RURAL BIRMINGHAM

ELECTRICAL REVIEW

FOUNDED 1872

Vol. CXXXV. No. 3476 JULY 7, 1944 9d. WEEKLY

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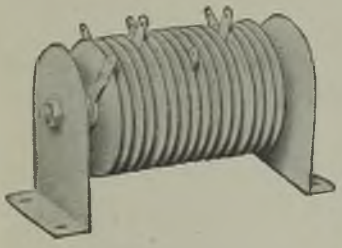

Selenium Rectifiers

Rectifier Sales Department:
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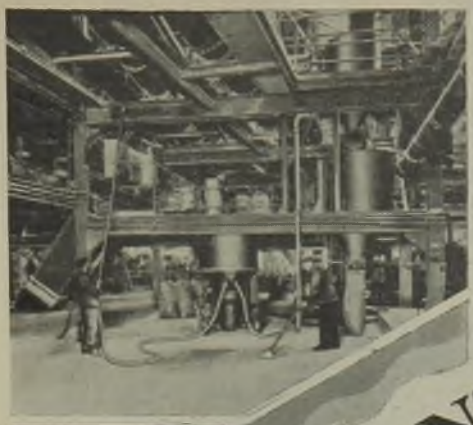

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They are giving continuous service and maintaining the highest efficiency under the most exacting conditions. Experience shows that the systematic and regular use of a Sturtevant Cleaner overcomes dust problems and increases the efficiency of all cleaning operations. Furthermore, it has been proved conclusively by a great many users that better and greater output can be produced as a result of the very clean conditions obtainable by using a Sturtevant Industrial Vacuum Cleaner.

Innumerable tests have proved that, due to the high mechanical and electrical efficiency, Sturtevant Cleaners clean more quickly and thoroughly than any others of equal power. May we send particulars and our publication U.1391 ?

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It may be a problem to the hens, but it's no problem to us. The same identical photograph reproduced again and again does the trick. We are in that line of business—turning out the same thing by the hundred, by the thousand, by the million, in accordance with your instructions. At Tube Products Ltd. we mass-produce Tru-Wel electrically welded steel tubes at great speed, and apply rigorous tests to see that they never vary. Tru-Wel Tubes can be expanded, tapered, flattened, bent—in fact they lend themselves to manipulation for any required purpose and are proving the solution to scores of industrial "stepping-up" problems. We will process them for you if you wish.

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ELECTRICALLY WELDED STEEL TUBES

MADE BY
TUBE PRODUCTS LTD
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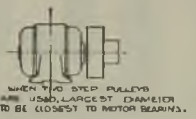
5

Motor Maintenance Points & Problems

Keep this page. it may prove of service to your Maintenance Engineers

TWO-STEP PULLEYS

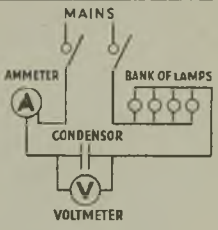
When two-step pulleys are fitted to the shaft, keep the largest diameter pulley closest to the motor bearing, as shown here. Oversize pulleys in either diameter or length mean extra shaft strain Larger diameters than given in the following table are not recommended; for greater pulley length a third bearing should be used.



Motor ... ... h.p.	1½	3	5	10	20	40	60	80	120	175
Maximum pulley width in.	5	6	7	8	10	12	14	16	18	20
Maximum pulley diam in.	5	6	8	9	11	13	15	17	20	24

CHECKING CONDENSER CAPACITY

where capacitor motors develop starting or running troubles.



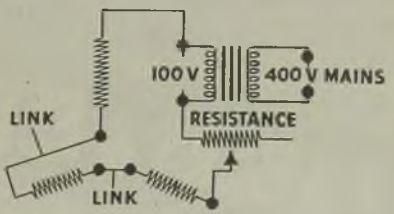
Capacitor motors are now becoming the accepted form for power driving on single phase supply, as they are the only type to combine good electrical performance with high over-load capacity.

Such condensers are in use in the electrical circuit during both the starting and running positions. The success of such a motor depends entirely on the reliability of the condenser, and if such a motor should give trouble. e.g. fail to start when connected to the mains, or stalls easily on load, it is not always appreciated that the failure is likely to be in the condenser and not in the motor. The capacity of the condenser is stamped on its side, and should some of the condenser sections have failed they may account for the erratic performance of the motor. To check the condenser capacity, the condenser should be connected across the 50 cycles supply in series with ammeter and several lamps, the latter forming the resistance. A voltmeter should be connected across the terminals of the condenser.

$$\text{Capacity (m.f.d.)} = \frac{\text{Amperes} \times 100}{\text{Voltage}} \times 32$$

DRYING OUT STATOR WINDINGS

A large motor, situated in an inaccessible site, had been flooded and was dried out in the following manner—



CONNECTIONS FOR DRYING STATOR WINDING

The rotor was removed, and the 400 volt Star-Delta winding connected so that all three phases were in series. Next a 400/100 volt single-phase transformer was connected across two phases of the A.C. supply; the low voltage side was connected in series with an old starter resistance. Sufficient current was passed to heat the winding to 195° F. and this was retained for two days. The winding was thus thoroughly dried out.

