meeting of the newly-appointed Executive Council of the A.S.E.E., in London, on June 9, **Mr. J. W. Noble** (Manchester) was elected chairman of the association and **Mr. J. D. Griffiths** (Birmingham) vice-chairman, **Mr. J. J. Smith** (London) being re-elected hon. treasurer. Vacancies on the Council caused by the resignation of Messrs. W. S. Gearing and G. H. Parker, have been filled by Messrs. A. E. Poole (Wolverhampton) and J. J. Wilson (Liverpool).

Mr. Killingworth Hedges, pioneer electrical engineer, left £483 082 (net £467 920).

The following officers of the I.E.E. London Students' Section have been elected for the 1945-46 session: chairman, **Mr. H. Shorland;** vice-chairman, **Mr. R. G. F. Stefanelli;** hon. secretary, **Mr. R. V. Darton;** hon. assistant secretary, **Mr. G. S. H. Mogford.**

Mr. James Robinson, a director of Mather and Platt, Ltd., left £23 815 (net £19 732).

Mr. Bernard Ryder has been elected a director of the Lightfoot Refrigeration Co., Ltd.

Major B. G. Drummond, eldest son of **Mr. B. G. Drummond,** general manager of the East Anglian Electric Supply Co., Ltd., Stowmarket, Suffolk, has recently been promoted Lieut.-Colonel and appointed C.R.E.M.E., 30 Corps Troops, B.L.A.

The following elections have been made by the board of the Institute of Physics:—

Fellows: J. Bell, L. W. Brown, A. Charlesby, R. W. France, K. Konstantinowsky, A. T. Pickles, A. Potts, W. Railston, H. T. Ramsay and T. V. I. Starkey. Associates: E. Boardman, B. F. Brown, H. M. Churches, F. R. Coombe, D. F. Davies, H. G. Davies, A. E. De Barr, E. T. De la Perrelle, H. Edge, T. Gardiner, E. P. George, M. H. Green, A. E. Harper, K. G. Hildifch, C. A. Hogarth, F. Kay, E. Langton, G. F. Longster, D. M. C. MacEwan, D. M. MacKay, G. A. Mann, M. M. Nicolson, H. C. Olding, E. H. Putley, R. F. Y. Randall, E. Robinson, E. H. Rhoderick, F. Schofield, G. C. Seager, W. J. Sparrow, J. W. W. Whitehead and B. Wood

Eleven subscribers and nineteen students were also admitted.

At the annual meeting of the Institute of Physics on June 4, the following were elected to take office on October 1: President, **Sir Frank Smith;** Vice-President, **Prof. A. M. Tyndall;** hon. treasurer, Major C. E. S. Phillips; hon. secretary, Prof. J. A. Crowther; ordinary members of the board: Dr. B. P. Dudding, Mr. A. J. Maddock, Prof. W. Sucksmith and Dr. C. Sykes. Prof. C. T. R. Wilson, F.R.S., was elected an Honorary Fellow of the Institute.

Sir Peirson Frank, chief engineer of the London County Council, has been elected president of the Institution of Civil Engineers for 1945-46. Prior to his appointment to the L.C.C., Sir Peirson Frank was city engineer of Liverpool.

The late **Mr. J. A. Hirst,** chairman, Electrical Switchgear and Associated Manufacturers, Ltd., left £76 627 (n.p. £68 294).

Ald. J. Bleakley, of Bolton, chairman of Proffitt's Radio, Ltd., has been elected president of the National Chamber of Trade.

On the joint recommendation of the Presidents of the Royal Society and the Institution of Civil Engineers, the Council of the latter have awarded the James Alfred Ewing Medal for 1944 to **Mr. B. N. Wallis,** C.B.E., F.R.S., for specially meritorious contributions to the science of engineering in the field of research. Mr. Wallis is chief of aeronautical research and development to Vickers-Armstrong, Ltd.

Part of group taken during a recent visit of the South Midland Centre of the I.E.E. to Hams Hall "B" power station

Among the civilian contingent selected from various firms associated with aircraft and aircraft component manufacture, who attended the British Aircraft Exhibition, Oxford Street, opened by Lord Beaverbrook on June 21, were men and women from the Osram-G.E.C. Lamp Works, Hammersmith.

The Merseyside Centre of the Institute of Industrial Administration has elected

Men and women from the Osram-G.E.C. Lamp Works arriving at the British Aircraft Exhibition

Mr. F. Walter Oakley (legal adviser to the Automatic Telephone and Electric Co., Ltd.) as chairman and **Mr. J. A. Mason** (assistant works manager of the same company), as vice-chairman.

Mr. M. A. Fiennes has resigned from the Brush Electrical Engineering Co., Ltd., to take up the post of managing director of the Davy and United Engineering Co., Sheffield. He will be leaving the Brush organisation on July 31. As from August 1, **Mr. D. B. Hoseason,** will be the director responsible for the turbine division of the company, while still maintaining responsibility for the electrical division.

Capt. R. C. Petter, has resigned from the board of Associated British Engineering, Ltd.

The Archdeacon of Aston last week dedicated a G.E.C. bed in Ward " C " of the Birmingham Accident Hospital, endowed by members of the staff and works at Witton. It was the first bed in a women's ward to be dedicated since the opening of the hospital in April, 1941. After a service in the hospital chapel and at the bedside, Councillor V. W. Grosvenor, deputy chairman of the hospital, thanked the donors, and **Mr. J. J. Gracie,** joint general manager, and **Mr. H. Martin,** convener of the Works Joint Production Committee, replied on their behalf.

To mark the centenary of the birth of Colonel R. E. B. Crompton, the Association of Old Cromptonians is holding a dinner on September 26. The Hon. Secretary of the association would be grateful if Old Cromptonians wishing to be present would get in touch with him at " Electra House," Victoria Embankment, W.C.2.

Blackpool Corporation has agreed to loan their illuminations engineer, **Mr. F. W. Field,** to devise and supervise a scheme of decorations, etc., for the Isle of Man during the Royal visit.

York Electricity Committee reports the resignation of **Mr. E. W. Wright,** chief clerk, after 45 years' service.

Mr. Walter H. Swain, a director of Hirst, Ibbetson and Taylor, Ltd., was elected president of the Electrical Wholesalers Federation, on June 27.

A " Bring and Buy Sale " is being held by the London Branch at the E.A.W. Headquarters, 20, Regent Street, on July 12, at 2.30 p.m., the proceeds to be devoted to the " Caroline Haslett Trust." Friends will be warmly welcomed and gifts or donations gratefully received.

Mr. J. W. Lapthorn has been appointed manager of the order department of W. T. Henley's Telegraph Works Co., Ltd., as from June 1 last. He joined the company as a junior in the stock room in 1899 and in 1909 was appointed chief assistant to that department, later re-named the order department.

Flight Lieut. W. H. Diment, who has been awarded the D.F.C., was on the staff of the Reading electricity department before joining the Forces. He is a pilot in Bomber Command.

Mr. L. Ashworth, who has retired from service in the power station at Burnley, began work in the department over 50 years ago, during the time the first chief engineer, Mr. Thursfield, was in charge.

Obituary

Mr. William Richard May, a member of the Institution of Electrical Engineers, on June 26.

Major C. E. S. Phillips, on June 17, aged 74 years. He was the son of Samuel E. Phillips, one of the founders of Johnson and Phillips, Ltd., and after the discovery of X-rays in 1896 devoted much time to the making of X-ray tubes in his own laboratory and studying the use of X-rays in medicine. During the 1914-18 war he worked on the development of X-ray tubes and ancillary apparatus, and was made an O.B.E. for his services. For many years he remained a member of the War Office X-ray Committee and he served as president of the British Institution of Radiology for 1930-31. He was one of the Founder Fellows of the Institute of Physics, of which he was honorary treasurer from 1925 to the time of his death. From 1929 until a few weeks ago he was honorary secretary of the Royal Institution.

Electrical Developments in Europe

New Power Stations Projected—Spanish Hydro Difficulties

A PROJECT is under discussion in Switzerland for a large new power station in the Urseren valley, the plan for which involves the building of a dam 650 ft. high to enclose a reservoir of 1 200 million metric tons capacity. After about 25 years the annual output of the several stages of the project will, it is anticipated, be nearly 2 500 million kWh.

Some information has now been released about the new power station of Mörel, on the Upper Rhone near Reckingen, which went into operation in the autumn of 1943. It uses a fall of about 850 ft., on the Rhone itself, and also takes water from the River Binna, a tributary of the Rhone. There are three generating sets, each of 20 000 kVA rating at 9 000 V, driven by a normal flow of 12 cu. metres a second.

In the financial year ended September 30, 1944, the Nordostschweizerische Kraftwerke, one of Switzerland's largest electricity-supply companies, handled 1 129.5 million kWh, as compared with 1 088 million kWh in 1942/3. The company's own works at Beznau, Eglisau and Löntsch provided 452 million kWh, and 678 million kWh were bought. Sales amounted to 1 055 million kWh in 1943/4. The company looks forward to opening its new Rupperswil-Auenstein plant in the autumn of this year.

