THE
ELECTRICIAN

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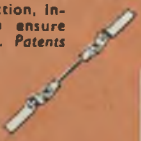
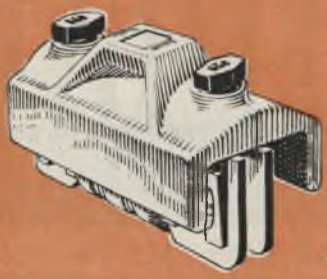
Barrel constructed of special ceramic. Ends precision ground to form perfect bedding for spun-on end caps

Fuse Element of special construction, incorporating patented features to ensure low working temperature. *(U.K. Patents Nos 466525 and 467684).*



Special lattice construction of fuse elements allows full advantage to be taken of arc-quenching properties of graded quartz filling.

Outer end caps, forced on under heavy pressure and electrically soldered in position can be fitted with wedge type contacts *(upper illustration)* or bolted type contacts *(lower illustration).*



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MANUFACTURERS' SUPPLIES SECTION

MISCELLANEOUS ADVERTISEMENTS

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ROYAL TECHNICAL COLLEGE, SALFORD.

Principal: J. E. Richardson, Ph.D., B.Eng., M.I.E.E., A.M.I.Mech.E.

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Salary in accordance with the Burnham Technical Scale, plus war bonus, with allowance for approved industrial experience.

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H. H. TOMSON,
Clerk to the Governors.

SITUATIONS VACANT

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Applications in writing (no interviews) stating date of birth, full details of qualifications and experience (including a list in chronological order of posts held) and quoting appropriate reference number should be addressed to the Ministry of Labour and National Service Appointments Office, Lloyds Bank Chambers, Hobson Street, Cambridge.

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CHIEF CONTENTS OF THIS ISSUE

Technical Education

UNDER the new Education Act it will be necessary to provide part-time training for pupils possessing a wide range of aptitudes and much detailed work will, in consequence, have to be done, not only by educational authorities but also by industry if the best results are to be realised.

So far as the electrical industry is concerned, its technical personnel falls naturally into three main groups in which the duties differ so markedly that any part-time educational scheme must, at its higher levels, have three distinct channels feeding recruits of high standard into the ranks of these principal categories. The first group consists of craftsmen, the second includes technicians, and the third is made up of professional engineers.

The need for a high standard of ability in each of these groups becomes apparent as soon as it is realised that local manufacture has already begun in many overseas countries formerly importing from Great Britain, and that this will continue after the war. Before 1939 the electrical industry had a substantial export business, and to recover and expand this it will be necessary for the industry to manufacture not conventional equipment of the type which can readily be made overseas, but to produce improved apparatus and plant for new purposes, and equipment which is beyond the manufacturing ability of overseas countries. The general standard of craftsmen, of technicians and of professional engineers must therefore be raised, and means by which this may be achieved are given in a report of the I.E.E. Post-War Planning Committee, based on the work of Sub-Committee No. 1, under the chairmanship of Sir Arthur P. M. Fleming.

This report, which will be the subject of a discussion at a meeting of the institution next Thursday, is both thorough and appreciative of the many problems involved, and suggests that there should be a three-year course for a craftsman certificate, followed by a more general course, lasting two years, in workshop administration. For the technicians' group, which includes technical assistants, testers, designer-draughtsmen and erection engineers, it is proposed that the existing course for the Ordinary National Certificate in Electrical and Mechanical Engineering should be co-ordinated as a basic course and that this should be followed, where necessary, by a course in advanced technology of a type which has already been developed by the London City and Guilds.

One of the most important suggestions is that pupils who do well in the first two years of the course for the Ordinary National Certificate should be combined

with those who have reached the standard of a good school certificate in mathematics and physics, and that together these students should enter a two-year course leading to an Intermediate National Certificate, which would be designed to meet the requirements of the Section A examinations of the Institutions of Civil, Mechanical and Electrical Engineers, these courses leading to the Higher National Certificates in Electrical Engineering and kindred subjects.

Importance of Right Courses

THE report is a sequel to the findings published in April, 1943, of the same I.E.E. Sub-Committee, when a number of general principles were put forward upon which future educational developments might be based. Since then the new Education Act has become law, and by raising the school leaving age, first to 15 and then to 16, the Act will eventually result in some measure of secondary school education being within the reach of all young people, and, by requiring employers to release youths up to 18 for one whole day each week, will provide full opportunity for industry to take into its employment personnel suitably trained, and aware of what is expected of them. The designing of appropriate part-time courses, however, is not easy, for it is unlikely that the objective will be achieved with less than three types of courses, and any attempt at compression will inevitably result in failure to provide industry with what is needed. The subject is obviously not only very broad in its scope but so controversial that the discussion next Thursday is likely to result in the raising of new problems, new solutions and, it is hoped, a ventilation of the views of those responsible for the technical training of our youth under the present arrangements.

A New Crystal Palace?

SUBSTANTIAL advance in the scheme for the restoration of the Crystal Palace as a place for education, recreation and the promotion of industry and commerce was announced at the annual meeting of the trustees last week, and the year 1945 may see the production of a design for a Crystal Palace which may well fill the pages of history as interestingly as did the original building. The South London Exhibition, which used to be staged there, had about it an intimacy all its own, and offered to the electrical industry an opportunity of introducing the South London housewife to its various labour-saving devices in a way not always possible at other exhibitions. The tempo was slower, the display area not so vast, because visitors to the stands in most cases lived in the immediate neighbourhood they were less hurried and more attentive, and because they saw their neighbours buying this and that, the desire to possess was stronger than at most national exhibitions. The Crystal Palace was the only place in South London where the exhibition could be staged, and no matter how great the desire to hold another, satisfaction must await either the restoration or the erection of another building.

Lighting Fittings Design

A REPORT of some interest to the makers of lighting fittings is that of a Committee set up to consider how to give practical effect in the light metal and allied trades to the recommendations in "Design and the Designer in Industry," and published by the Stationery Office. Normally, such a report might not attract our attention, but in this instance views are expressed with respect to the part played by the architect in lighting fittings design, which many manufacturers hold to be in agreement with their own. In short, almost all the firms interviewed by the Committee were unanimous in complaining of the trade practice whereby architects dictate the outlines of a design by submitting sketch drawings with their inquiries. The objection to this arises from the fact that the architect produces his sketch in the first place after scanning the trade catalogues of a large number of firms, choosing designs he likes and copying them. This results, in many cases, in the small monopoly enjoyed by a firm in a specially attractive design being destroyed, and is particularly annoying in view of the short term considerations of competition. The practice may in the long run succeed in weeding out a number of designs unattractive to architects, but how far

such weeding out is desirable is a matter for conjecture. It must be pointed out that with industrial designs, as with biological species, survival, while a criterion of success, is not necessarily a sign of moral worthiness.

Reconversion of Industry

THE President of the Board of Trade has made it known that it is the aim of the Government to make the transition from war to peace as smooth as possible, and to that end his department is entering the regions now operated by the Ministry of Production, and will in due course assume the dominant role. In this connection it should be understood by all those who share in the responsibility of releasing industry from its war-time fetters, that the process of transition must not only be smooth but speedy, if we are not to be outpaced by our competitors. Controls are accepted as a necessary measure in the successful prosecution of a total war, but when international trading again becomes possible, those countries whose industries still operate under the control system will be at an enormous disadvantage compared with those countries where control has been withdrawn. As it is, British industry is already at a disadvantage when competing against American manufacturers, for not only is there less control in the U.S.A. but the man-power and industrial capacity of that country are by no means as absorbed in the production of war equipment as are their counterparts in this country.

Lectures and Showmanship

THE lecture which Mr. R. GILLESPIE WILLIAMS delivered at a meeting of the Illuminating Engineering Society on Tuesday had about it an attraction not often met with in the lecture theatre. The purpose of the lecture was to deal with the use of light to impart character and to emphasise certain aspects of objects and people. This the author did with the able assistance of lady models and draperies, introducing into the lecture an appreciation of showmanship and the value of demonstrations. The electrical industry offers an amazingly large number of opportunities for illustrating lectures with demonstrations, and though many speakers make the most of these possibilities, many more could do so. The cause of lighting was well served by Mr. GILLESPIE WILLIAMS' talk alone, but supported by the practical examples, his instruction was more easily understood and will be longer remembered.

Servicing of Buildings

TWO reports reviewed this week deal with the lighting and servicing of buildings respectively, of which the first is perhaps the more interesting, in that it includes the results of interviews with housewives as to their lighting needs in the home. Known as Study No. 12, and issued by the Ministry of Works, it gives among other things, some appreciation of the reactions of the average woman to the comfort which good lighting offers, how the family income governs the amount of light used, and what are generally considered the lighting hopes of the future. The second report, though it also touches upon lighting, is concerned with business premises and includes recommendations regarded as essential to good electrical servicing. Both reports are more constructive than critical, and both deserve careful study by those responsible for installations designed to meet future needs. The controversy which exists in the industry with respect to what is, and what is not, adequate installation, appears to be as lively as ever, and the two reports in question may assist in reaching some decision acceptable to the majority.

Edmundson's Plant Extensions

IN accordance with the direction given by the Central Electricity Board, Edmundson's Electricity Corporation propose to make a start on the extension of their station at Stourport. The extension will comprise a boiler of evaporative capacity of 525 000 lbs. per hour, and generating plant of 60 000 kW. It will be remembered that the Edmundson's Group recently announced development plans costing £15 000 000, and since the Group is responsible for supplies in a considerable rural area, and its development programme is designed to attract to its distributive network those who work on the land, the extension at Stourport may be said to be the first step. As the development programme advances, further extensions and the erection of new stations may be expected.

Electrical Exhibition at Oxford

Joint Display of Post-war Kitchen Arrangements

AN exhibition of an all-electric post-war kitchen, arranged jointly by the City of Oxford Electricity Supply Department and the Wessex Electricity Company was opened at the city's showrooms in George Street, Oxford, on January 5. In association with the exhibition, a questionnaire is being issued, for which prizes of electrical appliances are being offered.

Part of the kitchen exhibited

The Mayor of Oxford, Councillor R. P. Capel, who presided at the opening ceremony, stated that the chief aim of the exhibition was to put before the public an example of a modern, up-to-date, labour-saving kitchen, designed to make electricity do the work. Illustrating the growth of the use of electricity in the City of Oxford, the Mayor said some twelve years ago electric cooking and heating were almost unknown in Oxford; to-day 9 000 electric cookers and 7 000 water heaters were in operation.