PIONEERS

in the Electrical Industry, the pre-war pre-eminence of GENTS' of Leicester will not be forgotten when Peace is once more proclaimed and Industry demands the products they manufacture.

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ESTAB. 1851

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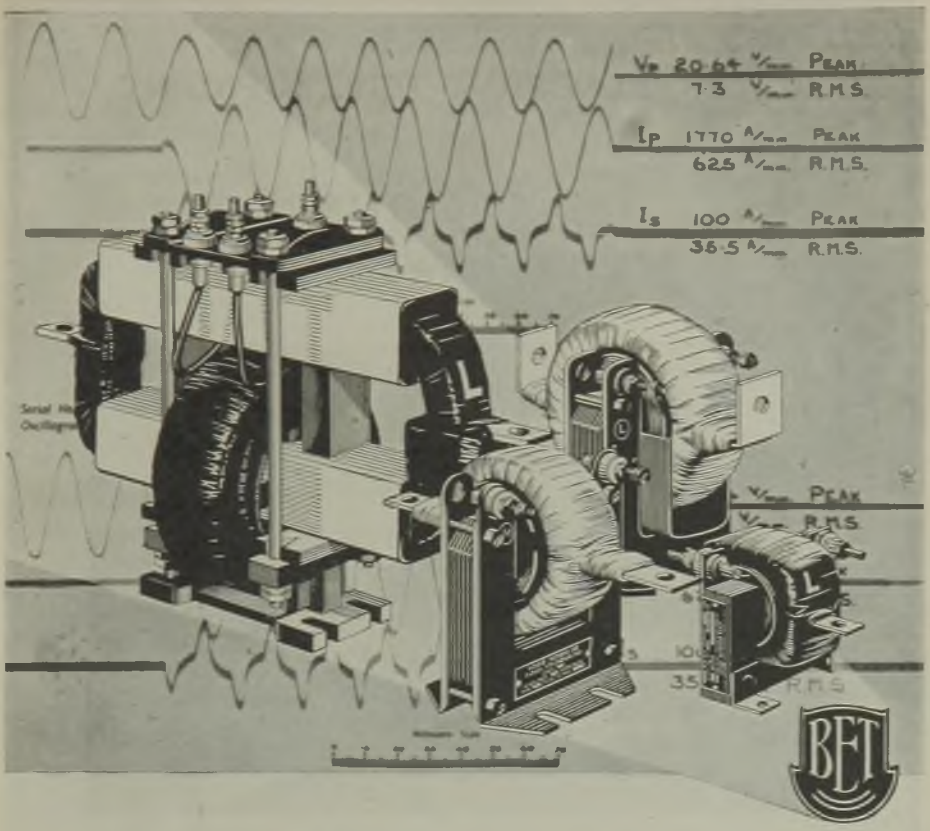

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ELECTRICAL REVIEW

July 7, 1944

Contents :—

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXV. No. 3476. JULY 7, 1944 9d. WEEKLY

Technical Writing

Advice to Would-be Authors

KNOWLEDGE that is not shared is liable to be lost or, at best, to remain sterile. This applies with especial force to any field of human activity, such as electrical engineering, in which developments are so rapid and so diverse as to make it difficult for those engaged in its varied yet interdependent sections to keep in touch with one another's work. To aid them to do so is a primary duty of the technical Press which, among its several functions, provides opportunities for mutually helpful exchange of experiences.

Engineers who are capable of preparing lucid and logically arranged reports are apt to lack confidence in their powers of literary expression; yet, given an elementary acquaintance with grammar and syntax, such diffidence is often unwarranted.

Essential Collaboration

Those contemplating authorship may be recommended to study a contribution to the May issue of the *I.E.E. Journal*, in which Mr, G. E. Williams discusses the presentation of technical literature with particular reference to the response it arouses in readers—an essential collaboration. Seventy-five words, however, is surely too liberal, even as a maximum limit, to the number advisable in one sentence in a technical article and Fowler's "Modern English Usage" might have been added to the lists of references cited.

Distinction should be made between the requirements of technical and other forms of literature. Since practising engineers read about their work for utilitarian reasons, the aim of the first is a sharp definition of subject-matter that will be instantly perceived by an alert and trained intelligence of a specialised order. This frame of mind is far removed from that characteristic of leisure hours occupied with literature that appeals to other sides of one's nature, when words may be employed for their emotional values and associations.