In the year ended September 30 last, the Ryburg-Schwörstadt station, which is jointly owned by Swiss and German interests, produced 673 million kWh, as compared with 651 million kWh in 1942/3. It is this plant that supplies a large part of the electricity requirements of the Rheinfelden aluminium works.

Rhone Power Station

The Rhone power station Verbois, of a designed capacity of 110 000 kVA, was built in the years 1939-43 to supply the town of Geneva, from which it lies about 10 miles downstream. The useful head of water is 69 ft., of which 54 ft. was produced by damming and 15 ft. by lowering the level of the river below the dam. The dam itself is about 1 500 ft. in over-all length, and 250 ft. of this is occupied by the generator house. Only three of the projected Kaplan turbines of 31 500 H.P. have so far been installed.

Increasing traffic congestion in Stockholm has at last brought about a start on the long-proposed underground railway. It is now intended to complete a 3-mile stretch at a cost of Kr.50 million. The tunnel is to carry two lines; it will be 24 ft. wide and 13-18 ft. high. Carriages are to be of an unconventional design; they will be 53 ft. long and 9 ft. wide, and will hold 100 passengers.

Unlike the rest of Scandinavia, Sweden did not suffer from any electricity restrictions during the winter of 1944/5. Rainfall was so extensive in the autumn of 1944 that a part of the water flowing into the Väner lake was not used for hydro-electric production. Output in the calendar year 1944 was about 12.3 milliard kWh, as against 11.0 and 9.8 million kWh in 1943 and 1942 respectively.. This increase is wholly due to exploitation of water power.

Consumption in Sweden

Electricity consumption in Sweden generally, is estimated to have been during 1944, 11.2 milliard kWh, compared with 10.4 milliard kWh in 1943 and 9.5 milliard kWh in 1942. Between 1940 and 1943 consumption rose by nearly one-half, of which 25 per cent. was accounted for by the railways, 40 per cent. by the electro-chemical and electro-metallurgical industries, and 10 per cent. by other industries. Household consumption, increased by the serious shortage of solid fuels, also rose considerably.

The power-supply situation in Spain continues to be generally so bad that in the Province of Madrid electricity is available for household consumption on three days a week only, between 9 a.m. and 6 p.m. As there were heavy snowfalls in the Pyrenees during the winter it is expected that a considerable improvement will result.

A number of municipalities are associating themselves with a new power station which is planned for construction at Skaerbaek, Denmark. The towns of Fredericia, Kolding, Horsens, and Velje among others intend to close down their own plants and draw supplies from the new station, which is scheduled to begin operation early in 1950, and to cost 50 million Kr. This sum suggests that the Skaerbaek plant will be large by Danish standards.

Temporary Housing Equipment.—Bangor City Council has decided that electricity be used for cooking, washing and refrigeration purposes in the temporary bungalows to be erected in Maesgeirchen. The Accrington T.C. has decided to provide gas and electricity services in all the new houses for cooking and washing purposes, appliances to be supplied according to the wishes of tenants.

Water Power in Canada

Brief Annual Review of Resources and Development

IN its annual review, the Dominion Water and Power Bureau, Department of Mines and Resources, Ottawa, states that the present recorded water-power resources of Canada will permit of a turbine installation of more than 51 350 000 H.P. The total turbine installation is rated at 10 283 763 H.P., but as it has proved to be sound practice to allow a turbine set averaging 30 per cent. in excess of the ordinary six months flow power, the present turbine installation represents the development of 20 per cent. of the recorded water-power resources of Canada.

At January 1, 1900, the total water-power plant was rated at 143 156 H.P.

In the Province of Quebec, with the largest available water-power resources the generating plant represents almost 57 per cent. of the total for Canada. The Beauharnois development, 689 000 H.P., on the St. Lawrence River, near Montreal, and the recently completed Shipshaw development, 1 200 000 H.P., on the Saguenay River are the two greatest in the Dominion. More than 93 per cent. of the total installation of the province is operated by central electric station organisations.

The Province of Ontario has available power resources only exceeded by those of Quebec and British Columbia, and developed power only exceeded by that of Quebec. The largest development in the province, Chippawa-Queenston, 560 000 H.P., is one of 55 generating stations operated by the Hydro-Electric Power Commission of Ontario with installations aggregating more than 1 800 000 H.P. In addition, the Commission purchases 910 000 H.P. Power is supplied to some 900 municipalities and a notable feature is the service given to more than 136 000 rural consumers, including about 65 000 farms.

Greatest Power Resources

Of the Prairie provinces, Manitoba has the greatest power resources and the greatest development, almost 70 per cent. of the total hydraulic development of the three provinces being installed on the Winnipeg river to serve the city of Winnipeg and adjacent municipalities, and over the 2 125-mile network of the Manitoba Power Commission more than 21 000 consumers in 152 cities, towns and villages.

British Columbia ranks second among the provinces in available power resources and has a hydraulic development exceeded in only Ontario and Quebec.

The war-time expansion in hydro-electric facilities was virtually completed in 1944. The net increase for the year was only 69 250 H.P.; the smallest annual increase recorded since 1939, and no large power projects are presently under construction.

The year's outstanding achievement in construction was the new generating station at Brilliant, on the Kootenay river in British Columbia, of the West Kootenay Power and Light Company (Consolidated Mining and Smelting Company of Canada). Two units of 34 000 H.P. each were brought into operation during the summer of 1944 with provision being made for the installation of two similar units at a later date. This is the company's fifth station on the Kootenay river, which, with the other four plants, provides a total installation of 346 000 H.P.

Supply to Rural Areas

In Alberta, Calgary Power Co., Ltd. ,and Canadian Utilities Ltd., undertook the supply of power to three selected rural areas involving 184 farms, as an experiment to determine the feasibility of more general rural service. In Manitoba some 325 farms were connected to the transmission lines of the Manitoba Power Commission.

In Ontario, construction to provide new power capacity was limited to an extension of the Alexander Development on the Nipigon river, by the Hydro-Electric Power Commission of Ontario. A new unit of 19 000 H.P. is being added to this plant which, when completed about this month, will raise the rated capacity to 73 000 H.P. The transmission line, built to supply power in the Steep Rock Lake area and brought into operation by the Commission in December, 1943, services pumping plants which lower the water level in Steep Rock Lake sufficiently to give access to iron ore deposits below the bed of the lake. During the year about 460 miles of rural distribution lines were built by the Commission, the total number of miles in service being now 21 137.

In Quebec a net increase of 1 250 H.P. only took place in 1944. Shawinigan Water and Power Company and Southern Canada Power Company made important extensions to their respective rural electrification systems.

The installation of central electric stations is the largest and most rapidly growing class and represents the power developed for the sale of electricity to meet the general industrial, commercial, municipal, domestic and agricultural demands of the public. In all, 9 290 849 H.P., or 90.3 per cent. of the total hydraulic installation of Canada is so developed. Pulp and paper

mills have an aggregate hydraulic installation of 642 576 H.P. or 6.3 per cent. of the total, while the installation for other purposes amounts to 350 338 H.P., or 3.4 per cent. of the total. The average installation per 1 000 population is 859 H.P., a figure which places Canada in an outstanding position amongst the water-power-using countries of the world. More than 97½ per cent. of all electricity produced for sale in Canada, or for export to the United States, is generated from water power, the 1944 production being 39 479 363 000 kWh, slightly less than that for 1943.

Electricity and Agriculture

Plea for Closer Unity between the Two Industries

AT a meeting of the Norwich and District E.D.A. Circle, on June 29, Mr. William Cover, of the G.E.C. agricultural department, read a paper on the application of electricity to agriculture, in the course of which he pointed out that in a paper read before the Royal Society of Arts in 1942 it was stated that, as a result of a survey, labour on the farm cost approximately 10s. per H.P.-hour. If this was compared with electricity at 1½d. per unit (representing 1½d. per H.P.-hour) then this fact coupled with the increasing cost of farm labour would induce farmers to use electricity wherever possible.

Materials and labour were, however, problems which confronted supply authorities and not until they became easier could rapid progress in rural electrification be achieved; it should be borne in mind nevertheless that electricity was already easily available to 75 per cent. of the dwellings in rural areas.

Speaking of the special features which electricity offered the farmer, Mr. Cover said that efficient lighting should always be installed on farms and careful thought given to the layout so that the light was applied in the correct position. Tungsten lighting should always be controlled by efficient reflectors and the fluorescent lamp would find many applications in farm buildings when the equipment became more readily available.