Capt. the Hon. Quintin Hogg, M.P. for Oxford City. in declaring the exhibition open, said that though the exhibition showed all kinds of things which made Aladdin's lamp look out of date—there was, alas, nothing as yet to sell. Not long ago a controversy, originated in Oxford, as to whether a housewife was entitled to wages or not at the expense of the husband. He was not going to be enticed into pronouncing on so delicate a matter, but he was certain that wives had the right to demand that husbands should mechanise their kitchens as far as possible.

The kitchen is intended as a practical suggestion and in the general arrangement every endeavour has been made to ensure that the kitchen is easy to run. The principle of unit cabinet and cupboard construction has been adopted throughout, and the cabinets are arranged from ceiling level to floor to obviate dust accumulation. Adequate toe space has been allowed at the bottom of each unit and magnetic catches are fitted to all cupboard doors.

At the rear of the various working tables are switch socket outlets for connecting the various kitchen accessories, such as the electric kettle, toaster, mixer, etc. An electric clock is mounted on the door of the electrical appliance corner cupboard and a cooking time signal can be added when available.

A small radio receiver is installed for the benefit of those using the kitchen. On one side of this receiver a book shelf has been made available for cookery and other instructional books. On the other side a

Some of the appliances displayed

space is utilised for the telephone to which access can also be obtained from the dining room when required.

The kitchen includes drying and airing cupboards fitted with electric heating; a kitchen unit with U.D.B. electric wash-boiler and washing machine; a horizontal type cooker with accommodation for utensils, or, alternatively, this cooker unit can be replaced with an upright cabinet model cooker with additional cupboard space; a " Peoples " refrigerator, 4 cu. ft. capacity, built-in and lining up with the cupboards; a telephone and wireless set; a large cupboard for storage of cleaning accessories including the vacuum cleaner, brushes, etc.; wall storage cupboards, and specially fitted corner cupboard for small electrical appliances, etc. Three extractor fans are fitted, one over the cooker, one in the window over sink and one in the drying cupboard. The lighting of the kitchen is by means of three 80 W fluorescent lamps fitted in the ceiling and two panel heaters are provided for heating the kitchen.

Among the appliances displayed are a cabinet model cream and black 3-plate cooker and a cream and green washing machine with wringer, by the English Electric Co., Ltd.; a Westinghouse dish-washer; a Hotpoint washing machine; a Burco wash-boiler; a Heatrae wall mounting water-heater; Santon and Berry under-the-draining-board heaters; a Hotpoint display showing immersion type water-heater with lagged tank; and G.E.C. and Revo cookers.

Uprating of Plugs

By " SUPERVISOR "

WITH all the optimistic outlook in the international sphere for 1945 and the natural hopes associated with a New Year, one trough of deep depression remains—the chaotic state of the installation trade in this first month of the year. For over two years our planners and reconstruction committees have been working at high pressure—with what result? It is fair to say that not one decision of any far-reaching nature has yet been obtained. Ideas abound in plenty, ring mains and room circuits, new plugs and sockets, new wiring systems, etc., all have received attention from appropriate committees; but not one single mouse has emerged from these mountains in labour.

The depression is deepened by information received from at least two usually reliable sources—as the newspapers say—to the effect that the long-heralded new socket and plug is to be nothing more than our old friend the 5 A socket and plug, uprated to 10 A. Whether this is to have a fused plug or not seems still on the knees of the gods, but it is hoped that it is not yet too late to urge upon the powers that be, to think again and think well before reaching any hard and fast decision on this point. Probably why we make no progress is just this fact, that no sooner is some settlement or other mooted on any one point, than there is always somebody ready and eager to say " No, don't do that, do this."

The uprating of the 5 A socket and plug appears so blatantly the wrong thing to do that we should certainly pause before making any serious mistake. Decisions on sockets and plugs made now will tie us for ever, as no similar chance to revise our ideas, and with them our standards, will arise. This is an unique opportunity for making certain that our post-war practice will definitely eliminate the deficiencies of the past, and will more efficiently meet the new methods proposed for the future. Can it be said that the putting of a double amount of new wine into the old bottle of the 5 A socket will in any way contribute to this end?

In the first place, a 10 A socket and plug will be inadequate for the purpose. Whilst few of the rooms found in the smaller houses require 3 kW for heating, it is commonplace to provide a 3 kW radiator for this purpose. This permits the initial quick heat so desirable in some cases, and with the attainment of a working temperature the radiator can be at once cut to 2 or even 1 kW. Is this feature to be limited by reason of the new socket and plug—a case, if ever, of the tail wagging the dog?

Competition with gas will be intensified after the war, and we shall be presenting the enemy with an initial advantage in thus restricting our own application of quick heat. It is considered that nothing less than a 3 kW socket and plug should even receive consideration as a post-war standard, and apparently the Committee responsible for Study No. 11 had reached the same conclusion. Who, then, are the elusive " they " who are now reaching diverse decisions? The two manufacturers to whom I referred as the source of my information will commit themselves only to " the authorities concerned "; surely we are all concerned in a decision of this kind.

Very few of the existing sockets and plugs, ostensibly to BSS 456, will stand uprating to 10 A, as may be ascertained from the simplest tests. New designs are

necessary if the ring main proposal is to receive approval, for at least three 7/.029 cables must be accommodated in each terminal. One manufacturer has informed me that but for uprating, the old design remains the same, from which it appears that we may also bid farewell to the ring main; this, if true, will prove another handicap in the post-war extension of electrical services.

Position of Fuse

It is not known if the uprating proposal contemplates a fuse in the plug or not, but practically no designs of 5 A plug have room for fuses. With uprating to 10 A any such fuses must be adequate for 10 A, with substantial clips and contacts—something very different from what is now known as a fused plug, and which usually permits a small load to be taken from a large plug. This again explains part of the depression felt. As with the uprating of the 5 A socket fused plugs, an essential feature of the ring main, with the ring main proposal itself, recedes into the far distance.

Chaotic conditions in existing installations will certainly arise, with some sockets and plugs suitable only for 5 A, whilst others indistinguishable from them, and interchangeable with them, will be adequate for 10 A. It is understood that this is one of the reasons why the E. C. A. representatives on the Study Committee so rigidly opposed the uprating of the 5 A socket. It is inconceivable that some fused and some unfused plugs should be available for use on the utility ring main, and this in itself would sound the deathknell of ring mains. Is BSS 546 worth saving at this cost?

The same indecision exists in connection with fuses. As is well known, there have been strong representations in favour of the cartridge type of fuse for the past few years, intensified in view of improved post-war practice over the past two years, but there is no standard for cartridge fuses. It is understood that the first meeting called to consider cartridge fuse standardisation met on December 20, 1944, less than one month ago, and we all know only too well how long it takes to reach finality on standards. If we see a standard cartridge fuse within one year, this should also be the earliest date upon which we can standardise a fused plug, assuming that it can wait for the standard fuse.

To the ordinary electrician it seems inexplicable that so vital a matter can have been deferred until so late in the day, especially as committees of various kinds have been sitting for the past two years in consideration of matters purely electrical. In spite of the fact that we are still installing sockets and plugs to BSS 546, we have been looking upon these as obsolescent for the past year or so. The industry will have to continue under these conditions for some time to come yet, apparently, and the knowledge shakes one's faith in the powers that be. It has been said that if Moses had been a committee, the Children of Israel would still have been languishing in Egypt; I could not agree more.

And yet—in spite of the hard things said about committees and ruling bodies—if the uprated 5 A socket and the loss of the ring main are eventually imposed upon the industry, then the installation side will have only itself to blame. An opportunity arose a few weeks ago for the expression of views, and the wiring section had every chance to say what it wanted, and what it did not intend to accept. But the opportunity was missed in the utterance of the old platitudes, the pattings on the back, and the hope that nobody, especially manufacturers, would be disturbed more than could be helped. The term " vested interests " has been badly overworked, and in any case it does not seem really applicable to the electrical industry; but at the same time some sections seem to exercise an unwarranted pull in matters of this kind.

Anyway, we commence 1945 in a bigger muddle than ever before, and it seems time that some real decisions were reached. Peace may, happily, descend upon us unexpectedly, and we should have everything straight, well before then. These are simple questions, not approaching in magnitude the matter of voltage standardisation, and a quick answer should be forthcoming.

COVENTRY ELECTRIC CLUB

The Coventry Electric Club held its sixth annual general meeting on January 2 at the electricity showrooms after enjoying a high tea. Mr. F. W. Godden, chief electrical engineer and manager, was returned unopposed as president for the coming season, and the following officers were also elected: Vice-president, Mr. G. S. Nott; hon. treasurer, Mr. H. Sayce; and hon. secretary, Mr. F. N. Crabtree. The new committee appointed by ballot consisted of Mr. G. R. Marson, Mr. F. C. Dain, Mr. J. W. Dainty, Mr. H. K. Houghton, Mr. F. L. Flinn, Mr. A. Heelis.

" Lets Have a Party."—With these words the current issue of the E.A.W. folder " Cheerful Rationing," introduces arrangements and recipes for a cold buffet, including Norwegian prune pudding, ice cream and marzipan fruits, and finishes up with a series of dishes which have been tested in the housecraft school. The fuel hint for the month reminds readers " that two bars of an electric fire use 12 lbs. of coal in 4 hours. Use only one bar."

What Manufacturers are Doing —III

Outstanding Work During 1944—Equipment for U.S.S.R.

IMPROVEMENT of design-details and standardisation of components and products brought about by A. Reyrolle and Co., Ltd., resulted in economies in materials and labour. An outstanding

Part of consignment of medium voltage distribution switchgear supplied to the U.S.S.R.

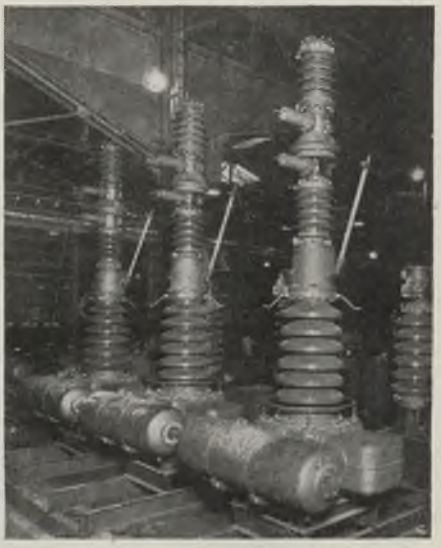
event was the commissioning, during the year, of 66 kV air-blast switchgear, while other orders for air-blast switchgear, including some for 110 kV and 132 kV units are in hand. For normal breaking-capacity ratings the circuit-breakers have single

33 kV, 1 500 MVA switchgear

turbulators, but for the higher ratings duplex turbulators are used.