Full Knowledge of Subject

Readability depends ultimately on a thorough mental grasp by an author of his subject and on his will and ability to express himself in words each of which plays an essential part. There are many recognised methods of achieving this. Adjectives especially should be scrutinised to see whether they really pull their weight. Subordinate clauses can often be effectively replaced by adverbs. Superlatives too often detract from the emphasis intended by their use. Connecting phrases between sentences in many cases serve no obvious purpose and may with other circumlocutions tend to create an impression of vagueness on the part of the author towards his subject.

Conciseness that does not degenerate into a mere catalogue is a merit not only because it saves space (important, apart from the present paper shortage) but also because it has regard for the value of the reader's time. The result is a "functional" style which follows the precept that the sound must seem an echo to the sense,

and this should be as pleasing to engineers in its way as is a clean lay-out of plant. Writers who find composition difficult may be consoled by the reflection of a literary figure of three centuries ago that "easy writing's curst hard reading." They should find ample compensation in finding out the truth for themselves of Bacon's even earlier dictum that writing makes an exact man. The main consideration, however, is an author's attitude to his readers. A sincere wish to impart information that will advance the interests of his profession is likely to make his written words a more potent influence than would any conscious straining after literary effect.

Temperature Control

BY appropriate regulation of temperature, economies in the application of electricity can be made to offset to a marked extent heat losses inevitably incurred in production. The comprehensive data on commercial thermostats presented by Mr. R. Grierson to the Institution of Heating and Ventilating Engineers last week provides the groundwork for a measure of standardisation, especially with regard to rating and performance, which is overdue. Any lack of success in the use of thermostats is generally, as he showed, traceable to unsuitable design, incorrect location or putting into permanent service without ensuring that they do exercise control at the right temperature. The "anticipating" thermostat (with auxiliary heater) which he described indicates that the potentialities of thermostatic control are by no means exhausted.

Irish Difficulties

THE Irish Electricity Supply Board has been passing through an extremely difficult period and there are apparently no signs of improvement. Lack of water has seriously reduced the output of the Shannon scheme upon which the country depends so much and the Liffey scheme, which will ameliorate conditions to a large extent, is not yet in operation. The other main source of supply is the Pigeon House station, Dublin, and here coal shortage has limited output. Mr. Sean Lemass, Minister for Supplies who answers for the Electricity Supply Board in Dail Eireann, has stated that plans for another steam station in Dublin are being prepared. It is a tribute to the developmental activities of the Board that the demand for electricity should be so great and bad luck that the war should have prevented the Board from meeting it, as no doubt it would have done in normal times.

Lack of Water

ANOTHER part of the Empire adversely affected by lack of rain is British Columbia. In that Province the power companies recently warned consumers that they might have to institute a scheme of power rationing as the hoped-for rains to replenish the reservoirs of the hydro-electric undertakings have not arrived. The steam stations, some of which were built after a similar experience in 1929, have been working "full out." The Columbia River was said to be down to 50 per cent. of its normal flow in May; this, of course, also affects some of the undertakings on the other side of the United States-Canadian border.

Shorter Working Week

IT is often accepted as axiomatic that the cutting down of the working week, so far from reducing output, actually results in greater production. A report prepared for the Industrial Health Research Board by Dr. S. Wyatt qualifies this somewhat. It is agreed that "it is fairly certain that, for the type of work and within the limits of reduction of hours dealt with in this investigation, a shortened length of working week may be expected to be followed by a tendency to increasing output." But, says the report, other conditions frequently obscure the effect of reduction of hours and without rigid control of these other factors the effect is not determinable and, in any event, it may not be great.

Co-ordinated Lighting

ONE of the motorist's bugbears in peacetime was the violent variation in lighting intensity between district and district—it was also a prolific source of accidents. There will be even greater contrast if some authorities are not ready to switch on when the word is given that the black-out is ended. The matter is being considered by the London J.E.A. whose Local Distribution Committee supports a proposal that officials of lighting authorities in a part of its area

should get together to discuss co-ordination. The General Purposes Committee goes further and recommends that representations should be made to the Government Departments concerned, suggesting the desirability of taking action to ensure synchronisation of the resumption of street lighting as far as practicable throughout the whole of the London and Home Counties Electricity District. The same considerations apply in other parts of the country.

Export Trade

IT is extremely rare nowadays for chairmen of electrical concerns to give any definite information regarding the extent of their export business. An approach to this was made by Sir Montague Hughman at Henley's meeting last week when he stated that during the past year overseas trade represented 14·5 per cent. of the company's total business, as compared with 28 per cent. in the years just before the war. This does not mean, of course, that the actual volume has fallen to about half, for during the war the company's turnover has continued to increase and it reached a new record in 1943. In fact Sir Montague said that on the whole their business overseas had been maintained.