When electric motors were installed it was advisable, as far as possible, to use individual drives to each machine, and at the same time the opportunity should be taken of replanning the layout of the machines so as to reduce manual labour and to take full advantage of the available space. An example of electrical experimental research carried out to determine a method of improving the load factor of farm grinding was the small hammer mill driven by a 3 H.P. motor. This could be operated automatically by time-switch controls or switched on manually and switched off by a cut-out which would operate when the feed from the hopper to the mill was interrupted.

There were many operations in agriculture where heat was required and a few examples were sterilising, water heating, pig-food cooking, and an application during recent years was for grain drying. In horticulture and market gardening it was used for green-house air heating, soil heating, soil sterilising, etc.

In dairy farming one of the outstanding successes had been the introduction and development of electric sterilising chests. The chest now supplied by his company was a self-contained unit, simple to use and ensured cleanliness as it did not create fumes or dust. Some farmers specified a high-pressure electric boiler because it had been necessary in the past to use high pressure coal and coke-fired steam boilers. With an electric boiler the steam evaporation was constant and sterilising operations had been successfully accomplished at pressures of 15 lbs. per sq. in. or less.

During the war and as a result of increased production of grain, crop-drying had made considerable progress. Electric motors were widely used for driving the fans, elevators, cleaners, etc., and in some instances electricity was used to heat the air for drying the grain. It was essential that the grain was dried under closely controlled temperature conditions and, therefore, the accurate and close control obtainable with thermostatically-controlled electric air heaters made electricity an obvious choice. There was no pre-heating time as the required air temperature was reached within 2 or 3 minutes of switching on. The loading for heating grain dryers was usually between 150 and 350 kW, depending on the type of drier, output and temperature employed.

In the speaker's view there should be a closer co-operation between the electrical and agricultural industries, and representatives of both should be on the technical panels of the Ministry of Agriculture advisory bodies, National Farmers' Union and similar organisations so that the electrical and the farming industries were aware of each other's problems and could co-operate closely. Service after sales would be a boon to farmers and this could take the form of maintenance contracts for inspection of installations, etc., and could be used to ensure that the farmer was using his equipment to the best advantage.

Market Research and Exports

Brief Review of Overseas Trade Conditions and Possibilities

WITH the cessation of hostilities in Europe it is generally recognised that the most immediate problems are (a) the switch-over of war-time industries to peace-time production, (b) the transfer of men and women demobilised from the Forces and war industries to peace-time industry, and (c) the production of goods for export to enable us to recapture and expand our pre-war overseas markets.

Schemes to cope with (a) and (b) are now being discussed, and put into operation as far as conditions allow, but there is as yet, little evidence to show that comprehensive plans are being drawn up to meet all the problems of export.

In addition to radio-location and other developments of which little has so far been disclosed, the plastics industry has, during the war years, opened up many new lines of development, and in the pamphlet published recently by the Ministry of Labour, on the training of personnel who have had their careers interrupted by the war, this industry was mentioned as one of considerable scope.

War conditions increased the need for substitute materials and while many of these may become redundant when raw materials are again in good supply, it is reasonable to expect that some of them, including plastic compounds, will be retained and further improved upon. It is generally appreciated that some substitute materials are in many cases better than the raw materials they replace, and provided they are less costly than the original they may assist considerably the extension of our overseas trade.

Severe Competition Expected

To capture the overseas markets in the initial stages will not, however, be easy for we have to face the severe systems of barter, such as were adopted by Germany before 1939. Whether future world competition will be based on these lines it is impossible to predict, but it is essential that every allowance be made for its resumption.

Goods will not sell on quality and price alone; it is first essential for every country to be a " shop window " where it may display its goods in the most effective manner. In the past, many manufacturers were in a position to sit at home and wait for overseas customers to come here, methods which, with the aid of a few representatives stationed overseas and the erection of a few stalls at World Fairs and the like, achieved successful results. In future it may be necessary for the manufacturer to seek and cultivate overseas markets.

Normally the two methods of obtaining overseas trade are (1) by price-list, and (2) by submitting tenders in competition with overseas manufacturers. The former means manufacturing to our specifications; the latter, manufacturing to the customers' specifications. With some types of goods both methods are satisfactory in a strictly limited range, but the greatest scope for development is found in the sale of goods most commonly used by the general public. Such goods include cooking, water heating, space heating and other electrical appliances, radio sets, fittings, cables, conduit, accessories and the like. A considerable portion of these may be sold by tender, or even on the price-list basis when manufactured in accordance with local needs, but lower standards of living in certain countries, high cost of transport, the imposition of tariffs, and so on, are often against such forms of trading.

Visiting Representatives

Before we can hope to capture and retain really lucrative markets, it is generally appreciated that it will be necessary to send specialised representatives to the countries concerned to study the particular requirements of those countries. Such representatives, however, must not be expected to be able to assess the requirements of customers without spending a considerable time in their countries. A short visit paid first to one country and then to another will be of little use.

Although design usually precedes customers' personal preferences, new designs must conform to general tastes. Revolutionary changes were common before the war, only because the purchasing public were prepared to accept them. To-day utility is the first consideration and this may last for some years.

Assessing overseas requirements calls for a technique, dependent upon (a) the particular designs of current models produced by manufacturers in those countries; (b) designs of models imported from other countries and how they differ from (a); and, (c) whether the products in either (a) or (b) completely meet the requirements of the purchasing public. It is to (c), therefore, that attention must be given by the British manufacturer when cultivating the overseas markets. For instance, electric cookers manufactured in this country for export were in many cases designed on the lines of those generally adopted by those countries, as for example, drop-down oven doors.

The personnel who would benefit by

specialised training are those who possess a flair for this type of research work, are naturally observant and preferably have some knowledge of the people and the language of the particular countries. Many men with these qualifications will be found in the ranks (all ranks) of the Fighting Forces. Those members of H.M. Forces who should be particularly qualified to train as European representatives are those who are staying in the Forces for some time for the purpose of occupying the various countries in Europe. It is during this period that they will obtain first-hand knowledge of the people and their likes and dislikes and preferences. They will also have the opportunity of learning the language of the particular country where they are stationed. Further, schemes which now exist to enable serving members to train for peace-time occupations will be extended, particularly as the preoccupation of staging warfare is removed, and the need to fit new men for peace-time occupations given preference. These men might be termed our potential ambassadors of overseas trade.

News in Brief

Warlingham Hospital Lighting.—Croydon Hospital Committee is to provide electric lighting at the hospital approach road at a cost of £370.

Tynemouth Exhibition.—The electrical and industrial exhibition arranged by Tynemouth Corporation in conjunction with local firms was seen by more than 5 000 people. The exhibition cost £300.

Coal Costs.—Ald. H. E. Rhodes, chairman of Preston Electricity Committee, told the T.C., on June 28, that the cost of coal at the power station this year was £55 000 up on last year, yet they were not increasing the unit cost to the consumer.

Radio-Equipped Fire Engines.—Sheffield fire engines have been equipped with radio equipment by means of which operators can keep in touch with each other and with headquarters. Reports can be made and instructions received over a radius of 30 miles.

Croydon Power Station.—The Electricity Committee has made arrangements with Messrs. C. S. Allott and Son, to undertake the duties of consultants for the civil engineering work in connection with the first section of the new power station, and with Mr. Robert Atkinson, to prepare designs for the new buildings.

Street Lighting at Plymouth.—Dusk to dawn gas and electric street lighting is to be resumed at Plymouth as from July 15, but the cost will be more than pre-war and a supplementary estimate of £31 050 is to be submitted to the City Council's Finance Committee.

Hull's Last Tramcar.—The last electric tramcar was run in Hull on Saturday night. All the traffic routes have been converted to the trolley-bus system.

Mains Extensions.—The T.C. has applied to the Electricity Commissioners for sanction to borrow £8 000 for mains and various services and £4 000 for specified sub-station plant.

New Sub-Stations Proposed.—Hackney Electricity Committee has obtained sanction to borrow £3 500 for sub-station plant. Tynemouth Town Council proposes erecting a sub-station in the Hawkey's Lane area. Battersea Electricity Committee is to provide a transformer sub-station in Muncaster Road at a cost of £6 437.

Controversy at Belfast.—At a meeting of Belfast Chamber of Commerce on June 27, the president, Mr. A. F. Shillington, referring to Belfast's electricity undertaking, said that while recognising the theoretical advantages of the administration by a central authority, the Council of the Chamber was not satisfied that the Government proposals adequately safeguarded the interests of the ratepayers of the city. Representations had been made to the Corporation, but that body had accepted the Government proposals. The Chamber would have a further opportunity of stating their views when the Bill to put the Government proposals into effect came before the Northern Parliament.

Syrian Wireless Station.—Several British and American tenders have been submitted to the Syrian authorities for the erection of a high powered wireless station at Damascus and for the conversion of the Syrian telephone system.

Wessex E.C. Miss Championship.—The Wessex Electricity Company were the runners-up this season for the Newbury and district table tennis championship tournament.