Orders for power-station switchgear and equipment rated up to 33 kV and 1 500 MVA were executed during the year, while the company's range of metal-clad switchgear with horizontal-draw-out circuit-breakers for voltages from 3.3 to 33 kV and with ratings from 75 to 1 000 MVA continued in demand.

A 75 A type GET contactor for motor-starting was added during the year to HH



110 kV air-blast switchgear during assembly

switch-and-fuse distribution-gear, orders for which were well maintained, and substantial quantities have been supplied to shipyards for a.c. welding and other purposes.

Marine work still in progress includes control-gear and motor-boosters for a number of electrically-propelled 10 000-ton single-screw vessels, the control-gear being both a.c. and d.c. for the main and emergency generators, the propulsion-motors, the motor-boosters, and the turbine-governor.

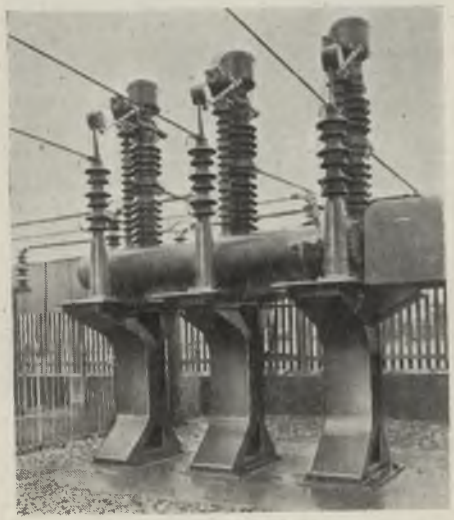
For an important 22 kV terminal switching-station in Victoria, Australia, 27 units of 750 MVA horizontal-draw-out compound-filled metal-clad indoor switchgear are under construction, a novel point being the requirement for physical and electrical sectionalisation into five parts.

A notable success has been achieved in

Southern Rhodesia, where the three existing major power-stations are equipped with Reyrolle switchgear of various sizes, the Electricity Supply Commission having given the company a contract for all the switchgear required for their new power-station.

High-voltage outdoor circuit-breakers have played an important part in the company's activities in Australia, outstanding equipment being quantities of 66 kV, 1 000 MVA and 132 kV, 1 500 MVA pneumatically-operated small-oil-volume switchgear.

A large quantity of switchgear was supplied to the U.S.S.R., including 400 units of 6.6 kV flameproof mining-switchgear, rated at 30 MVA and 50 MVA, as well as 100 units of 6 kV, 250 MVA horizontal-draw-out compound-filled metal-clad, indoor switchgear for general distribution work. In addition, power-station switchgear was supplied for 12 000 kW and 25 000 kW plants, including 115 kV, 38 kV, 10 kV, 6 kV and 400 V switchgear-units of



66 kV air-blast switchgear

several sizes, together with the control-boards and complete automatic protection.

Over and above special war-time activity, the company have made shipments to New Zealand, India, and the Union of South Africa, to a degree comparable with their pre-war magnitude.

The increased facilities for turning out the established range of fully-flameproof products were heavily occupied, and as a result of intensive efforts it was possible actually to increase the output. A starter-panel, designated as type GAB, is now available, in association with a protector circuit-breaker, for the local or remote-control of coal-cutters, conveyors, and the like, and its compactness has been achieved without any sacrifice of safety. Pillar-type switchgear with internal earthing-contacts continues to be in great demand, and the range of flit-plugs has been extended by the inclusion of a 60 A standard.

The continued study of protection problems, and the standardisation of schemes and extension of range, marked another year of progress. The particular requirements of machine and system protection for the U.S.S.R. were met by adaptation of existing relay designs and circuit-arrangements.

Orders for a.c. variable-speed commutator-motors were substantially greater during the year, and there are indications that the increase will continue. It is anticipated that increased production-facilities can be made available when conditions permit, particularly for electrical driving-equipment for the printing industry.

The company's multi-operator a.c. transformer arc-welding plant, added to the already established welding-range, was well received, and orders were mostly for six-operator and twelve-operator sets.

SOUTHEND-ON-SEA STATISTICS

In his report on the Southend-on-Sea electricity undertaking for the year ended March 31, 1944, Mr. A. C. Johnson, borough electrical engineer and manager, said the income from the sale of electricity was increased by 15 per cent. over the previous year. The expenditure in excess of income for the year was £28 418 as compared with £58 215 in 1942-3, bringing the aggregate amount charged to the rates to £99 874 since the declaration of war. At March, 1944, the undertaking's outstanding debt, which in 1939 was £866 000, had been reduced to £637 000. 4 183 consumers were disconnected and 7 677 consumers were connected to the mains, bringing the total connections to 32 312. The number of sub-stations remained at 120, as in the previous year. The number of units purchased was 50 273 000 (43 171 000), units generated 849 000 (201 000), and units sold, 45 566 000 (39 383 000). The revenue from 24 027 374 (19 824 751) units sold under the domestic tariff was £138 962 (£113 132) at 1.39d. (1.37d.) per unit; business tariff, 11 354 163 (10 270 589) units, £89 907 (£78 614) at 1.90d. (1.84d. per unit) and power, 9 777 903 (8 909 696) units, gave a revenue of £47 111 (£43 442) at 1.16d. (1.17d. per unit), giving a total of 45 159 440 (39 005 036) units with a revenue of £275 984 (£235 188) at 1.47d. (1.45d.) per unit. The revenue from .406 278 (378 256) units sold outside the borough was £2 739 (£2 515) at 1.62d. (1.60d.) per unit, before deduction of discounts.

Training for Engineers

I.E.E. Report on Part-Time Further Education

THE report to the Council of the I.E.E. from the Post-War Planning Committee, on " Part-Time Further Education at Technical Colleges, including courses for those returning from the Services," is to be discussed at the meeting of the institution, on January 18. A first report on " Education and Training for Engineers " was published by the authority of the Council, in April, 1943.

This second report of the series, as its title indicates, deals primarily with part-time courses at technical colleges; it does not deal in detail with work at universities, or other full-time courses, which provide the principal channels for the further education of the professional group, nor does it deal with the practical training of engineers. Its main purpose is to develop, more fully than was possible in the first report, recommendations concerning part-time further education, which must play an important part in the preparation of all grades of personnel for the engineering industry.

Three Groups of Personnel

It is proposed in this report that the system of part-time education should be developed to provide for the needs of the three main groups of engineering personnel. A prominent place in this system should be allocated to courses for craftsmen; other courses would provide the necessary education for technicians, and a further group of courses would serve the needs of those future professional engineers who for some reason are unable to take the normal university course. These steps would necessitate an extensive reorganisation of technical education, and a possible method of development is suggested. The full benefits of these proposals, it is stated, will not be realised without proper provision for the supply and training of technical teachers. The need should be adequately met by putting into effect the recommendations of the McNair Committee concerning the provision and training of teachers for technical colleges. Industry must be prepared to recognise and accept its full responsibilities in these matters.

These developments in technical education should be accompanied by corresponding improvements in the practical training of apprentices, and it is hoped to deal with this subject in one of the later reports in this series.

The problem of the provision of further education for electrical engineers returning from the Forces, and the organisation and grouping of technical colleges and their functions under the new system are dealt with.

It is suggested, not so much that the existing arrangements have failed to produce many excellent men, but rather that it is imperative to raise the standard of the average man to as high a level as possible. In addition to widening the knowledge of the professional engineer and increasing the skill and dexterity of the craftsman, it is essential that the general standard of design staffs and the knowledge and technique of those supervising factory production should be raised. There is also a need for a highly qualified class of overseas sales engineers to explain the engineering features and applications of new developments, to assess the need for the adaptation of apparatus to suit local requirements and even to design that adaptation.

It is doubtful whether those entering the three chief groups of engineering personnel through part-time courses could receive the education best suited to their needs if any overlapping of the courses were adopted. Such a policy would inevitably lead to a subordination of the correct objective in each individual group, and would diminish the advantages to be derived from the national part-time educational system. The aim should be to provide all individuals with equal opportunities to develop their own abilities to the fullest extent; the achievement of this objective would be impeded by any combination of groups, as this would result in compromise courses unsatisfying to all except individuals on the borderlines of the groups.

Higher Standards and Improvements

The need which has been emphasised above for a close adaptation of the courses to the needs of the three separate groups must become more apparent when it is recognised that three main objectives must be attained, the raising of the standards for all, more thorough teaching of fundamental subjects for some, and improvement of the technical courses for others. It is realised that this concept brings with it a heightened interweaving of the already complex pattern of the courses afforded by a technical college; but the need is pressing, and its remedy must prevail. There should not, however, be complete isolation of one course from another; " escalation " or interchange between different courses and between part-time and university schemes must be facilitated.

The professional engineering institutions

are in close touch with the needs of the industries to which they are related, and their councils endeavour to frame their requirements for corporate membership so as to encourage in the various teaching institutions those methods of education and training which will provide the professional man with the mental equipment which will enable him to make the maximum contribution to the welfare of the community.

The steady development of the science and practice of electrical engineering and the broadening of its applications require a corresponding effort to widen the basis upon which the education of the professional engineer is founded. There is also a need for providing more specialised knowledge in the advanced stages. There has been a steady improvement in the methods of education and training during the last twenty years, but the time seems to have come when the future of the electrical industry in this country requires that definite reforms should be introduced. The impending revision of the whole educational system of the country affords an opportunity for taking such steps as are necessary.

The Council of the institution have frequently expressed their intention to broaden the foundations and to raise the standard of education for professional electrical engineers, and they have given effect to these views in the revision of the Regulations for the Associate Membership Examination, which will come into effect in October, 1945. Under the new scheme, the examination will be divided into two parts, Section A and Section B. Section A consists of five compulsory papers in the basic subjects of engineering science and in English, while Section B consists of a general paper in electrical engineering and a special paper in one of the major branches of the subject.

Effect of the War

The industry has been seriously starved of professional engineers for the past five years. There are at the present time over 2 500 graduates and students of the institution in the Services. Had it not been for the war, the majority of these would have been in appropriate positions in industry; as it is, they are at many different stages both in their technical education and in their practical training. Their absorption or reabsorption by the industry will probably be limited more by the available facilities for further engineering education and training than by the immediate post-war production requirements of the industry. Many of the men concerned will have domestic and other commitments, and it is very desirable that an adequate scale of allowances should be made in order that candidates may have the choice to enter the profession by that route which offers them the best opportunities.

Many men will have been drafted to the Forces immediately on completion, and even in the middle, of their educational schemes; few of those with whom we are concerned will have had any contact with industry. Before starting their practical training in industry they should receive short-term refresher courses, which might be provided during the period of waiting for demobilisation. Such courses would act as filters in which the men could be sorted into their appropriate grades and by which the flow to industry could be regulated. The courses would be required at different levels, and each might be arranged to last 2 or 3 months. It is possible that three courses would be sufficient.