Plant for Russia

WHEN Mr. Churchill recently made a statement on supplies for Russia his references were to material *despatched* from this country, although he skilfully avoided a question put by a member on the point. Now the Soviet Government has published some figures of actual *receipts* from this country and America up to April 30th last. Among these are included 15,084 electric motors of unspecified capacity and 374,000 kW of electric power plant of unspecified numbers. We have described some of this plant and have pointed out that this is not the whole story; plenty more is on the way and further supplies will reach our Ally during the next year or two.

Electricians' Tea

POLITICIANS in the old days used to pose as champions of the working man's right to his beer. But things have changed since then; while no doubt many working men still appreciate their pint, the anxiety of most seems to be to safeguard their right to tea. For instance, the E.C.A. mentions that the E.T.U. has "expressed some considerable concern" that on the smaller contracting jobs where no canteen facilities exist electrical operatives are unable to have any tea unless they use their domestic ration. It is pointed out that the Ministry of Food regulations provide that in such cases employers may obtain permits for an allocation of tea, milk and sugar which, however, must be "communally brewed" and not distributed in "dry form."

Maintenance and Q.C.

WHILE repairs put a defect right, maintenance is intended to prevent its happening. In this its function is akin to that of quality control, which aims at avoiding waste by preventing a continuance of the manufacture of products which fall outside permissible tolerances. The link between the two is more than superficial and may make desirable a revision of maintenance methods, as Mr. J. J. L. Murray suggested in his chairman's address to the I.E.E. Tees-side Sub-Centre. Calls upon the maintenance department are likely to be more frequent for the making of minor adjustments before many wrongly dimensioned articles have been made than they are for dealing with breakdowns after the event.

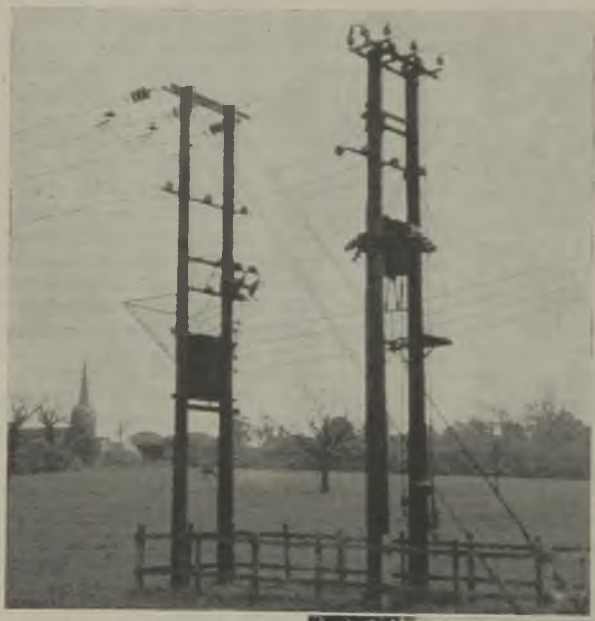
Scottish Water Power

WELL within a twelve-month of the passage of its Act the North of Scotland Hydro-Electric Board has produced its first scheme comprising three generating stations. Similar speed is promised in their construction. The largest, Loch Sloy (130,000 kW) is expected to take only two-and-a-half years, whereas to build an equivalent pre-war steam station would have needed about four years. Capital expenditure works out at £34 per kW, compared with $150 (about twice the figure for a steam station) used by Mr. Selwyn S. Grant, chairman of the I.E.E. Devon and Cornwall Sub-Centre, as a rough guide to the economic potentialities of a water-power project. This assumes a load factor of not less than 25 per cent., but for the present scheme not much more than 10 per cent. seems to be expected. Although Loch Sloy should cost considerably less per kW than the two small stations, they all evidently depend upon the grid to absorb their output as and when available.

Rural Birmingham

Advantages from the Backing of a Large Industrial Load

IT may seem rather strange to consider Birmingham in connection with rural development and it will probably come as a surprise to many to learn that the City's Electric Supply Department operates a rural area of 112 sq. miles—nearly half as much again, in fact, as the undertaking's 80-sq. mile city area. True, the area includes the residential district of Solihull, but for the most part its rural characteristics are practically unaffected by the close proximity of such a highly industrialised centre. The population of the area is only about 88,200.