TWENTY-FIVE YEARS AGO

FROM THE ELECTRICIAN *of July 2, 1920: An electrical engineering firm is to have the credit of inaugurating the first aerial beanfeast party. Employees of Messrs. Macdonald, Syer and Company, of Gray's Inn Road, have chartered a Handley Page aeroplane to convey them to Margate and back, for their annual outing.*

Book Review

The Protective Gear Handbook. By M. Kaufmann (London: Pitman). Pp. ix + 298. 30s. net.

The author's definition of protective gear is the assembly of instrument transformers and relays employed for detecting a fault and tripping the appropriate circuit breakers to clear it—the circuit breakers themselves and such equipment as fuses, reactors and lightning arresters are not included; they have, in fact, already been dealt with in the companion volumes, Switchgear Handbooks I and II. Furthermore, the reader is assumed to have a knowledge of the principal instrument transformers and the different types of relay so that all the available space is devoted to the applications of these items in building up protective schemes appropriate to various circumstances. An introductory chapter outlines the requirements of a protective scheme, discusses the effect on fault current of various methods of earthing and gives the principles underlying the determination of relay settings with particular reference to the influence of idle current transformers when using various methods of connection, including the use of negative sequence networks. Feeder protection follows and comprises nearly half the book. Amongst the pilot wire schemes, only the Translay Opposed Voltage scheme is discussed in detail although others are mentioned. The applications of overload and earth leakage relays are adequately dealt with and impedance equipment is discussed in considerable detail, although the author finds its use difficult to justify in face of modern lock-in schemes; in connection with impedance protection are included the somewhat academic formulæ for zero-sequence reactance of overhead lines and cables as given by Wagner and Evans—these are of doubtful value owing to the indeterminate nature of the earth path, particularly in the case of cables where current may return in various incalculable ways, such as among several sheaths in parallel if a number of cables lie in the same trench; supply companies must by now have accumulated a considerable amount of data on this matter and it would be very useful if it could be collated and published. Parallel feeder and lock-in schemes are described although the application of high-frequency carrier current to the latter is only allowed four pages, in spite of the fact that the author quotes authorities as stating that this is destined to become the first choice for all important high-voltage lines. Succeeding chapters deal very satisfactorily with the protection of bus-bars, generators and transformers, while a final very valuable chapter of fifty pages discusses testing and maintenance. The author very rightly stresses the importance of routine maintenance and testing and describes a number of secondary injection tests sets with illustrations of their use for different types of equipment; arrangements for primary injection testing both with test transformers and with generators are also described. As the book is written rather from the manufacturers' point of view it is, perhaps, natural that no information is given regarding the troubles, both electrical and mechanical, which are likely to be met. In spite of certain omissions mentioned above, this is the most comprehensive book yet published on the subject in this country and although it suffers to some extent by being devoted largely to the equipment of one manufacturer it is a valuable work and should be read by all protective gear engineers.

E.O.T.

NEW LIGHTING FITTING

An addition to the range of industrial local lighting units produced by the Electric Depôt Ltd., is the "Lens Lite" which illuminates and magnifies fine work and leaves the operator's hands free. It can be used for close inspection or production work either on a bench or machine. Provision is made for two lamps — one on each side of the lens, and completely shielded from the viewing side. This arrangement gives balanced shadow-free illumination of the work. The lenses are of finest quality British optical glass, and are available in alternative powers. The main body carrying the lens and lamps, is supported on two 9 in. hinged arms attached to a universal fixing base giving easy movement in all directions.

The "Lens Lite"

BOOKS RECEIVED

"Prefabricated Homes." By Bernard H. Cox. (London: Paul Elek). Pp. 36. 2s. net.

Journal of the I.E.E. Vol. 92. Part I (General). No. 53. (May. (London: Spon). 5s. net.

Development of Supplies

Partial Relaxation of the 1942 Restrictions

WITH victory in Europe now attained, the Electricity Commissioners announce that the restrictions on electrical development which came into being in April and December, 1942, are now suspended, subject to the considerations set out below.

Essential Services

The highest priority should still be given to supplies required for the continuance of the war effort or in connection with food production. After any such requirements have been met, priority should be given to supplies for (a) essential civilian needs, such as water or sewage pumping; (b) new buildings and to existing buildings rehabilitated after war damage, or released from requisition; reinstatement of supplies and facilities required by returning evacuees; supplies to premises requiring additional facilities consequent upon the occupation of one house by two or more families; (c) domestic or other purposes where the withholding of a supply would result in genuine hardship.

With a view to the maximum number of persons benefiting with a minimum expenditure on labour and materials, priority should also be given to the connection of premises on the route of existing mains, though for the time being preference, within that priority, should be given to the connection of those premises which have no reasonable facilities already.

Subject to these priorities, undertakings may, if they have the labour and materials available, meet other requirements.

Building and Civil Engineering Work

Application for an authorisation under Regulation 56A of the Defence (General) Regulations, 1939, will still be necessary in respect of any building and civil engineering work in excess of a value of £100 (£10 in the London and S.E. England Regions) in any period of 12 months. The figure of £100 is being reduced to £10 in all regions for the period of six months from August 1, and the Commissioners will shortly advise the undertakings concerned indicating a simplified basis on which authorisations will be given for building and civil engineering works of a value above £10 but under £100. The Commissioners will also be prepared in the case of public authority undertakings to consider applications for consent to borrow for development on the foregoing lines, and in respect of hire or hire-purchase facilities.

It will be appreciated that the labour requirements for housing and other post-war building development are likely to delay the carrying out of the full five-year programme of work already submitted by undertakings in reply to the Commissioners' invitation of February 28, 1944, and the Commissioners accordingly do not anticipate that they will be able to approve, save in exceptional circumstances, the carrying out of schemes for the building of new offices, showrooms or workshops or major alterations to such buildings during the first post-war year.

The Commissioners have been asked by the Treasury to draw the attention of undertakings to paras. 62 and 63 of the White Paper on Employment Policy, which sets out the Government's attitude in regard to capital expenditure by public authorities. Undertakings will no doubt have noted that the Government are considering the lines on which the procedure proposed in these paragraphs can be applied to the programming of capital expenditure by public utility companies. Finally, undertakings are reminded that the consent of the Treasury continues to be required, under Regulation 6 of the Defence (Finance) Regulations, 1939, to issues of capital, and in this connection attention is drawn to the White Paper on Capital Issues Control (Memorandum of Guidance to the Capital Issues Committee).

WHOLESALER'S SILVER JUBILEE

Messrs. Hirst, Ibbetson and Taylor, Ltd., of Manchester, celebrated their silver jubilee, by a day's outing of the head office and branch staffs to Southport, on June 28.

Lunch was served at the Belle Vue Hotel, and dinner at the New Mornington Hotel, Mr. John Hirst, managing director proposed the health of the staff, and recalled in humorous vein, early days of the firm, and pointed out that 75 per cent. of the original staff were still on the payroll.

Mr. K. E. Pickard, Liverpool branch manager, who was in naval uniform suitably responded, and was supported by Miss S. Ram.

Mr. H. Clitheroe of Manchester toasted the firm and Mr. Hobday supported. Mr. Walter H. Swain, director, responded and paid tribute to the loyal service of the staff. Other speakers were Miss Luvatti, of Manchester, and Mrs. Swift, and Miss K. Foster, of Liverpool.

The toast to the Chairman was proposed by Mr. A. J. Cross (secretary), and Mr. T. P. Hannah, of Manchester, responded.

Answers to Technical Questions

We produce below the answers to a selection of questions which have been sent to us by readers. The co-operation of students, and others in making this feature one of general interest is invited.

A correspondent has requested information regarding the wave shapes of electric discharge lamps.

The general features of the wave shapes of the currents and voltages associated with sodium, mercury and mercury fluorescent lamps are similar and are governed

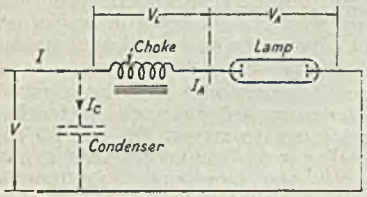


Fig. 1

largely by the fact that the discharge itself has a negative resistance characteristic, i.e., its resistance decreases as the current increases. If the resistance decreased proportionately as the current increased ($R \propto 1/I$) the voltage across the discharge would be the same for all currents. The shape of curve actually obtained is shown in Fig. 2a—as the voltage rises from its zero value it reaches a peak at which the discharge starts, after which it remains approximately constant for the remainder of the half-cycle.

Due to this negative resistance characteristic it is necessary to include a choke in the circuit in series with the lamp as shown in Fig. 1. The sum of the arc voltage and the choke voltage must equal the supply voltage which may be assumed to be sinusoidal. Whereas the lamp voltage will be approximately in phase with the current through the lamp, the choke voltage will be leading by nearly 90° on the current, so that the two voltages are displaced by about 90° in phase. The sum of the two, however, must equal the sinusoidal applied voltage as shown in Fig. 2b; it can be seen that the dip in the choke voltage corresponds to the peak of the lamp voltage.