Loch Sloy Inquiry

THE inquiry into objections against the North of Scotland Hydro-Electric Board's Loch Sloy project ended on Jan. 4, when the Commissioner conducting the inquiry, Mr. John Cameron, K.C., announced that he would submit his report on the evidence to the Secretary of State for Scotland at an early date. The proceedings were devoted to addresses by counsel—Mr. R. P. Morison, K.C. (for the Hydro-Electric Board); Mr. L. Hill Watson, K.C. (Dumbarton C.C.); Mr. J. F. Gordon Thomson (for the Clyde Valley Regional Planning Advisory Committee), and Mr. A. B. Salmond (on behalf of a private objector).

Mr. Hill Watson contended that water needed for domestic and industrial purposes should be given first priority. On Dumbaron County Council's computation it would eventually require all the Loch Sloy water, and possibly even more, to meet future industrial and domestic.

The Cooper Report was not the Hydro-Electric Board's policy. The whole basis of the Board's arguments as regards costs was entirely in the realm of speculation, and its experts did not even agree among themselves as to costs.

Mr. J. F. Gordon Thomson discussed the question of amenities, and urged that in any scheme architects should be consulted and their advice taken.

Mr. Andrew Salmond pleaded for consideration of the rights of private land owners.

Mr. Morison submitted that the Board had established that Loch Sloy was essential for the production of electrical energy. It was an admirable choice. Rural areas could not stand economically on their own feet, and Sloy would enable the smaller areas to reap advantages which they could not obtain on their own.

Lighting of Buildings

Recommendations for Practice in Post-war Installations

UNDER the title of Post-war Building Study No. 12, obtainable from the Stationery Office (2s. 6d. net), the Committee on the Lighting of Buildings, which sat under the chairmanship of Dr. C. C. Paterson, have issued a report which warrants the careful study of everyone in the industry concerned with illumination.

The terms of reference of the committee were briefly to review existing information and practice, to make recommendations for post-war practice, and to make such recommendations for future research as suggest themselves. The following are the main conclusions :—

While the fundamental principles of lighting, are well established, the knowledge of these principles is not sufficiently widespread and has not been put to full use in general practice.

The lighting of many dwellings and schools is unsatisfactory, due very largely to the lack of recognised standards and means for their adoption. This has been shown very clearly in the case of dwellings by the results of lighting surveys and steps should be taken to ensure a wider understanding of available information on lighting.

The training of illuminating engineers should include suitable instruction in building practice and design and efforts should be made to give the general public a better opportunity of appreciating the importance of the provision and maintenance of sufficient and suitable lighting. Teaching in schools and colleges should include instruction on the need for care of the eyes and the value of good lighting. Fittings for sale to the public should conform with the requirements of a code of practice or specification containing details of the distribution and output, which would enable the buyer to judge of the performance of the fittings as well as of their appearance.

Legislation for Good Lighting

Standards of lighting, both natural and artificial, should be laid down for various classes of buildings, and in particular recommendations are made for dwellings and schools. The appropriate authority should consider the administrative means and regulations by which inadequate natural and artificial lighting in houses and flats may be prevented. This might be done by ensuring that powers such as those given by the Housing Act, 1936, are applied to all dwellings. In interpreting the meaning of adequate lighting, standards not less than the minima suggested in the report should be adopted.

Satisfactory artificial lighting of dwellings built for sale or to let should be ensured by a complete installation at the time of building, and this should include suitable fittings of prescribed performance, together with lamps of the correct sizes. The continued use of reasonable intensities with such installations would in many cases depend on the availability of low price electricity supplies.

School Lighting and Eye Strain

Good lighting in schools is essential to the efficiency and comfort of both pupils and teachers, and since schools are buildings used compulsorily by the whole community, some form of control seems well justified and should be instituted for all schools, whether state-aided or otherwise. The high incidence of eye defects in school children is a matter of grave concern. In the absence of an analysis of the relative importance of various possible causes for these defects, good lighting should be regarded as at least a necessary form of insurance.

Recommendations are made in the report for minimum standards for both natural and artificial lighting, and possible solutions for single-storey schools are suggested. For multi-storey schools, the problem is difficult with classrooms of normal size and depth except as top floors. If, with the proposed reduction in numbers of children per class, somewhat shallower classrooms could be used for future schools, the problem would be much easier. In certain cases it may be necessary to rely upon artificial light to supplement daylight. The artificial lighting of schools should be designed by qualified lighting engineers. At certain times of the day there may be a need for supplementing daylight in the least well-lit parts of some classrooms, and in such cases it is recommended that the artificial lighting be designed for admixture with daylight, and that switching be arranged so that such light can be provided as required.

The committee have included in the report the results of recent investigations regarding lighting and they recommend that these studies should be continued. They consider that the admixture of natural and artificial light should, in view of the possibilities opened up by new artificial sources, be examined; in particular, the value of illumination by artificial light which is to be mixed with day-

light. Considerable further study is desirable of the problem of artificial light-source brightness in relation to comfort, health, and efficiency under different durations and other conditions of exposure. Certain claims are made as to the usefulness of diffusing and re-directive glasses and the committee would welcome a full study which would make possible an assessment of the value of such glasses. They have noted the high proportion of children developing eye defects during school life and have pointed out that it is not at present possible to say what factors are responsible. They consider that research on this is urgently required and make certain suggestions for the improvement of lighting in schools. They suggest, too, that an inquiry be made into the possibility of carrying out an investigation of the effect of lighting on the work of school children.

Housewives' Reaction to Lighting

The report includes a number of interesting appendices based on an inquiry among housewives as to what they thought about artificial lighting in relation to the main activities in the home. The inquiry was concerned with, among other things, a detailed analysis of the artificial lighting of the main downstair rooms. This included the size of the lamps, their position and the type of fitting, the dimensions of the rooms, and the colour of the walls and ceilings. The amount of light in the main working positions was measured with a light meter. The influence of cost of electricity on the amount used was studied. How well the housewife thought she could see when doing her housework by artificial light, and how well she thought the children could see when doing their homework by artificial light. Whether or not there was direct daylight at the main working positions in the scullery, kitchen, living room, and parlour. How well the housewife thought she could see when doing her housework by daylight, and how well she thought the children could see when doing their homework by daylight. To what extent it was necessary to supplement daylighting by artificial lighting.

The most striking result of this inquiry was the small wattages found in the scullery or working kitchen; almost all had less than 75 W and a third had less than 25 W. The other rooms had more powerful lamps, but the rooms were larger and in many cases the fittings absorbed some of the light. The size of lamps was significantly larger in the higher income groups.

An analysis of watts in relation to housewives' views about their ability to see showed that although at every point there are housewives who say they can see well in spite of the very small amount of light, in general, the higher the watts the greater is the proportion who are able to see well. A similar analysis of watts per square foot showed that 44 per cent. of scullery or working kitchens, 54 per cent. of kitchen living rooms, and 56 per cent. of sitting rooms had less than half a watt per sq. ft. The analysis taking account of size of rooms showed that householders often failed to use more light in larger rooms.

Effect of War on Lamp Sizes Used

About one-third of the households were using lamps of less power than before the war. This has produced a marked difference in their lighting measured in watts per sq. ft. The main type of fitting used was the direct fitting. The type of fitting which obscures the lamp is found more in the sitting rooms or parlours than elsewhere, and more in the higher income groups than in the lower. The proportions having more than one lamp was greater in the highest income group than in the two others.

In the scullery and working kitchen, two-thirds of dwellings had a utilisation factor higher than .4, in the kitchen living room the proportion was four-fifths, and in the sitting room or parlour the proportion was about three-quarters. The falling off in the sitting room or parlour is probably due to the use of fittings which obscure the lamp, as there were no very great differences in the proportions having light and dark walls.

The most striking feature of the tests made with the light meter was the fact that of the main working position of the scullery or kitchen, only in the case of the kitchen living room table and the fireplace position was there a considerable proportion of dwellings with 5 f.c. or more. At the sink and cooker a very large proportion of housewives had less than 1 f.c., and the proportion having this amount of light was quite large at the scullery table. The lighting of the sitting room fire position was much better, over half having more than 5 f.c.

There were no very great differences between houses and flats or between pre-war and post-war dwellings, nor was there any marked differences between the income groups.

The analysis by cost of electricity did not show the same tendency as the analysis of watts per sq. ft., probably due to the fact that these working positions are very near the centre of light.

The average meter readings at each of the main working positions showed that housewives who could see well had more light than those who said they could see all right or badly, although within each group there was a wide range in the amount of light available.

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.

An interesting ceremony took place recently in the canteen of the Brush Electrical Engineering Co. Ltd., when long service certificates were presented to 32 employees who have left the company's service during the past 2 years, and whose aggregate length of service represents the total of 1 295 years. The record is held by Mr. John Edward Grey, who, before his retirement had been employed by the company for 54 years, but he had good runners-up in the persons of Messrs. William Fowler and Arthur Gent, each 53 years' service, followed closely by 7 others with an individual record of more than half-a-century. The presentation of the certificates was carried out by Mr. Alan P. Good, managing director, and other directors also present at the ceremony included Mr. M. A. Fiennes, Mr. H. E. Good, Mr. D. B. Hoseason, Mr. H. E. Midgley, Capt. R. C. Petter, and Mr. P. C. Sharp, the company's secretary. The following are the names of the recipients of the certificates with their length of service: Mr. J. E. Grey (54 years), W. Fowler (53), A. Gent (53), E. R. Watson (52), T. Clarke (50), C. T. Neild (50), W. Bowley (50), H. W. Rowett (50), J. H. Freeman (50), H. Clarke (50), E. A. Minton (46), W. H. Howard (45), H. Priestley (44), L. Birkin (44), J. Harris (44), A. J. Lomax (44), G. Simmons (43), H. Widdowson (42), T. Unsworth (42), G. W. Robotham (41), J. R. Tilley (40), A. Brooks (39), T. Crisp (39), W. E. Ashbourne (37), W. W. Mills (35), S. Price (35), R. Hicking (31), H. Brooksby (25), Mrs. F. Fowkes (24), C. Smith (22), W. Barrett (20), G. W. Simmonds (20). These old employees were entertained to luncheon during which a concert was given by the work's choir (choir-master, Mr. W. Webb) and the Brush Military Band conducted by Mr. J. Payne, late deputy bandmaster of the R.A.F. Central Band. The soloists were Miss J. Allen (soprano) and Mr. Roland Whensley (tenor). In addition to the award of certificates as mentioned above, 17 long service certificates are being presented to the next-of-kin of long service employees who have passed over, and whose names are as follows: J. H. Chambers (45 years), J. Black (42), J. Smith (42), J. Amey (41), W. Talbot (40), H. V. Standring (38), H. Whelband (36), C. H. Fraser (36), H. G. Tyler (36), A. Walker (35), J. West (35), H. Clarke (31), H. Cornes (29), G. H. Luff (24), F. W. Kidger (23), J. W. Goddard (22), J. C. Bailey (20). This total service represented 592 years.