Above: Auto-reclose breakers have been employed with noteworthy success
Right: Base-type substations are strongly favoured. The apparatus shown here comprises a 200-kVA transformer, isolators, switch fuse and three-way distribution pillar

In 1926 in order to provide electrical facilities to a colliery outside the normal area of supply, a Fringe Order was obtained and a double-circuit 11-kV overhead line on A-poles was run from the city boundary at the north of the area. This line thus furnished the means of bringing electricity to a rural area north-east of the city. In the meantime supplies were required in Solihull and for this purpose small 11-kV mains designed to carry up to 2,000 kVA were run out from the eastern portion of the city, and an Order was obtained covering the whole of the area now supplied under the rural scheme. With the completion of the first section of Hams Hall "A" station in 1929 an 11-kV overhead line was run direct to Solihull, so permitting the mains originally supplying Solihull to be used to feed back into the city. Thereafter the load grew so rapidly that it soon became necessary to lay a 33-kV underground trunk of 15,000 kVA capacity from Hams Hall to Solihull. As a result, instead of using the old overhead line for bringing the supply to Solihull it was possible to utilise it to feed outwards from that point to adjacent villages and hamlets.

Since then the 11-kV network has been extended to cover practically the whole area, with ring mains wherever practicable, and there are now 170 substations of all types available, with a total capacity of 32,970 kVA. Twenty-three of the most important of these are of brick-built construction, having a capacity of 10,800 kVA, while thirty-two steel kiosks

between them handle 12,200 kVA. Base-type units comprising transformers, isolators, switch fuses and distribution pillars, located at the bases of overhead line poles, are strongly favoured as being both reliable and economical and 37 of them (6,350 kVA) are now in use. The remaining 78 substations (3,620 kVA) are of the pole-mounted type.

Underground cables are preferred wherever the load justifies the additional expense and almost one-half (114 miles out of 236 miles) of the e.h.v. lines is now underground—a very high proportion for such an area. On the low-voltage side the proportion of underground mains is still greater, 267 miles out of 404. This practice of minimising the use of overhead lines does, of course, help to eliminate potential causes of failure to a very considerable extent, but where overhead lines are used full precautions are taken to ensure that outages, if they cannot be avoided, are of the shortest possible duration.

Balancers have been employed on some of the longer stretches of line to overcome voltage drop (above). Several agricultural cottages such as those on the right have been given supplies since the beginning of the war

Auto-reclose breakers have been employed with noteworthy success in each of the seven sections into which the rural area is divided. Various types of equipment are used, some giving three and some six reclosures, with a discriminating feature providing for cutting-out on a sustained fault. Indicators (comprising a simple pilot light and battery) installed at the bottom of the poles to show the position of the switches, have proved of great assistance under black-out conditions for the speedy location of faults. On about half a dozen of the sections most sensitive to lightning, surge absorbers, if they have not completely cured, have very largely overcome troubles, while balancers and tail-end boosters have been employed on some of the longer stretches of low-voltage line to overcome voltage drop.

The rural area is nearly half as big again as the city area

It is not only on the engineering side that the consumers benefit from the undertaking's possession of a large highly developed urban and industrial area. Apart from the high degree of technical skill available, the Electric Supply Department's financial resources, wide diversity of load and large numbers of consumers, make it possible to give rural supplies on exactly the same terms as in the city. The domestic contract tariff for domestic supplies embodies a " unit " charge of only ½d. with a fixed annual charge, payable quarterly, one-third in each winter quarter

and one-sixth in each summer quarter. As in the case of most of the other tariffs, a discount of 5 per cent. is given for prompt payment of accounts. Under 1,000 kWh a quarter the ordinary lighting flat rate is 4d., a sliding scale reducing this to as little as 2¼d. for over 20,000 kWh a quarter. For a consumption of under 5,000 kWh a quarter the power rate is 1⅛d., above that figure 1d.

Surge absorbers have largely overcome lightning troubles. They are here seen installed on the overhead line supplying a colliery

Special tariffs are also available covering energy for such purposes as electric vehicle battery charging, commercial cooking and commercial water heating, cinemas and theatres, thermal storage and industrial heating, and church heating. Consideration of a special tariff for farms, of which 350 now take supplies, is in abeyance pending probable revision of tariffs on a national scale.

In outer areas guarantees of minimum consumption are asked for: generally these are on a three-year basis and their amount is dependent on the route and length of the mains and what prospects there are of further load being connected.

In normal times the methods employed in the development of supplies to rural areas are both comprehensive and varied. Representatives are regularly employed in calling on consumers to give information and advice, and suitable publicity material is regularly distributed, as well as appearing in local newspapers and cinemas throughout the area. Displays are arranged at local exhibitions and shows, while special demonstrations and lectures on cooking, farm appliances, etc., are given from time to time in village halls and institutes to stimulate interest in electricity. A caravan has been used to visit the villages, for exhibiting apparatus and for giving lectures on its use. In addition to a permanent showroom at Solihull, premises have also been leased in shopping centres for collecting inquiries from local residents and arrangements are made with a number of tradesmen in different parts of the area for the payment of accounts.