The current wave is difficult to estimate accurately since it results from the application of a sinusoidal voltage to a circuit containing an inductance and resistance in series, both of which are variable and dependent on the value of the current. However, the back e.m.f. in the choke, which is numerically approximately equal to the choke voltage is given by $e = L\frac{di}{dt}$ volts so that, if L, the inductance, is assumed constant, the current will be given by

$$i = \frac{I}{L}\int e\,dt \text{ amps.}$$

Integrating the choke voltage curve therefore, gives an approximation to the current through the choke and lamp and

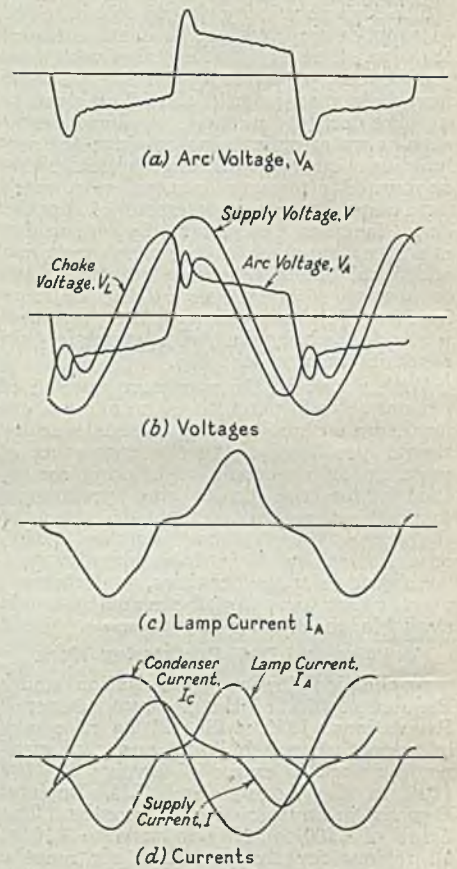


Fig. 2.

is as shown in Fig. 2c. The kink in the current curve corresponds to the dip in the voltage curve. This curve agrees approximately with that obtained from oscillographs.

It can be seen that this current lags considerably behind the supply voltage, i.e., the power factor is low, about 0.6 in practice, so that a condenser is put across the supply as shown by the dotted lines in Fig. 1. This takes a sinusoidal

current leading on the voltage by almost 90° so that the total supply current is as shown in Fig. 2d. It can be seen that the supply current is less than either the lamp or the condenser currents, although it is approximately in phase with the voltage.

It can also be seen that the supply current is not sinusoidal but contains appreciable harmonics. With the types of lamp mentioned earlier the magnitude of the harmonics (r.m.s. value) is between 9 and 12 per cent. of the total r.m.s. value of the current. It is for this reason that, however carefully the value of the condenser is adjusted to bring the current into phase with the voltage, the power factor cannot be made more than about 0.96.

E.O.T.

Industrial Information

Production and Engineering.—The June bulletin of the Ministeries of Labour and Production features efficient factory lighting, the roller conveyor as a useful labour-saver, motion study for small quantity production, desiccants for tropical packages, follow-on press tools, and milling data charts.

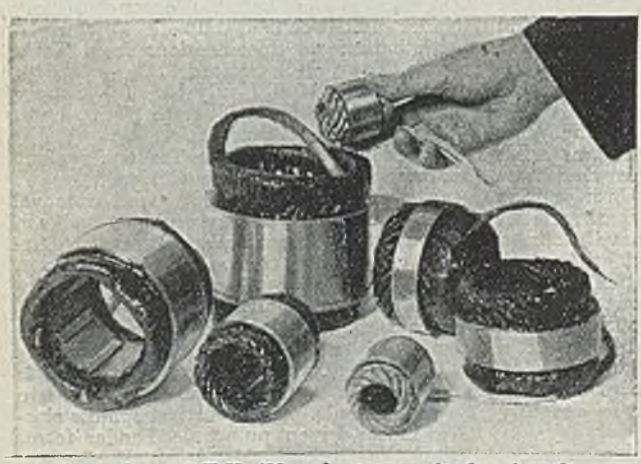
Electrical and Radio Engineering.—Intensive courses in electrical and radio engineering under the Hankey Scheme will commence in the Department of Electrical Engineering and Physics, at the Borough Polytechnic, London, S.E.1, on Monday, October 2. There are full six months' courses in which students get free tuition and a maintenance grant. Particulars may be obtained from Mr. W. C. S. Phillips, head of the department.

Electric Irons.—The Central Price Regulation Committee have approved the following prices, exclusive of purchase tax, for electric irons complete with adaptor and cable manufactured by Dale Electronics, Ltd.:—Model 500: Manufacturers' selling price, 15s.; wholesalers' selling price, 18s. 9d.; retail, 25s.; model 350: 13s. 3d., 16s. 6d., 22s. The "Roxy" electric irons manufactured by Messrs. R. Nuttall: Manufacturers' selling price, 13s. 4d.; wholesale selling price, 16s.; retail, 20s., exclusive of purchase tax.

Fuel Efficiency News.—The necessity for continued saving of heat, steam, power and light is emphasised in the current issue of the Fuel Efficiency Committee's leaflet. "Don't leave it all to your fuel watcher" is the exhortation on the latest poster of the Ministry of Fuel and Power supplied to works and factories.

Tropical Packaging Exhibition.—Since the Anglo-American Services Exhibition on Tropical Preservation and Packaging opened at Feltham last October, more than 20 000 visitors have seen the display. It is now possible to accept a much wider representation from industrial firms, and applications for invitations for such personnel as shop managers, foremen and charge hands should be sent to the Exhibition Officer, Anglo-American Services Exhibition, Central Ordnance Depôt, Feltham, Middlesex.

A.C. Stator Units for Aircraft.—Since the equipment of the Shetland flying boat with a.c. motors of B.T-H. design and manufacture, further progress has been made in the development of electrical equipment for aircraft, and the accompanying illustration shows a group of 400 cycle a.c. stator units made by the British Thomson-Houston Co., Ltd., for a new type of aircraft. The two largest stators are for alternators, that in front being for a 1.2 kVA high-frequency inductor alternator for the radio and radar supplies. The larger stator at the back is for a 7.5 kVA, 400 cycle, three-phase alternator for the main power supply; it runs at 8 000 r.p.m. and feeds the smaller units shown, which are all for induction motors. These are 4-pole motors, running at approximately 12 000 r.p.m. The smallest, held in the hand, has an intermittent rating of 0.1 H.P., and the others



Examples of B.T-H. 400 cycle stator units for aircraft

range up to 1.5 H.P. All these units use glass insulation as a safeguard against the arduous operating conditions.

Crompton Parkinson Notice.—Crompton Parkinson, Ltd., have issued a statement to the effect that as from July 1, 1945, the three companies which they acquired in 1941, the Young Accumulator Co. Ltd., A. E. Morrison and Sons, Ltd., and Electricars, Ltd., will cease to function as separate sales entities and will be merged into the Crompton Parkinson organisation. Orders outstanding and not invoiced at June 30 last are to be executed by Crompton Parkinson, Ltd., by whom the invoicing and rendering of accounts will be carried out. The brand names under which the products have been previously sold—"Young," Morrison-Electricar" and "Electricar"—will, however, be retained.

B.I. and Callenders Merger.—As and from June 29, British Insulated Callender's Cables Ltd., has acquired the main assets of British Insulated Cables Ltd. and those of Callender's Cable & Construction Co. Ltd., and will be responsible for their liabilities.

The E.I.B.A. Report

THE two high lights of the annual general meeting of the Electrical Industries Benevolent Association, which was held on June 29, were that the reserve funds of the association had reached the £100 000 mark, and that a special committee had been appointed to examine to what extent there was a need for homes for aged people associated with the electrical industry.

In his speech introducing the report and accounts, Mr. J. N. Stephens, who was appointed president for a second year, said that the amount paid out in relief in 1944 was the all-time record of £10 803, practically four times the comparable figure for ten years ago. It was most gratifying that, in spite of this, there was a sufficient surplus to have brought the reserve up to the six figure mark, and it was fitting that this should have occurred in the year which included the 40th "birthday" of the association. These and still bigger reserves, however, were necessary to ensure the continuation of the association's work should there be a serious post-war slump in which calls on the funds might greatly increase at a time when subscriptions might be seriously reduced.

It would have been understandable, after nearly six years of extreme difficulties, if the association had been faced with a deficit; that the E.I.B.A. was in such a much better financial position than this, and was able to lay plans for the future, resulted from the way in which old and new helpers had assisted it, and in this connection Mr. Stephens paid particular tribute to Mr. E. E. Hoadley, Mr. P. V. Hunter and Mr. E. E. Sharp, the three who had immediately preceded him in office.