Apart from the fact that his name appeared in last week's New Year Honours List as a Knight Bachelor, **Dr. A. P. M. Fleming** is in the news this week as a result of the publication of the second report on Education and Training for Engineers, by the Education and Training and Personnel Sub-Committee of the I.E.E., of which he is chairman. Dr. Fleming who is director of research and education at the Metropolitan-Vickers Electrical Co. Ltd., and a director of several companies engaged in the manufacture of electrical insulators, paper, etc., was educated at Finsbury Technical College, London. After gaining experience at the Westinghouse Electrical Co., Pittsburgh, he joined the British Westinghouse Co., now the Metropolitan-Vickers Electrical Co., with which latter he has been asso-

The aggregate service of this group of employees represents 1 295 years of employment with the Brush Electrical Engineering Co., Ltd.

ciated since 1902. Dr. Fleming created both the research and education departments of his firm, and his contributions to both are well-known in the industry. For work on submarine detection, the O.B.E. was conferred on Dr. Fleming in 1918, and the C.B.E. in 1920. Dr. Fleming was one of the pioneers of broadcasting in Great Britain for the first Manchester broadcasting station was organised and conducted in the Metropolitan-Vickers research department in 1922. For his work in education and research, the University of Manchester conferred the Honorary Degree of M.Sc. (Tech.) and the University of Liverpool, that of D.Eng. Dr. Fleming holds the Faraday Medal of the I.E.E., and the Hawksley Medal of the Institution of Mechanical Engineers. He was president of the I.E.E. for 1938-9 and president of Section L of the British Association for the Advancement of Science, 1939.

Included in the second section of the New Year Honours List were the following awards: O.B.E., Mr. F. Smith, general manager, M.O. Valve Co. M.B.E., Mr. H. R. Angell, superintendent, rectifier department, Westinghouse Brake and Signal Co., Ltd.; Mr. W. Bird, chairman, St. Albans District Committee, Ministry of Production Eastern Regional Board; Mr. S. H. Browell, works director, A. H. Hunt, Ltd., Mr. H. F. Buckmaster, technical director and works manager, McMichael Radio, Ltd.; Mr. G. Casemore, lately telephone manager, Tunbridge Wells, G.P.O.; Mr. W. F. J. Dowley, shop superintendent, aluminium refining, Enfield Rolling Mills (Aluminium), Ltd.; Mrs. E. L. J. Gamhazzie (Miss O'Keefe), confidential secretary to general manager, Telegraph Condenser Co., Ltd.; Mr. W. A. Henley, production manager, Tubes, Ltd.; Mr. J. H. McFarland, manager, electrical department, Cammell Laird and Co., Ltd.; Mr. A. G. Newman, assistant inspector, wireless telegraph section, G.P.O.; Mr. H. C. Perry, assistant chief engineer, Normand Electrical Co.; Mr. R. G. Powell, development engineer, Decca Radio and Television, Ltd.; Mr. J. McGregor Sinclair, managing director, A.1. Electric Welding Machines, Ltd.; Mr. H. S. Walker, head of valve department, B.B.C.; Mr. K. McIntosh Whyte, production manager (Bradford factories), General Electric Co., Ltd.; Mr. J. Wooldridge, cable works manager, Johnson and Phillips, Ltd.

At a meeting of Bolton Council on January 3, it was made known that **Mr. H. E. Annett,** electrical engineer, had declined to accept remuneration of £3 000 in respect of extensions to the Back o' th' Bank power station. It is understood that Mr. Annett reached his decision because of prolonged controversy over the matter, and of comments which he, as an official, had been unable to correct. He has, however, expressed the hope that his decision will not prejudice the amounts approved for the others concerned with the extensions. In the circumstances, he is reported to have stated he does not feel justified in shouldering the responsibility of carrying out the extensions to be completed by 1946, as directed by the Central Board.

Sir Ernest Benn, as president of the newly amalgamated Society of Individualists and National League for Freedom will deliver an address at a mass demonstration of the united organisation at the Central Hall, Westminster, on January 24, at 2.30 p.m. Sir Leonard Lyle, M.P., will take the chair and other speakers will include Prof. David C. Douglas, of Leeds University, Commander R. T. Bower, M.P., Sir Robert Gower, M.P., Viscount Long and Lord Perry.

The E.D.A. exhibition of four working models of all-electric kitchens for post-war homes was opened by **Lord Brabazon of Tara,** president of the association, at the Building Centre, 23, Maddox Street, London, W.1, on January 4.

Mr. C. N. Longworth, mains engineer to Bolton electricity department, has been elected umpires' secretary by Bolton Cricket League.

As a souvenir of the visit to their works of Company Sgt.-Major S. E. Hollis, V.C., and Lance Cpl. F. A. Jeffersen, V.C., the Rowland Electrical Appliances Ltd., have prepared a framed quotation from the poems of Rupert Brooke, which has been autographed by these two distinguished soldiers.

Mr. Henry William Lee, chairman of the Superheater Co., Ltd., a director of the Chloride Electrical Storage Co., Ltd., and late managing director of J. Stone and Co., Ltd., left £264 342 (net £232 434).

At the Willans Works, on the occasion of the retirement of employees of the English Electric Co., Ltd., and its predecessor, Willans and Robinson Ltd., illuminated long service testimonials were presented on behalf of the directors and management, to **Mr. H. J. Matthews,** who had been an inspector for 47 years; **Mr. G. H. Gauntley,** who had been for many years an assistant to the works manager, and had 42 years' service, and **Mrs. G. H. Gauntley** (née Miss E. Creed), who has been employed at Willans Works for many years as a stenographer and more recently as head of the typing department. Mr. Matthews also had a gift of money from friends and colleagues at the works. Mr. and Mrs. Gauntley were handed an envelope containing bank notes from their friends, and the Apprentices' Association presented Mr. Gauntley with a set of table glassware.

News in Brief

Street Lighting Plans.—An inquiry has been received from Church Council concerning the cost of converting all the street lighting in the district to electricity. Accrington has prepared a rough estimate of the cost and this is to be considered. The Rotherham T.C. is to appoint a sub-committee to consider street lighting.

Electricity in Bungalows.—The Birkenhead Housing Committee has decided that fifty per cent. of the temporary bungalows to be erected in Birkenhead shall be all-electric.

Appointment Vacant.—Applications are invited by the Birmingham University Department of Metallurgy for the post of lecturer in metallurgy.

Library Heating.—The Hastings Library Committee has arranged for the electricity department to instal tubular heating at the Silverhill branch library at a cost of £106.

School Installations.—The Sunderland Educational Committee has agreed to the provision of electric cooking equipment in hutments for dining accommodation at Bede Schools, at an estimated cost of £1 649.

I.E.E. Additional Meeting.—In view of the interest which is being taken in the Second Report on Education and Training for Engineers, prepared by the Education and Training Personnel Sub-Committee of the Post-War Planning Committee of the Institution, the Council have arranged an additional ordinary meeting for the purpose of discussing this report. This will be held in the Lecture Theatre of the Institution on January 18, at 5.30 p.m. when the report will be presented by Sir Arthur P. M. Fleming.

York Cooling Towers.—The fear that further cooling towers would be built at York electricity station was dealt with at a meeting of the City Council. Ald. C. T. Hutchinson stated that the Central Electricity Board had referred to the need for an additional 20 000 kW turbine at the Foss Islands works. He stated, however, that it was probable that the water for cooling purposes would be obtained by means of a pipe line from the Ouse to the Foss near the generating station and there would be no need for a tower.

TWENTY-FIVE YEARS AGO

FROM THE ELECTRICIAN *of January 9, 1920: Electricity supply undertakings which are in difficulties as regards meeting demands on their mains are asked to communicate with the Electrical Development Association, when, as the lawyers say, "they will hear of something to their advantage."*

New Scientific Society.—A Radio and Television Society for Leeds was formed recently at Swarthmore Settlement, the objects being to cater for the needs of amateur radio enthusiasts in the study of radio technology, television, electronics, and all matters appertaining to radio engineering.

All-electric Canteens.—Liverpool now has two all-electric mobile canteens, which when they take up their stands take a supply of electricity from five street terminal boxes. Each canteen is fitted with an electric cooker, an electric geyser, and two electric urns for hot water.

Social Item.—The fire brigade at the Pulsometer Engineering Company's works at Reading, held their annual party in the works canteen, the 150 present including the joint managing directors and their wives, Col. and Mrs. L. G. Pilkington and Mr. and Mrs. J. S. Woodrow. After tea there was a variety programme, and for the children a Christmas tree.

Lighting in Edinburgh.—Out of the proposed installation of 3 500 electric and 3 000 gas lamps, the city is now stated to have 2 600 electric and 800 gas lamps in operation. The conversion has cost approximately £6 000.

Power in Northern Ireland.—Portstewart U.C. has agreed to the suggestion made by the Northern Ireland E.S.B. that a conference should be arranged between the representatives of the Council and the Board to exchange views regarding the proposed development scheme in County Antrim and County Londonderry in relation to the scheme by which the Board proposes to acquire the municipally owned electricity undertaking in Portstewart.

N.E. Post-War Industrial Prospects.—The Newcastle-on-Tyne branch of the Association of Scientific Workers has prepared a report on post-war industrial prospects in the North-East. This suggests that the minor industries of electrical power and chemicals, should be expanded to become future basic industries. It is suggested that a Regional Research Committee should be formed to be attached to the recently-formed North-East Development Association.

Servicing Business Premises

Need for Elasticity in Installations—Lighting Standards

THE subject of Post-War Building Studies No. 16, published by the Ministry of Works, is "Business Buildings."

The desirability of elasticity of service connections (lighting, power, telephones, bells, and so on) in all business buildings is stressed. These services, states the report, are normally concealed in office buildings and in shops and stores; in order to achieve these dual requirements of elasticity and concealment a continuous space (which may be filled by a light screed) should be available between the surface of the floor and the top of the floor structure. For offices this continuous space should ideally be some 4 in. deep, and for stores, with their more elaborate services, about 6 in. deep. It is alternatively possible to accommodate some of the services below the floor slab, but this is not generally desirable and introduces complications of increased cover and the slotting of neutral axes of beams.