Extensive Use

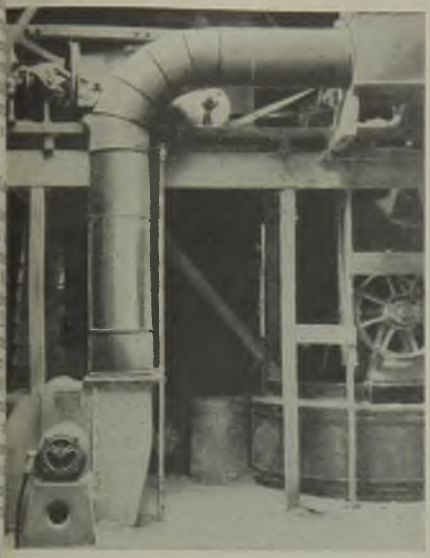
The population of the rural area is, as already mentioned, approximately 88,200, and the number of houses is about 25,600; it will thus be judged from the number of consumers, namely 23,400, that a very substantial degree of saturation has already been achieved, at any rate so far as initial installations are concerned. A considerable extension of the uses of electricity still remains to be carried out, however, and it is in this direction that the undertaking plans mainly to turn its attention when wartime restrictions are removed.

At the present time there is a total connected load of 118,000 kW, of which 17,000 kW is for lighting and the remainder for heating, cooking and power, while domestic apparatus supplied on hire at March 31st last included 5,087 cookers (representing 21 per cent. of the consumers), 3,388 circulators (14 per cent.), 222 storage water heaters (

Sand and gravel works are among the rural industries served

per cent.) and 643 wash boilers (3 per cent.).

Apart from the various branches of farming, several other rural industries are catered for, among them brickmaking; sand and gravel dredging and grading; woodworking; cattle, pig and poultry food manufactures, etc., as well as the more urban activities of engineering, ironwork, coach building, cardboard box making, confectionery, etc. With the facilities already available and those planned, industrial development in the outer areas is expected to expand considerably in the immediate future.



Through the availability of electricity it has been possible to establish a cattle, pig and poultry food plant, which has served as a model for many similar installations all over the country

Though the war has brought normal development work almost to a standstill, it must not be thought from the above remarks that the undertaking's activities have been static for the past four years or so. Very many new supplies and extensions have been made available for work directly concerned with the war effort. In addition to supplies for farming, provision has also been made to bring the convenience of electricity to a number of farm workers' cottages in the Birmingham rural area.

We should like to thank Mr. F. W. Lawton, chief engineer and manager of the Electric Supply Department, for granting us permission to inspect the area, and also Major R. H. Rawll, sales and development engineer, Mr. H. W. Blades, mains engineer, and Mr. J. E. Gilbert, district engineer, for their assistance in the compilation of this article.

Institute of Welding

Past Year's Activities

THE annual report of the Institute of Welding for the year ended March, 1944, shows the net increase of membership to have been 897, which compares with the previous year's figure of 377 and far exceeds the highest ever before recorded. The total of 3,252 includes the first results of a recruitment campaign launched this year, but the rate of increase will have to be quickened if the target of 5,000 members is to be reached by the end of this year.

There are now twelve branches, two new ones having been recognised during the year. Various schemes for the improvement of the organisation of the Institute have been investigated and important proposals are to be laid before members shortly.

There have been additions to the library, which during the year lent 961 publications and 40 lantern slides to 591 borrowers apart from some 400 inquiries dealt with by post and telephone.

Educational syllabuses on welding for designers and draughtsmen in specialised branches of engineering are being drawn up, the first two respectively serving as a general introduction and covering application to shipbuilding. With the help of the Board of Education they have been made known to technical colleges in seaports and shipbuilding towns; courses of lectures based upon these syllabuses have now been arranged at various centres.

Research Extension

Possible effects of establishing the Welding Research Council as a separate research association have been studied. Its administrative machinery, having become somewhat complicated, has been reorganised to simplify the committee structure. The provision of central laboratories has not been excluded, but the Council's work continues to be mostly on a co-operative basis, undertaken by groups of investigators utilising the facilities of various organisations. In future, to preserve continuity, it seems likely that research groups will be established at certain universities with senior investigators paid by the Welding Research Council. Such an arrangement has already been put into operation at Cambridge University.

Expenditure on research amounted to £8,557 last year and is expected to reach £20,000 this year. Contributions have gradually increased to £9,000 and there is now a reserve of £11,000. The Department of Scientific and Industrial Research has agreed to double its former grant of £4,500, subject to the collection of an industrial subscription of £12,000.

Great Expansion of Use

During the war years the numbers of welders employed and of resistance machines used have more than doubled and the consumption of electrodes has increased threefold. Welding has enabled many kinds of munitions to be made in quantities and of a quality which, it is claimed, could not have been achieved by other means.