Mr. L. C. Penwill, in proposing that Mr. J. N. Stephens should be re-elected president for a second year in view of special circumstances, said that he, Mr. Stephens, had been working for the association for 22 years, during the last 17 of which he had been a member of its governing body. He had occupied the position of chairman of the Court for six years, he had been chairman of the Relief Committee for many years before, and it was fitting that he should be president in the first year during which social functions could be revived.

Mr. W. J. Jones was appointed as a new member of the Court; Mr. L. C. Penwill was re-elected chairman of the Court; Mr. L. C. Sharp vice-chairman; and Mr. J. Y. Fletcher honorary treasurer.

Contracts Open

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

Salford Public Health Department, July 7.—Supply and delivery to Hope Hospital, Salford of (a) electric platform truck, 15-20 cwt. capacity, with batteries; (b) electric unit, suitable for one or more trailer units, capacity up to 15-20 cwt., with batteries. Specifications from Town Clerk, Town Hall, Salford 3.

Manchester C.C., July 12.—(a) Supply of l.p. water valves, 6 in. to 62 in. bore. —Stuart Street generating station; (b) supply and erection of ash sluicing plant extensions at Barton generating station; (c) purchase, dismantling, and removal from site of two electrically operated ash telphers and structural steelwork at Barton generating station. Specifications, from Mr. R. A. S. Thwaites, Chief Engineer and Manager, Electricity Department, Town Hall, Manchester 2; deposit £1 1s. for each specification.

Kingston-upon-Hull Electricity Department, July 13.—Supply and erection of two 1½ million galls. per hr. vertical spindle electric motor-driven pumps. Tender forms from the General Manager, Ferensway, Kingston-upon-Hull; deposit, £1.

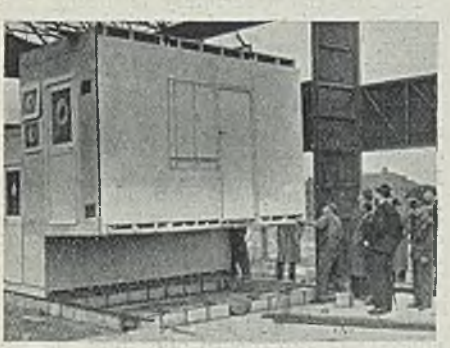
West Riding C.C., July 16.—Rewiring of electrical installation at Oulton Hall Institution, Oulton, near Leeds. Specification from West Riding Architect, County Hall, Wakefield.

Electricity and "Howard" Houses

First Permanent Prefabricated Dwellings—Wiring Arrangements

DURING the morning of June 28, Mr. Duncan Sandys, Minister of Works, and General Sir Frederick Pile, Director-General, Ministry of Works, watched the initial stages in the erection of the first of twenty-two " Howard " houses that are to be built at Alnwick Road, Woolwich. These comprise the first of a group of post-war permanent prefabricated dwellings. With economical use of man-power, and without any effort to create a speed record, the erection of the 22 houses is expected to take ten weeks. Seven men, working the normal number of hours, can complete one house ready for occupation in seven days.

The " Howard " house is steel-framed with specially treated asbestos sheet or other form of cladding. The whole kitchen,



The Howard kitchen unit being swung into position

complete with service pipes, electric cooker and other components, is constructed in the factory, delivered to the site as one section, weighing 23 cwt., and swung into position by a crane as one of the first stages of erection. It has a solid fuel boiler to give a hot water supply, but space is provided for an electric wash-boiler and also a refrigerator, which may be supplied by the local authority.

The electric wiring installation is on the " octobus " system, with two distribution boxes—one for the ground floor and the other for the upper storey—from which braided cables are drawn under the floor to the appropriate points. One of the distribution boxes is situated in the kitchen ceiling. On the kitchen wall is a control panel incorporating a fuse box and also the switches for the cooker, water heater, other apparatus, and lighting. The cooker, which is of ample capacity, has three boiling plates.

Of special electrical interest is a temperature control system which is to be installed in some of the houses. Each of these dwellings will be equipped with a solid fuel automatic boiler, which will feed hot water to radiators for space heating in all the rooms, and an indirect cylinder for an automatic hot water supply. The boiler temperature will be controlled by a thermostat in the boiler which operates an electro-magnetic damper, and the flow of water to the space-heating radiators is to be controlled by a room thermostat and a simple electric valve. The indirect cylinder is to be fitted with an immersion heater, also thermostatically controlled. This temperature control system is by the Rheostatic Co., Ltd.

ELECTRICITY SUPPLY

Sheffield.—The Electricity Committee is to extend mains at a cost of £5 592.

Poplar.—The Electricity Committee is to extend mains in the Fairfield Road, area at a cost of £885.

Bolton.—The annual accounts show an increase of £15 052 in departmental costs.

Middlesbrough.—Application is being made to the Electricity Commissioners by the T.C. to borrow £1 000 for mains and £1 500 for services.

Birmingham.—The Electricity Committee is seeking sanction to borrow £25 000 for sub-station plant and equipment.

Clithero.—The Electricity Committee has decided to afford supplies to Horton and Newsholme by overhead line at the earliest possible date.

Croydon.—The Electricity Committee is to provide supply to the Gravel Pits Estate, Mitcham Road, at a cost of £1 674. The Committee has obtained sanction to borrow £7 090 for supply to Long Heath.

Mansfield.—The Electricity Committee has received sanction to borrow £742 for supply to temporary housing estates, and is seeking sanction to borrow £996 for mains in the town centre.

York.—The Electricity Committee has obtained sanction to borrow £1 670 for extensions to the Upper Poppleton area, and is seeking sanction to borrow £7 893 for supply to temporary bungalows.

Stockton-on-Tees.—The T.C. has received sanction to borrow £10 000 in connection with unspecified works for the electricity undertaking. Sanction has also been received to borrow £5 430 for a h.t. mains extension from Thompson Street sub-station to Mile House sub-station.

Company News

GARRARD ENGINEERING AND MANUFACTURING CO., LTD.—Fin. div. 12½% and bonus 5% on ord., mkg. 30%.

SOUTHERN BRAZILIAN ELECTRIC CO., LTD.—Funds remitted enable int. to be paid in full on the 7% prior lien deb. stk. for half-yr. to June 30, and a paymt. of 2¼% on the 6½% mort. debs. coverg. int. for half-yr. to Dec. 31, 1944, at 4½% p.a. Mtgs. of holders of the 7% prior lien deb. stk. and 6½% mort. debs. will be convened to submit proposals embodyg. the extensn. of the existg. int. and sinkg. fund arrangements for further period.

LACRINOID PRODUCTS LTD.—It is announced that acceptance forms for the issue of 300 000 shs. of 2s. must reach the New Trading Co., 82, King William Street, E.C.4, not later than 3 p.m. on July 10. The new shs. will rank pari passu in all respects with the existg. shs.

ELECTRICAL FINANCE AND SECURITIES TRUST.—Total inc. for 1944 £100 219 (£100 192). After taxn. £12 081 (£12 675), etc., net rev. £74 027 (£68 184), plus £64 003 (£56 944) brot. in. Pref. div. absorbs £10 500 (same), fin. ord. div. 6% and bonus 3½%, mkg. 13½% (same), fwd. £76 905. Mtg., July 10.

J. STONE AND CO., LTD.—Tradg. pft. and invstmt. income 1944 (after tax) £678 687 (£659 989). To dirs.' fees £4 000 (same), bldg. replacement and repairs £19 125 (£24 566), deprecn. freeholds £3 423 (£2 714), plant maintenance and deprecn. £428 025 (£390 404), leavg. £224 114 (£238 305). Pref. div. £39 000 (same), ord. div. 25% £150 100 (same), fwd. £353 660 (£318 646). Stock £1 069 270 (£984 360), trade, etc., invstmts. £65 764 (£83 002), due by subsids. £36 592 (£67 436), debtors £1 057 010 (£1 221 181), tax certs. and cash £170 940 (£209 616). Creditors, tax and contings. £1 601 681 (£1 858 615), due to subsids. £49 575 (£25 359), res. £450 000 (£400 000), plant maintenance, etc., £783 701 (£692 028). Mtg., July 10.

CABLE MERGER APPROVED.—At the separate class meetings of stockholders of Callender's Cable and Construction Co. and at the subsequent extraordinary general meeting, held on June 29, the resolutions for the amalgamation with British Insulated Cables Ltd., were passed with the requisite majorities. The figures were: Holders of the 6½% cum. pref. stk.: for the resolution 190 462, against 1 150, majority in favour 189 312; holders of the 7½% "B" pref. stk.: for the resolution 209 965, against 183, majority in favour 209 782; holders of the ord. stk.: for the resolution 603 384, agst. 1 788, majority in favour 601 596. At the extraordinary general meeting there was a majority of 602 873 in favour of the resolution. On an average, over all classes of stk., proxies were received from 52.08% of the holders, and of these 99.74% were in favour.