Where such space is provided, the report adds, a flexible electric layout may then be installed on a grid or similar pattern. Concealed wiring may, alternatively, be accommodated in ceilings and in specially designed dadoes or skirtings. All skirting connections, plugs, etc., should be at least 8 in. above floor level to prevent damage by cleaners.

Office Buildings

For office buildings the committee suggest three alternative methods of heat distribution—radiators, panel heating, or electric heating. The last named may be by fires or radiators, panels (in walls or ceilings), exposed tubes (usually at skirting level), and wiring grids applied to ceilings in paper covers.

The type, the intensity, the placing, and the method of distribution of artificial lighting, states the report, depend upon and vary considerably with the work to be carried out, taken in conjunction with the area to be lighted and the interior finish of the room. Both direct and reflected glare must be avoided and general illumination should be of such even intensity as to eliminate shadow. Excessive contrast between the intensities of general and local lighting may cause eyestrain; local lighting should therefore be regarded as additional to general lighting with a minimum ratio of intensity between the two. Local desk lighting for ordinary office use is likely to disappear when shadowless fluorescent lighting has become normal practice. Appreciation of these facts, coupled with research, has enormously improved working conditions and workers' efficiency, particularly in factories. Lighting intensities at working level have frequently been increased; as an instance, they have been raised 50 to 150 per cent. in Royal Ordnance factories during the last few years and for special inspection work intensities of 40 f.c. are now reached.

Mention is made of the fact that detailed tables of recommended intensities at working level over a large range of tasks are given in foot-candles by the E.L.M.A. Lighting Service Bureau, and there is given a table which takes into account the recommendations concerning the lighting of offices made by the Bureau to a Committee of the Department of Scientific and Industrial Research.

"Poetry of Light"

AT a lecture of the Illuminating Engineering Society at the E.L.M.A. Lighting Service Bureau, on Tuesday, Mr. R. Gillespie Williams spoke on the "Poetry of Light."

The purpose of the lecture was to deal with the use of light to impart character, and to emphasise certain aspects of objects and people. The future development of illumination on these lines was considered, and applications to the lighting of theatres, cinemas, shop windows, stores, floodlighting and interior decoration was discussed.

The perception of colour was discussed and demonstrations were given, explaining hue, saturation and brightness; also the mixing of colours to provide tints and shades. The dependence of colour perception on comparison of colours was shown and demonstrations were given of the effect of colours on each other, when contrasted. It was shown that the face of a lady changed quite appreciably when lighted from different angles; furthermore, by suitable control of the lighting, delightful effects could be imparted. Again, the lighting created an appearance in line with any mood or purpose, and demonstrations were given showing the alteration in a lady's appearance, in keeping with the moods of sadness, happiness, fear and romance.

Ald. Sir Thos. Higham has resigned membership of the District Council for the North-Western Area Electricity Supply, of which he has been chairman since 1919. He has for many years presided over Accrington Electricity Committee.

Electricity Supply

Rawtenstall.—A scheme has been approved by the Electricity Committee for the installation of further protective equipment.

St Pancras (London).—The Housing Committee has arranged for the electricity department to improve staircase lighting on council estates at a cost of £86.

Meriden.—The R.D.C. is negotiating with the Birmingham electricity department in connection with a supply of electricity to Hampton-in-Arden for street lighting.

Witney.—The U.D.C., after discussing post-war development of their electricity undertaking, has instructed the Electrical Engineer to submit figures for consideration.

Rotherham.—The Housing Committee has decided that in all permanent houses electric lighting is to be installed and points provided, so that tenants can use gas or electricity for heating and cooking.

Birmingham.—Plans for power station extensions costing £3 333 154 are contained in a report of the Electricity Committee. The report estimates the cost of extension of the main transmission system at £611 527.

Tynemouth.—The T.C. is to include £4 000 per annum in the accounts of the electricity undertaking for the replacement of the two-coil meters which do not comply with the provisions of the Electricity Supply Act of 1936.

Halifax.—The T.C. has adopted a report of the Light, Heat and Power Committee recommending the payment of £10 440 to Babcock and Wilcox, Ltd., in full settlement of their claim for war extras in the carrying out of a contract dated May, 1939, for boiler plant at the electricity station.

Maidenhead.—The Electricity Committee has prepared a report on the question of the reorganisation of the electricity supply system. They report that the measures proposed will, in their opinion, secure among other results uniform bulk charges throughout the country, followed by a greater degree of uniformity of charges to the consumer.

Preston.—Application is to be made to the Commissioners for permission to borrow £2 127 000 in respect of the proposed completion of the Ribble power station. The chairman of the Electricity Committee, Alderman H. Rhodes states that Preston will be eventually administering an undertaking with a capital value of £7 000 000.

Wigan.—Replying to the R.D.C.'s inquiry regarding electricity supplies to certain outlying districts, the Lancashire Electric Power Co. stated that the position at the present day was, if anything, rather worse than in 1939, as the Commissioners had placed a ban on general development, and unless it could be shown that it was essential in the interests of the war they could not give permission for local extension schemes to be proceeded with.

Basingstoke.—The B.C. has given notice of increases for the June quarter of 1945 as follows: In the area covered by the Basingstoke Electric Light Order, 1913, an increase in the present lighting flat rate tariff of ¼d. per unit, and all other tariffs to be increased by 20 per cent.; in the area covered by the Basingstoke Electricity (Extension) Special Order, 1927, lighting flat rate tariff, an increase of ¼d. per unit, and all other tariffs to be increased by 15 per cent.

Rothesay. — Negotiations have been opened between the North of Scotland Hydro-Electric Board and Rothesay T.C. for the taking over by the Board of the burgh's electricity supply. The Board offers (1) to take over the supply, by which they claim they will cut consumers rates by nearly half, switching the present maximum rate of 10d. to 5d. and the minimum present rate of ¾d. to ½d. Their second proposal is that the T.C. purchase electricity from the Board in bulk and distribute it themselves.

INDUSTRIAL RECONVERSION

The appointment by the Board of Trade of regional controllers whose main function will be to assist and advise in the change over to peace-time production, was announced to the technical and trade Press by Sir Philip Warter, controller-general of factory and storage premises, on January 3. The Board of Trade had, he said, built up an organisation in each of the civil defence regions and in Northern Ireland. The four principal functions with which the regional controllers would be concerned would be (1) the reconversion of industry generally, and particularly engineering, to peace production; (2) the de-requisitioning of factory and storage space and the allocation of surplus Government factories; (3) the distribution of industry, with special regard to new development areas and employment; and (4) the de-concentration of civilian industry and the release of raw materials and labour. The regional controllers would maintain a continuous survey of the industrial prospects of their regions and keep in touch with the Ministry of Labour as to employment needs in their regions.

Industrial Information

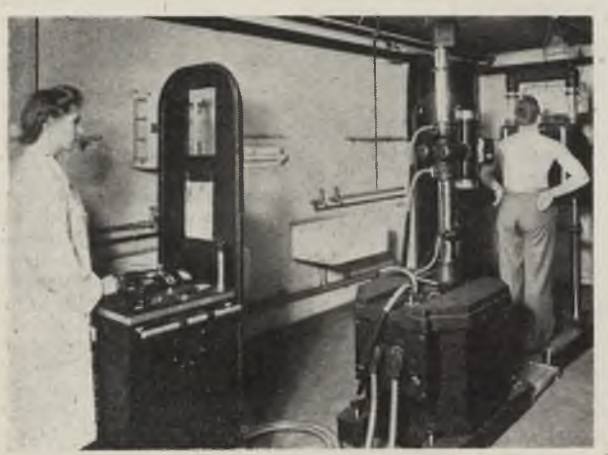
A New Fluorescent Lamp.—Two types of 80 W fluorescent tubular lamps, which are interchangeable, are now available. Described as "Daylight" and "Warm White," the lamps differ only in the colour of their light emission. While the older type of lamp emits illumination very closely resembling daylight, the new one give a sunlight effect without glare. Siemens Electric Lamps and Supplies, Ltd., have included both types in their "Sieray" range of lamps. The "Warm White" tubular lamps can be used to replace existing "Daylight" lamps without alteration of fittings or electric circuits. The British Thomson-Houston Co., Ltd., also provide Mazda fluorescent lamps giving illumination of daylight or sunlight quality and using the same fittings.

Post-War Electric Lighting. — The E.L.M.A., having in mind the important part which electric lighting, particularly in new forms, will play in post-war reconstruction, recently took the opportunity of holding a meeting in London, invitations being issued to representatives of all interests concerned in post-war planning. In order that the proceedings may be perused by those not present; the association has now issued in booklet form a report of the main happenings; including a comment by Lord Woolton, Minister of Reconstruction.

Electric Blankets and Pads.—The Central Price Regulation Committee has approved the following revised retail selling prices for electrically heated blankets and pads manufactured by Thermega, Ltd.: Electric pads 16 in. by 12 in., £3; ditto (with glass fabric inlay), £3 7s. 6d.; double pad, 16 in. by 24 in. or 32 in. by 12 in., £6; ditto (with glass fabric inlay), £6 15s.; Electric blankets: standard medical, 32 in. by 44 in., £6; domestic, 32 in. by 44 in., £4 17s. 6d.; special medical, 50 in. by 25 in., £6 6s. These prices are exclusive of purchase tax.

British Power.—Under this title the British Power Transformer Co., Ltd., have published a handsome booklet, admirably printed and profusely illustrated with excellent photographs, describing their methods of manufacturing transformers. It contains information not readily obtainable elsewhere, and is likely to be of general interest as a book of reference. One section deals with some technical aspects of transformer engineering, and there are several pages of overall dimensions of the company's transformers, which may be regarded as typical of commercial design. For the convenience of engineers there are at the back of the brochure a number of tear-off sheets to be used for enquiries for transformers.

Mass Miniature Radiography.—We reproduce in this page a photograph of the mass miniature radiography apparatus made by Watson and Sons (Electro-Medical) Ltd., and installed temporarily by the Birmingham Corporation at the G.E.C. Engineering Works, Witton, for the examination of the large personnel there employed. The apparatus is installed in a building originally intended as a gas decontamination centre which lends itself to the purpose very well. The apparatus is made in England. Contrary to the impression in some quarters that the apparatus being used in the official Ministry of Health Mass Radiography Scheme is imported from abroad.



British-made mass miniature radiography apparatus in operation at Birmingham

Fuel Efficiency News.—In this month's publication the Ministry of Fuel and Power announce a relaxation, as from January 1, of the criterion for granting licences for fuel efficiency equipment. A licence will be granted if it can be shown that the capital cost of a scheme can be repaid by fuel saving within four years, instead of two-and-a-half years, of the date of licensing. Fuel Efficiency Bulletin No. 37, deals with small vertical boilers.