Electricity in the Highlands

Hydro-Electric Board's First Scheme

PLANS for three of the 102 water-power projects to be developed by the North of Scotland Hydro-Electric Board have been issued as "Constructional Scheme No. 1" (Board's offices, Edinburgh, 2s. 9d. net). Capital expenditure is estimated at £4,600,000 for an aggregate installed capacity of 136,000 kW of three-phase 50-cycle plant. The scheme has been approved by the Amenity and Fisheries Committees and by the Electricity Commissioners, but before construction can be started forty days are allowed for the entering of objections, in respect of which the Secretary of State may order an inquiry. After confirmation by the Secretary of State the scheme will lie before Parliament for forty days. The Board's powers for compulsory purchase of land in the areas will cease at the end of 1947. No roads or paths will be closed until approved alternatives have been constructed.

The document consists of seven pages of printed matter, dealing mainly with civil engineering aspects, and three maps. Much the largest station is Loch Sloy with 130,000 kW installed and an expected output of 100 million kWh in years of normal rainfall. It will be situated on the west bank of Loch Lomond, four miles north of Tarbet. A dam at the north-east end will store the equivalent of 20 million kWh. Tunnels (including one of two miles through Ben Vorlich) and aqueducts will tap lochs and tributaries over an area of 30 sq. miles. The maximum operating head will be 890 ft. A small amount of water will, if required, be pumped from Loch Lomond by night to pass through the turbines by day. Main technical details of the scheme were worked out by Mr. James Williamson, of Sir Wm. Arrol & Co., Ltd., who is one of the technical advisers to the Board and was a member of the Cooper Committee.

Two Smaller Stations

The second station of 2,000-kW capacity will have an annual output of 5 million kWh. Its chief purpose is to supply local requirements (estimated at present at 600 kW) of four towns in the west of the mainland of Inverness-shire near the fishing port of Mallaig. Loch Morar will be dammed at its outlet and the water led by an aqueduct to a generating station to be built on the river of the same name. A fish pass will be included in the dam and the Board will maintain an average daily flow in it of 10 million gal. for freshets at the rate of 4½ million gal. per day and a discharge into the river, over the falls or through the power station, of 20 million gal. daily. The Morar station will have an operating head for the first stage of the scheme of 19 ft., to be increased to 24 ft. when the level of the loch is raised.

Lochalsh station, near Nostie Bridge, Inverness-shire, is also intended primarily to supply the electrical requirements of the district. Its ultimate capacity is to be 4,000 kW, but in the first stage provision will be made for only 1,000 kW and for one of two projected storage reservoirs. Compensation water at the rate of one million gal. per day is to be given from the dam. Technical details of this and the Morar schemes have been prepared by Sir William Halcrow and Partners.

London J.E.A.

AMONG the matters to be dealt with at yesterday's meeting of the London and Home Counties Joint Electricity Authority were the following items from Committees:—

Purchase Rights.—The General Purposes Committee has appointed a special sub-committee to consider what action should be taken with regard to purchase rights over electricity supply undertakings vested in the Authority and in local authorities in the London and Home Counties Electricity District.

Post-War Street Lighting.—The Thames Valley (No. 1) Area Committee has suggested the desirability of synchronising, as far as practicable, the arrangements for the resumption after the war of street lighting in the Thames Valley Area and securing co-operation between the bodies concerned. It was proposed that the Authority's chief engineer should convene a meeting of responsible officials in the area for general discussions. The Local Distribution Committee has approved the proposal and has decided to extend the conference to the Mid-Surrey (No. 3) Area.

Upon the general question, as it affects the whole of the Authority's District, the General Purposes Committee recommends that representations should be made to the appropriate Government Departments, suggesting the desirability of action being taken, by Order or otherwise, to provide for synchronising as far as practicable the arrangements for the resumption of public street lighting throughout the District.

Extensions at Burford.—The Local Distribution Committee states that in order to deal adequately after the war with the reconditioning of domestic appliances at the Authority's Burford establishment an extension will be necessary. The Committee has authorised the retention of an architect to prepare plans for an extension. It is proposed to secure the early approval of the Boxhill Preservation Committee and the Electricity Commissioners so that tenders may be obtained when the appropriate permits are secured from the Government.

Rising Mains in Flats

A New Form of Distribution Box

By E. E. Jolly,
M.I.E.E., A.M.I.Mech.E.
(Borough Electrical Engineer, Bethnal Green)

FOR use principally in blocks of flats, but equally applicable to commercial and industrial premises, a new type of distribution box has been developed having in mind the increase in domestic loadings to be expected after the war* and the necessity for lower distribution costs.

Accommodation of rising main system in chase

After due consideration of the probable layout of post-war blocks of flats, it was decided that a single design of box would meet all requirements. Since experience has shown that the number of flats per floor per staircase seldom exceeds six the box was designed to serve twelve consumers.