Electric Cooker Policy

IN reply to the questionnaire sent to members of the E.D.A. respecting (1) whether it was intended after the war to promote (or re-establish) cooker development by hire and/or hire purchase, and (2) whether the settlement of post-war policy regarding the hire or hire purchase of cookers was in abeyance on account of the uncertainty regarding Purchase Tax, 349 members answered to the following effect:—

209 find the uncertainty regarding P.T. a hindrance in formulating their post-war policy. Of these 30 have not yet decided, even provisionally, upon their policy; the remainder have adopted a provisional policy, which may be altered or modified according to the future of the P.T. (and, as noted by some, other factors such as post-war models and total price).

The latter may be subdivided thus:—30 propose to offer hire purchase in any case, but hire will depend upon P.T. (and other factors). 115 propose to offer both hire and hire purchase, but P.T. may affect their policy; in 16 cases the remark "especially as regards hire" was added. 11 propose to offer hire but not H.P.; 3 propose to offer hire but have not decided regarding H.P.; 18 propose to offer H.P. but not hire; 2 propose to offer neither hire nor H.P. The proviso that P.T. may cause a re-consideration of policy applies to all cases.

In 6 cases specific mention was made that "hire would be confined to existing stock," and policy as regards the hiring of new cookers was in abeyance.

117 undertakings gave negative answers to the question regarding P.T. though a large proportion stress the vital importance of the early removal of the tax. The remaining 23 left this question unanswered, and it may be assumed that their policy will not be affected (except as regards the actual terms for hire or H.P.) by P.T. This therefore makes a total of 140 undertakings whose policies are unlikely to be affected by P.T. Of these 75 will offer both hire and H.P.; 47 will offer H.P. only; 12 will offer hire only; 6 have either not yet discussed the matter, or their policy will be decided by factors other than P.T.

COMPANY MEETINGS

TELEGRAPH CONDENSER COMPANY

Radio in Modern Warfare

The twelfth ordinary general meeting of The Telegraph Condenser Co., Limited, was held on June 28, in London, Mr. W. H. McFadzean, C.A. (chairman) presiding.

The following is an extract from his statement circulated with the report and accounts:—

Output for 1944 showed a further improvement over the previous record achieved in 1943, but, as a result of increased costs and higher depreciation requirements, little benefit has accrued to the company. Investment income shows practically no change but, after crediting what must be considered as a special receipt of £1 200 in respect of interest on tax reserve certificates, the total available profit from 1944 is £1 842 higher at £63 781. It is proposed to pay a dividend of 7½ per cent. and a cash bonus of 2½ per cent. (both less income-tax) on the ordinary capital.

War-time Activities

The story is being gradually unfolded of the essential part played by radio in modern warfare, and most people are aware of some of its diversified uses. To both the Navy and the Air Force the use of radiolocation has been of invaluable assistance in successfully combating enemy submarines and bombers, while in attack accurate bombing by the Allied Air Forces at night and through cloud has only been possible by the use of radio instruments. With our armies radio has played an equally important rôle, and has often been described as the " eyes and ears " of our Forces.

In every type of radio set and instrument, the components manufactured by your company have played a vital part and our main problems have been to meet all demands, both for quantities and for special and ever-changing purposes. Output has been increased to many times its pre-war level through more intensive production at our main factory at Acton and the operation of four dispersal factories and several outworking units. In the field of development we have originated many novel designs of condensers as, for example, for use in aircraft flying at great heights and extremely low temperatures and by our armed Forces operating under severe tropical conditions.

Tribute to the Staff

Shareholders have every reason to be proud of the war-time achievements of the company, so briefly outlined above, but I can assure you these have only been accomplished through organisation of the highest degree under the main direction of our general manager, Mr. P. A. Sporing, and the complete co-operation received from all employees. The latter now number over three times the total employed pre-war and include some 60 men seriously disabled during the last war and over 100 crippled women and girls. If I pay a special tribute to the enthusiasm shown and high standard of efficiency gradually achieved by these disabled men and women it must in no way detract from the thanks due to all other employees for their steadfastness and accomplishments—often under the most difficult and dangerous conditions.

It has been a matter of great pleasure to your directors that the names of three of our employees have appeared in recent Honours Lists, a tribute which the recipients have rightly interpreted as one to our personnel as a whole. We also remember with gratitude those of our employes who are on other national service and look forward to their early return to the company.

The Future

Until complete victory over Japan has been achieved, all calls made on us for that theatre of operations will continue to receive our maximum effort. But with the ending of the war in Europe the total demands of the Services are naturally decreasing and we are, therefore, able to give increasing attention and supplies to home and overseas markets. In these spheres the technical improvements we have developed during the war, added to the deservedly high reputation for quality and service which your company has always enjoyed, should place us in a strong competitive position. Steps have already been taken and others are under consideration to recapture and develop overseas markets so that your company can play its full part in this vital national requirement.

In the transition from war-time to peace-time operation there are many problems to be faced. For example, the dispersal factories I have already referred to must, in the near future, be restored to the parties from whom they were requisitioned. Some of the capacity which will thus be lost to us is considered redundant to our long-term requirements, but to achieve the most efficient production lay-out, ad-

ditional space to that available at our main Acton factory is required. Negotiations are well advanced for a convenient additional factory being rented for this purpose. Some contraction in output as compared with that of the war-time years must ultimately be anticipated, but this factor of itself need not necessarily affect our financial results, as virtually all the trading profits we have earned on our additional output under war conditions have been paid away in E.P.T.

Over-riding all other problems in importance and urgency is, however, the question as to the conditions under which industry is to be allowed to operate. This issue is now being put to the nation for its decision, and until this is known, one must be reserved about the future. But I can, in concluding this review, make two claims. The first—that your company has achieved its present position under the system of private enterprise, and in that achievement the benefits accruing have, in my opinion, been equitably distributed between shareholders, customers, and employees. My second claim is—that the future prosperity of this country and, therefore, of each company and individual lies in a continuation of private enterprise, provided that in our freedom we take full advantage of past experience and tackle all our post-war difficulties with that same determination and team spirit which have been such features of the war-time years.

The report and accounts were adopted.

Cable and Wireless (Holding)

Confidence in the Future

The annual general meeting of Cable and Wireless (Holding), Ltd., was held on June 28, in London.

Sir Edward Wilshaw (chairman and managing director) said that Lord Pender, on the completion of 45 years' service in the telegraph industry, commencing with the old cable companies, had now retired from active participation in the group of companies. He had joined the old cable companies in 1900, served on the boards of those companies since 1906 and been the governor and managing director of Cable and Wireless (Holding) Ltd., since the merger in 1929. Many would remember in the difficult days of the company's early years the outstanding ability with which he conducted the general meetings in face of great difficulties. He had inspired confidence in the stockholders, and in these more prosperous days they should not forget that and should express their gratitude and wish him well in his retirement and leisure.

In round figures the profit for 1944 was £1 199 000, as against £1 221 000 in the previous year. The proposed dividend was 4 per cent. The dividends received from the subsidiary companies and Cables Investment Trust, Ltd., were the same as for the previous year, £1 314 000, while income from other investments at £43 000 showed an increase of £1 000. The taxes on profits paid and to be paid in this country by this group of companies amounted to about £7 000 000 for E.P.T., and about £4 000 000 for income tax, in addition to a further £2 000 000 to be paid in the Dominions, Colonies and foreign countries, making a grand total of about £13 000 000 taxation upon their incomes.

There had been references in the Press to various committees and missions which had been examining Imperial Telecommunications problems. It had been stated in November that discussions were afoot involving the creation in Britain, the Dominions and India of public utility corporations, owned by the State, to take over the conduct of external telegraph and telephone activities now in private hands. Later it was announced that Lord Reith had been invited by the British Government to visit the Dominions and India to discuss the future organisation of the telecommunications services of the Commonwealth.

Those proposals and the negotiations which had resulted had given the directors much thought. Whatever might be the trend of the discussions, the stockholders would be consulted before any irrevocable steps were taken by the board. For the moment he need say no more than that their group of companies during these last few years had provided yet another noteworthy example of the part that private enterprise could play in an emergency. They had emerged from the main conflict in a sound condition, looking forward to the future with calm confidence, fully equipped to offer their contribution towards their country's prosperity and the restoration of the universal good will on which the future peace of the world depended. The report was adopted.

Cable and Wireless. Ltd.

(The Operating Company)

War Activities

The following is an extract from the speech by Sir Edward Wilshaw, chairman of Cable and Wireless, Ltd., at the annual general meeting of the company held in London on June 28.

The profit for 1944 shows a small increase of £8 865 at £1 237 757.

In May, 1941, our Central Telegraph Station in Moorgate, with much valuable equipment, was destroyed by fire caused by enemy action. Due to forethought and careful planning, it was possible to transfer our activities to our present headquarters in Electra House, Victoria Embankment, and the flow of traffic was never seriously dislocated. Throughout all the periods of air raids, I know no case where a message failed to be delivered.