After Demobilisation.—Entitled "After Demobilisation," Crompton Parkinson, Ltd., and their associated companies, have sent to all their employees in the Forces, a booklet which broadly outlines the companies' plan for the reinstatement of serving personnel. It is the companies' aim to implement, not only to the letter, but in full spirit and deed, the terms of the Act, and the smooth fulfilment of their plans depends, primarily, on being able to make individual arrangements for each of their co-employees who wish to return to them. With this thought in mind the companies have prepared a little questionnaire in the back of the booklet, which should be returned by those who wish to resume their former occupation. In addition, the companies have written to the serving employees' commanding officers, asking for their co-operation in ensuring that the recipients complete the questionnaire, whatever their future plans. The booklet describes the companies' retaining and rehabilitation schemes, rates of pay and remuneration, and concludes:—

"There is an answer to every problem. This has been proved more than ever in war, but it may not be possible for you to find just the right answer to your individual problem in this booklet. We are confident, however, that with your help we can and will solve it. The replies you make to our questionnaire will be the guidance we want for further plans which will automatically follow, and we will endeavour to keep you posted of future developments.

"These are our principal reasons for sending this booklet but we also want you to know that much of the serious thinking now being done by the people responsible for the managerial functions of personnel and welfare, is about you and your return."

If any ex-employee of the Crompton-Parkinson group of companies now in the Forces, has not yet received a copy of the booklet he should apply to the Chief Personnel Officer, Crompton Parkinson, Ltd., Chelmsford, Essex.

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.

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

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

Bootle B.C., January 27.—Supply of electric lamps (Form No. 14), for six or twelve months from April 1, 1945. Particulars from Mr. W. A. Harrison, borough engineer, Town Hall, Bootle.

Gellygaer U.D.C., February 3.—Supply and delivery of (a) indoor and outdoor transformers; (b) kiosk complete with switchgear and accessories; (c) e.h.t. and l.t. cable; (d) overhead line equipment and (e) wood poles. Specification from the Electrical Engineer, Electricity Offices, Hanbury Road, Bargoed, Glam.

GRESHAM TRANSFORMERS

The fourth annual party held by Gresham Transformers Ltd., at Longford Senior School Hall, Feltham, Middlesex, on January 6, was attended by 380 employees and their friends. They were received by the directors, Messrs. J. P. Coleman, J. A. Clegg, J. J. Elsden (secretary), and H. Coleman, and their wives. The latter carried bouquets presented by the employees. After tea, Mr. J. P. Coleman (managing director) wished everyone a peaceful and prosperous New Year, and gave the usual report of the progress of the company. Despite the fact that they had lost their factory, plant, stores and some of their most important records twice in two years, he said, production had not stopped at any time for more than a few days and their monthly output had never fallen below two-thirds of the normal output.

Mr. Coleman concluded by adding that they could not let the occasion pass without expressing their deep regret at the death of Mr. Cotterell, the watchman, who lost his life by enemy action, and their unstinted admiration for the fire crew, who, although most of them were injured, got the pumps working. Mr. J. A. Norton, who was seriously injured, continued to work until he collapsed; Mr. D. Gerrard, who had been trapped near the fire and was suffering from shock, got out and immediately took his position at the hose branch; Mrs. Coxhead, who received cuts from glass, helped Miss D. Wilson out of the building and called an ambulance; Miss Wilson, although badly injured, assisted; Mr. D. W. Jackson, who was in charge of the crew, did a magnificent job. Mr. Coleman then presented, in token of the directors' admiration, cheques for £5 to Mrs. Coxhead and Miss Wilson, a cheque for £10 to Mr. Gerrard, and cheques for £25 each to Mr. Norton and Mr. Jackson.

An entertainment and dancing followed.

Company News

THOMAS BOLTON AND SONS, LTD.—Intm. on ord. 2½% (same).

SOLUS TEORANTA.—Intm. 5% on "A" and "B" shrs. (same).

GOODYEAR TIRE AND RUBBER CO. (U.S.). —Qtrly. div. 50 cts. (same).

TECALEMIT, LTD.—Fin. div. on ord. 12% (same), mkg. 18%, less tax for yr. (same).

AMERICAN GAS AND ELECTRIC.—Qtrly. div. 40 cts. per sh. and extra 20 cts. on com. mkg. $1.80 (same).

STERLING ELECTRIC HOLDINGS.—Pft. to Mar. 31, £8 702 (£407). Tax, £4 800 (£225), fwd. debit, £8 943 (debit, £12 844).

INTERNATIONAL TELEPHONE AND TELEGRAPH CORPN.—Net income (parent co.) nine months to Sept. 30, $441 512. Consd. net income, co. and subsids. $6 184 191.

SOUTHERN CANADA POWER (Montreal).—Pft. to Sept. 30 (after bond int.) $1 722 625 ($1 470 974). Taxn. $597 715 ($704 650), net pft. $721 950 ($766 324), pref. div. $425 334, com. div. $320 000 (both same), fwd. $660 295 ($683 679).

ENSIGN LAMPS, LTD.—Accounts at June 30 show tradg. pft. £43 855 (£46 579), stock and work is £101 271 (£49 072), debtors £39 144 (£56 889), creditors £21 279 (£38 463), tax res. £39 928 (£26 503), and overdraft £2 203 (nil).

POWER-GAS CORPORATION LTD.—Tradg. pft. of group to Sept. 30, 1944, £115 063 (£141 040), plus divs., int. and transf. fees, £438 (£817). Prov. for taxn. £52 750 (£85 790). Earngs. of parent co., £59 457 (£89 248). Ord. div. 10% and bonus 2½% (same), to taxn., £25 000 (£59 000), to res. £15 000 (£11 000), fwd., £30 336 (£29 629).

RADIO RENTALS, LTD.—Fin. div. on ord. 15% (same), mkg. 20% less tax (same) for yr. ended Aug. 31, 1944, payable Feb. 10. Tradg. pft. for yr. after deductg. amnt. written off radio sets, deprecn. of sundry assets, dir's. fees and commissions and all other exes., £111 178 (£112 658). After chargg. income tax, E.P.T. and war damage premiums and contributns., etc., net pft. is £23 232 (£23 116).

E. K. COLE, LTD.—Tradg. pft. for yr. to Sept. 30 last, £423 124 (£159 723 increase), after mkg. full provision for contings. Dirs' fees £3 000 (same); deprecn. £36 959 (£36 308) and taxatn. res. £245 000 (£142 000). Net balce. £138 165 (£56 072 increase). Cost of the distributn. is £20 206 (£13 980). To gen. res. £50 000 (same), mkg. £300 000. Carry-fwd. £65 598 (£13 738).

ISLE OF THANET ELECTRIC SUPPLY CO., LTD.—The Margate and Broadstairs Councils have been informed by the Electricity Commissioners that they can give statutory notice to the Isle of Thanet Electric Supply Co. requiring the transfer of the undertakg. in accordance with the Margate, Broadstairs and District Electricity Act, 1937. In the event of purchase, the dirs. will recommend liquidatn. of the co.

MARSHALL SONS AND CO.—Trdg. pft. to Sept. 30, £176 495 (£210 693), plus divs., etc., £8 046 (£5 858), mkg. £184 541 (£216 551). To dirs.' remun. £5 160 (£5 000), deprecn. £11 165 (£7 545), res. inc.-tax. and E.P.T. £112 155 (£140 700), leavg. net pft. £56 061 (£63 306), plus £78 390 (£70 501) brot. in. Intm. div. 3¾% (same) £9 375, fin. div. 10% (same), mkg. 13¾% (same) to gen. res. £20 000 (same), fwd. £79 451.

TUBE INVESTMENTS, LTD. (HOLDING CO.). —Tradg. pfts. of subsids. (excludg. one overseas), £2 345 038 (£2 271 185) for yr. to July 29, 1944. Net balnce. after tax and other charges was £680 263 (£565 106), with £251 641 (£171 065) brot. in, sum for disposal is £1 075 689 (£856 217). To gen. res. £100 000 (same), contings. nil (£100 000) and div. stabilisatn. fund £250 000 (nil). Dividends on the four classes of cap. take £451 523 and leave £274 166 to carry fwd.

J. BROCKHOUSE AND CO., LTD.—Accts. show net tradg. pft. £180 033 (£181 441, before £3 918 to employees' pft.-sharg.). To subsid. cos.' losses £18 185 (£651), deprecn. £24 021 (£27 810), W.D.C. £1 383 (£1 736), dirs.' remun. £11 316 (£16 735), int. on 5½% convert. stk. nil (£5 506), prem. on red. of 5½% conv. stk. nil (£294). Net pft. £125 128 (£124 791), to pref. div. £750 (same), fin. on ord. 12½%, mkg. 20%, less tax (both same). £89 730 (£86 182), fwd. £173 946 (£139 298).

WAILES DOVE BITUMASTIC CO., LTD.—Trdg. pft. for yr. to Sept. 30, £66 473 (£72 793), add gross int. and divs. £2 265 (£2 199), mkg. £68 738 (£74 992); to deprecn. £3 028 (£2 790) defd. repairs provn. £204 (£960), dirs.' fees £800 (same), inc. tax and E.P.T. provn. (after adjustg. prev. provn.) £43 485 (£48 824). Net £21 221 (£21 618), fin. div. 10% (7½%) mkg. 15% (12½%), less tax, £13 125 (£10 938), to gen. res. £7 000 (£10 000), fwd. £10 925 (£9 829).

UNIVERSAL GRINDING WHEEL CO., LTD.—Trdg. pft. to Sept. 30, after E.P.T., £184 969 (£187 629) and int. on invts., etc., £3 830 (£4 930), mkg. £188 799. To dirs.' fees £2 943 (£3 213), deprecn. £27 794 (£30 094), W.D.I. £1 242, inc.-tax £90 000 (same), leavg. net pft. £66 820 (£66 703). To pref. div. £10 000 (same), to partcg. div. 2% £4 000 (same), ord. div. 10% tax free (same), £20 000 (same), to res. £25 000 (same), fwd. £27 836 (£20 016).

BAGDAD LIGHT AND POWER CO. LTD.—Rev. 1943 £215 815 (£178 380). Generatg. and distr. costs £48 269 (£36 962), exes.