Abroad, on Italy's entry into the war, all the cables west of Malta were cut by the Italians. In the Far East, the Japanese, on their entry into the war, overran all our cable and wireless stations in that area, depriving the company of the best and fastest route to Australia and New Zealand. Despite the heavy losses of equipment and the necessity for expanding our services to meet war-time demands we have had the utmost difficulty in obtaining supplies.

Nevertheless, the services have been maintained; 47 new wireless circuits have been opened since September, 1939; the total traffic carried in 1938 comprised 231 000 000 words against no fewer than 705 000 000 words in 1944; whilst we have expanded our phototelegraph services until we are now handling as many as 2 000 pictures a month compared with 100 pre-war.

We have emerged from the war strengthened by the thought that by drive, initiative and foresight we have surmounted great dangers and formidable difficulties. We have shown that private enterprise in the right hands can achieve much. Experience has shown that the present system offers the merits of Government control without its disabilities. If left to our own resources and given reasonable encouragement and goodwill by the Governments, we and our associated companies overseas can continue to keep abreast of developments and to offer cheaper and extended telegraph services without adding to the taxpayers' burden.

The report was adopted.

W. T. Henley's Telegraph Works Co., Ltd.

A Great War Record

The 66th ordinary general meeting of W. T. Henley's Telegraph Works Co., Ltd., was held on June 29, in London.

Sir Montague Hughman (the chairman), said that the story he had to tell was fascinating and he was sure it would give the stockholders a thrill of satisfaction that that great organisation had taken such a wonderful part during the last 5½ years in helping to bring the war to a successful conclusion. From the early days of the war, up to the present time one of their most important contributions had been the manufacture for the Admiralty of a cable of unique design for combating magnetic mines. Many designs had been worked out and, after preliminary investigations with a number of heavier than water cables, towing different types of electrode, the Admiralty had decided that a cable which would float on the surface of the sea was necessary. By Christmas, 1939, their chief engineer, Dr. Percy Dunsheath, had conceived the idea of using tennis balls to support the weight of the heavy copper conductor required to carry many thousands of amperes. Altogether on that particular job they had had to make over 23 million tennis balls and draw some 200 000 miles of copper wire, and they had supplied over one million yards of that cable to the Admiralty to date. Many lives as well as valuable ships and cargoes had been saved by the tennis ball being employed in that original manner. He thought he could not be over-stating the case when he claimed that their efforts in that direction must be among the most remarkable and successful contributions of the electrical industry to defeat the enemy.

Another outstanding contract which they had executed was the H.A.I.S. cable for Operation "Pluto." The supply of millions of gallons of petrol to the Forces on the Continent through pipe lines laid across the Channel had been one of the outstanding British engineering achievements of the past few years. He was proud that Henley's had been able to take a major part in the enterprise. By September, 1944, the Henley straight-through presses had turned out 463 nautical miles of lead alloy pipe for H.A.I.S. cable. By the time one million gallons of fuel was being transmitted daily under the Channel the bulk of that had been through Henley's pipe. It had been a great triumph for the company.

The magnitude of the contract would be appreciated when he told them that from their Gravesend factory alone they had turned out nearly 8 000 tons of lead pipe and a total weight of armoured pipe of 11 500 tons.

Every possible step was being taken to see that they were able, as far as conditions would permit, to get back to pre-war conditions of output.

The report was adopted and the proposed final dividend of 10 per cent. and cash bonus of 5 per cent. were approved.

Commercial Information

Mortgages and Charges

NOTE.—*The Companies Act of 1908 provides that every Mortgage or Charge shall be registered within 21 days after its creation, and that every company shall, in its annual summary, specify the total amount of debt due from it in respect of mortgages or charges. The following mortgages and charges have been registered. The total debt prior to the present creation, as shown in the annual summary, is given—marked with an *—followed by the date of the summary, but such total may have been reduced.*

ACCUMULATOR AND CONTRACTING CO., LTD. (formerly Accumulator Contracting Co., Ltd.), Hull.—June 8, £2 000 debs.; general charge.

COPELAND AND JENKINS, LTD., London, E., mica manufacturers, etc.—June 15, charge to Westminster Bank, Ltd., securing all moneys due to or to become due to the bank; charged on National Works, Park Road, Wellingborough. **—. June 6, 1944.

County Court Judgments

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

STAFFORD, Stanley, Town End, Bolsover, wireless dealer and electrician. £10 10s. May 11.

COLEMAN, Donald Chas., 2 Cumberland Court, Hatfield, radio engineer.

VICKERY, Roy, 5a, Cheapside, Palmers Green, radio repairer. £31 14s. 7d. April 27.

WILLIAMS, D. P., 102, Westbourne Grove, W.2 (T/as 24 Hour Radio Service). £14 15s. 2d. April 26.

GREGORY, H. E., The Hawthorns, Salthouse Road, Rackheath, Norfolk, electrical apparatus maker. £23 0s. 8d. May 15.

LLOYD, William, 70 and 75, St. Ann's Well Road, Nottingham and 64, Renshall Street, Liverpool, electrical engineer. £188 8s. 4d. April 13.

AUTO ELECTRIC SERVICE (PETWORTH), LTD., East Street, Petworth, Sussex, £22 19s. May 11.

EVANS, Fred, Sherston, Nr. Malmesbury, Wilts., electrical dealer. £18 16s. 1d. May 11.

Applications for Discharge

SYMONS, Julian James (described in the Receiving Order as J. J. Symons) (carrying on business as The Zodiac Peerless Electric Lamp Company), 25, Denmark Street, Charing Cross Road, London. Date of hearing, July 10, 1945, 11 a.m., Bankruptcy Buildings, Carey Street, London, W.C.2.

YOUNG, Robert Allan, Gullet Passage, Shrewsbury, electrical and mechanical engineer. Date of hearing, July 23, 1945, 11.30 a.m., The Shire Hall, Shrewsbury.

RALPHS, William Boyce, now residing at 30, Ayresome Street Middlesbrough, York, lately residing and carrying on business at 2, Mulgrave Road, Middlesbrough as an electrical contractor. Date of hearing, July 19, 9.45 a.m. The Court House, Wilson Street West, Middlesbrough.

Order on Application for Discharge

WEBB, Cecil Robert Golden (trading as Southern Electrical Mechanical Co.), formerly 94, St. George's Road, Brighton, Sussex. Electrical engineer. Date of Order, May 31, 1945.

Notice of Intended Dividend

BOULT, John, residing at 48, Upper Hope Place, Liverpool, and Bolt, John Hugh, residing at 6, Pepper Street, Chester, and carrying on business together in copartnership under the style or firm of "John Boult," at 3, Grosvenor Street, Chester. Electricians. (Separate estate of John Hugh Bolt.) Last day for receiving proofs, July 17, 1945. Trustee, Ward, Arthur Harold, Hunter Street, Liverpool 3, Official Receiver.

Metal Prices

Monday, July 2.

		Price.	Inc.	Dec.
Copper—				
Best Selected (nom.)	per ton	£60 10 0	—	—
Electro Wirebars ...	„	£62 0 0	—	—
H.C. Wires, basis ...	per lb.	9 7/16d.	—	—
Sheet	„	11 1/16d.	—	—
Phosphor Bronze—				
Wire(Telephone)basis	„	1s. 0 7/8d.	—	
Brass (60/40)—				
Rod, basis	„	—	—	—
Sheet „	„	—	—	—
Wire „	„	—	—	—
Iron and Steel—				
Pig Iron (E. Coast Hematite No. 1)...	per ton	£7 13 6	—	—
Galvanised Steel Wire (Cable Armouring) basis 0.104 in. ...	„	£28 5 0	—	—
Mild Steel Tape (Cable Armouring) basis 0.04 in. ...	„	£20 0 0	—	—
Galvanised Steel Wire No. 8 S.W.G. ...	„	£26 0 0	—	—
Lead Pig—				
English	„	£31 10 0	—	—
Foreign or Colonial	„	£30 0 0	—	—
Tin—				
Ingot (minimum of 99.9% purity) ...	„	£303 10 0	—	—
Wire, basis... ...	per lb.	3s. 10d.	—	—
Aluminium Ingots ...	per ton	£85 0 0	—	—
Spelter...	„	£31 5 0	—	—
Mercury (spot) Warehouse	per bott.	£69 15 0	—	—

Prices of galvanised steel wire and steel tape supplied by the C.M.A. Other metal prices by B.I. Cables Ltd.

Photograph by courtesy of the Canadian Official News Bureau

FAMOUS HYDRO ELECTRIC STATIONS

The Chute a Caron power-house and dam is shown framed in the majestic beauty of a North Quebec winter landscape. Situated at Shipshaw on the Saguenay River, this huge project was rushed through by an army of Canadian workmen to enable 1,500,000 H.P. of electrical power to be added to the increasing war effort — this means more aluminium and more planes for the big offensives.

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