£16 035 (£13 415), dirs'. fees £3 000 (same), Govt. tech. control £225 (same), net rev. £148 286 (£124 676), plus int. and fees recvd. £3 519 (£3,462). Deprecn. res. £24 200 (£25 500), taxn. and Iraq Govt.'s share pfts. £114 712 (£90 119), net pft. £12 892 (£11 845). Brot. in £8 666, pref. div. £8 747, 5% ord. £5 002 (both same), fwd. £7 810.

SOUTHERN BRAZIL ELECTRIC.—Operatg. revenues 1943 £39 191 (£36 422), exes. and taxes £22 402 (£19 247), to property retiremt. res. £1 257 (£2 513), leavg. £15 532 (£14 663). Add int. from subsids. £58 414 (£20 464), divs. from subsids. £3 988 (£4 470), miscellaneous (net) £514 (£1 126), mkg. gross income £78 449 (£40 723). Deficit at Dec. 31, 1943, £218 185. Divs. on pref. shs. (cum.) in arrears from July 1, 1926. Div. on 6½% mort. debs. for 6 mos. to June 30, 1944. 2¼%, less tax, (same).

ELECTRIC FURNACE CO., LTD.—After deprecn. £1 031 (£643), etc., pft. to Mar. 31, £79 262 (£54 544), plus £4 000 (£5 320) divs. from subsid. cos. and £4 571 (£356) brot. in after dirs.' fees £3 550 (£3 325). Avail. blce. after intm. divs. 3½% on prefd. ord. and ord. absorbg. £5 731 (same), was £82 102 (£57 490). To second intm. div. of 4½% on both prefd. ord. and ord. to be treated as fin. distrib., mkg. 8% in each case (same), prov. for E.P.T. and inc.-tax £55 000 (£32 000), gen. res. £10 000 (same), fwd. £9 733 subject to dirs.' fees.

C. LINDLEY AND CO., LTD.—Gross trdg. pft. to Sept. 30 £142 862 (£150 335), other income £1 743 (£2 476). Dirs.' fees £3 600 (£3 700), salaries, etc., £19 557 (£16 082), exes., carriage, etc., £10 296 (£9 123), plant deprecn. £7 587 (£6 652), pensions (£1 210 (£1 029), A.R.P. £178 (£81), bank int. £99 (nil), lvg. pft. £102 079 (£116 143). Brot. in £15 304. Tax and war damage £92 000 (£106 000), leasehold amortisatn. £500, bldgs. deprecn. £222, genl. res. £2 000, pref. div. £1 420, ord. div. 25%, £6 087 (all same), fwd. £15 153.

HEENAN AND FROUDE, LTD.—Tradg. pft. to Aug. 31, £55 990 (£48 886), plus divs. from subsid. cos. £2 081 (£81), divs. from invests. £453 (£270), royalties nil (£387), mkg. £58 525 (£49 624). To staff superann. fund £5 161 (£3 596), int. and charges £3 741 (£1 374), dirs.' fees £1 817 (£1 500). war damage £438 (£667), leavg. net pft. before tax, £47 368. To taxn. £22 000 (£17 000) int. div. 5% (same) £7 500 fin. div. 5% and bonus 5% (both same), mkg. 15% (same), gen. res. nil (£625), female staff superann. fnd. nil (£3 388), fwd. £10 472 (£7 604).

CRYSTALATE, LTD.—Tradg. pft. for yr. to Sept. 30, £45 955 (£47 543), divs. from British Homophone £10 200 (£10 170), gross other income £1 015 (£1 014), mkg. £57 170 (£58 727); deduct admin. exes. £8 483 (£7 790), dirs.' fees £1 200 (£1 500), deprecn. £2 802 (£3 030), tax £33,300 (£35 085), leavg. net pft. £11 385 (£11 322). To 8% pref. div. yr. to Jan. 31, 1944, £6 000 (3 yrs. to Jan. 31, 1943, £18 000), fwd. £18 407 (£13 022). Combined. pfts. of Homophone and Ebonestos cos. for yr. to Mar. 31 were £43 620 (£37 142), tax absorbed £34 600 (£18 112), leavg. net pft. £9 020 (£19 030).

Company Meetings

HEENAN AND FROUDE, LTD.—The annual meeting was held at Worcester on December 21. Mr. Alan P. Good, the chairman, presided. In the review which was circulated with the report, the chairman said the total reserves of the company now stood at £110 000. There had been no change in the productive capacity of their respective works. Each had been kept consistently employed during the period on specialities and work of its own particular character and type. The manufacturing facilities had been well maintained, and the works were all well adapted and equipped for any post-war requirements that might develop. The directors anticipate the future with the fullest confidence.

GENERAL CABLE MANUFACTURING CO. LTD.—In the course of his address at the annual meeting held at Dorking, on

(*Continued on page* 44.)

Metal Prices

Monday, January 8.

		Price.	Inc.	Dec.
Copper—				
Best Selected (nom.)	per ton	£60 10 0	—	—
Electro Wirebars ...	„	£62 0 0	—	—
H.C. Wires, basis ...	per lb.	9 5/16d.	—	—
Sheet	„	10 7/8d.	—	—
Phosphor Bronze—				
Wire(Telephone)basis	per lb.	1s. 0 5/16d.	—	—
Brass (60/40)—				
Rod, basis	per lb.	—	—	—
Sheet „	„	—	—	—
Wire „	„	10 7/8d.	—	—
Iron and Steel—				
Pig Iron (E. Coast Hematite No. 1)...	per ton	£6 18 6	—	—
Galvanised Steel Wire (Cable Armouring) basis 0.104 in. ...	„	£27 10 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	per ton	£26 10 0	—	—
Foreign or Colonial	„	£25 0 0	—	—
Tin—				
Ingot (minimum of 99.9% purity) ...	per ton	£303 10 0	—	—
Wire, basis... ...	per lb.	3s. 10d.	—	—
Aluminium Ingots ...	per ton	£110 0 0	—	—
Spelter...	„	£25 15 0	—	—
Mercury (spot) Warehouse ...	...per bottle	£69 15 0	—	—

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

December 29, Mr. C. W. R. Pantlin, the chairman, said throughout the year the company's works were fully employed on behalf of the several war departments, production being well maintained, although not sufficient to meet the requirements of commercial sales. If industry was to have a chance to compete successfully in the overseas markets and play its part in the post-war world, it was imperative that not only must E.P.T. be repealed at the earliest possible moment, but in addition, some considerable relief from ordinary taxation must be granted. Otherwise industry in general would be strangled, with disastrous results to the country.

BRISTOL INDUSTRIES LTD.—The annual meeting was held on December 29, at Birmingham. Capt. C. V. Wills, the chairman, presided. The latter, in the statement circulated with the accounts, said a high level of production and efficiency had been maintained. The strong financial position of the company had been further strengthened by the addition to the general reserve of £10 000, being the amount over-reserved for taxation to October 31, 1942.

ROTHERMEL CORPORATION, LTD.—The annual meeting was held in London on December 28. Mr. R. A. Rothermel, the chairman, presided. In the statement circulated with the report and accounts, the chairman said the directors considered the results attained during the period of 18 months from December 31, 1942, to June 30, 1944, to be very satisfactory, taking the difficult circumstances into consideration. Turnover had expanded largely since normal working had been resumed, enabling most of the leeway to be made up, and the figures for the calendar year 1944 should show good results.

Commercial Notes

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.*

A. TAYLOR AND SON (EASTERN), LTD., Beccles, motor and radio experts.—Dec. 13, £2 200 mort., to C. G. Boggis, Reydon; charged on 2-4, Bridge Street, Halesworth. * £365. Aug. 29, 1943.

BOURNE RADIO AND ELECTRIC, LTD., Bournemouth.—Dec. 16, deb., to Lloyds Bank Ltd. securing all moneys due or to become due to the Bank; general charge. * Nil. Dec. 18, 1941.

Notice of Intended Dividend

PENTY, Percy Walter, trading as "Sackville Electrical Co.," residing and carrying on business at 38, Mannville Terrace, Morley Street, Bradford, electrical contractor. Claims to be sent by Jan. 20, 1945, to the Trustee, Mr. Edwin T. Sanders, Hallfield Chambers, 71, Manningham Lane, Bradford, Official Receiver.

Company Winding Up

I.C.I. (PLASTICS), LTD.—At an extraordinary general meeting of this company at Black Fan Road, Welwyn Garden City, on December 30, 1944, a resolution was passed that with a view to the assignment and transfer of the whole of the undertaking, assets and liabilities of the company to Imperial Chemical Industries, Ltd., at the close of business on December 31, 1944, the company be wound up voluntarily and that Mr. Charles S. Guthrie of I.C.I. (Plastics), Ltd., be appointed liquidator.

Coming Events

Friday, January 12. (To-day.)

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

Saturday, January 13.

I.E.E., N.E. CENTRE.—Visit to Dunston Power Station.—I.E.E., N.W. STUDENTS' SECTION, Manchester. Visit to the Christie Hospital and Holt Radium Institute. I.E.E., N. MID. STUDENTS' CENTRE, Leeds. "Early Power Station Equipment," E. Lunn. *2.30 p.m.*

ASSOCIATION OF SUPERVISING ELECTRICAL ENGINEERS.—E.L.M.A. Lighting Service Bureau, London, W.C.2. Lecture, "Installation, Maintenance and Operating Problems of Theatre Lighting," L. G. Applebee. *2.15 p.m.*

A.M.E. AND M.E., SOUTH WALES BRANCH.—Monmouthshire Mining and Technical College, Crumlin. "Flameproof Electrical Apparatus," H. Rainford. *5 p.m.*

Monday, January 15.

I.E.E., LONDON STUDENTS' SECTION.—"Insulating Varnishes," W. P. Walters. *7 p.m.*

Tuesday, January 16.

I.E.E., RADIO SECTION.—London, W.C.2. Discussion, "Frequency Allocation for Long-distance Communication Channels." *5.30 p.m.*—I.E.E., N.W. CENTRE, Manchester. "The Influence of Resistance Switching on the Design of High Voltage Airblast Circuit Breakers," H. E. Cox and T. W. Wilcox. *6 p.m.*

Thursday, January 18.

I.E.E.—London, W.C.2. Additional meeting to discuss the Second Report on Education and Training for Engineers. *5.30 p.m.*

Friday, January 19.

I.E.E., MEASUREMENTS SECTION.—London, W.C.2. "The Fixing of Confidence Limits to Measurements," H. J. Josephs. *5.30 p.m.*—I.E.E., N.E. STUDENTS' SECTION.—Newcastle-on-Tyne. "The Electrical Properties of the Human Body," J.M.A. Lenihan. *6.30 p.m.*

Saturday, January 20.

I.E.E., LONDON STUDENTS' SECTION.—Visit to the Museum Automatic Telephone Exchange, Howland Street. *2.30 p.m.*

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