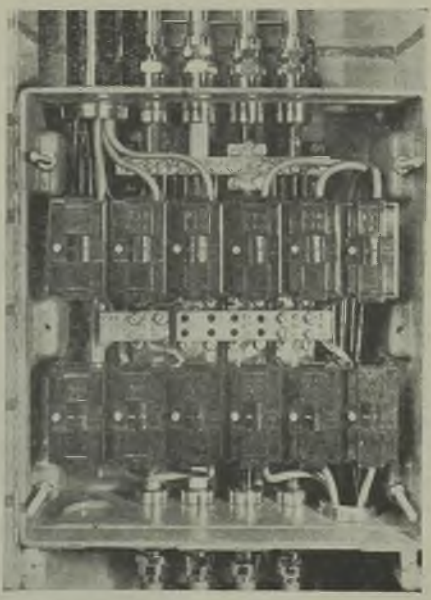
Boxes would, therefore, normally be installed on alternate floors, unless there were more than six flats per floor, when one box would be provided for each floor. The apparent wastage of fuseways should be easily offset by the many advantages of standardising one size of box.

Two clearly defined types of buildings were considered, necessitating different methods of installation and possibly different types of cabling. The first type of building will have a chase in which both the rising-main cabling and the distribution box can be accommodated. The rising mains will be installed simultaneously with the building construction and, after the distribution equipment has been installed, the 13½-in. chase will be covered with expanded metal so as to make a foundation for the plaster or tile covering.

The second type of building is the old block of flats previously without a supply of electricity or wired for lighting only. As the cost of cutting a 13½ by 4½-in. chase from the bottom to the top of the building would be prohibitive, all the equipment will have to be fixed to the surface of the staircase wall.

The system described has been devised to employ both rising-main box and cabling capable of meeting the requirements of both types of buildings. Its cost has been minimised by standardising one size of box, reducing the number of boxes per rising main where possible by making one box serve two floors, and reducing the length of time taken to install the rising main boxes and cabling.

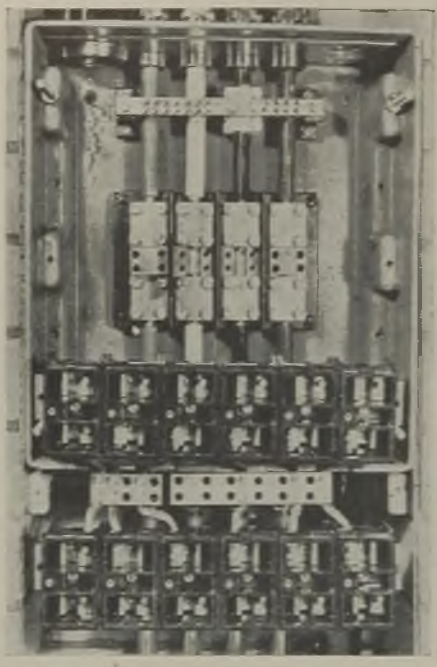
This reduction in time has been obtained by discontinuing the use of multi-core non-



General view of distribution box with cover and insulating screens removed

* See "Diversity Factor" by E. E. Jolly, *Electrical Review*, September 10th, 1943.

bleeding lead-covered cable in favour of a mineral-insulated copper-sheathed cable which could be used equally well in both



Mounting of fuse carriers and busbars (both shown disconnected and temporarily suspended for purpose of illustration

types of building. For new buildings, however, in which a chase is provided, a simpler type of conductor, consisting of copper rod covered with p.v.c., rubber or other form of insulating material, would do equally well as it will be less liable to damage or subject to unauthorised interference owing to the protection afforded by the chase covering. In the older type of building where a weatherproof well-insulated cable possessing good mechanical strength is required, the copper-sheathed mineral-insulated type should be used.

The box has been so designed as to facilitate installation and connection to the rising-main cabling. The only tool required is a screwdriver if the cables are previously prepared in the workshops, and this procedure is definitely recommended. The design of the conductor fittings caters for any reasonable variations in the lengths of the conductors between the boxes.

The shell of the box is made of cast-iron of substantial thickness, the external dimensions being 13½ in. wide by 14⅝ in. high by 5⅜ in. deep. It is provided with four holes side by side in the top and bottom of the casting to accommodate the rising main cables. Two 2-in. holes at each side of the main cabling are provided in both the top and bottom of the box for connection of the conduit containing the sub-service lines to individual consumers; these holes are provided with blanking plates which can be drilled for conduit of smaller diameter. The casting is fixed to the wall of the building by means of four screws through the back.

Provision is made inside the box for accommodating the ends of the rising-main cable conductors in heavy brass connecting clamps, the back portions of which are fixed to a moulded plastic base which in turn is fixed to the back of the casting. This base is provided with fillets between the clamps to ensure adequate inter-phase insulation. The front portions of the clamps are in two pieces, each of which holds one conductor firmly to the back portion.

The twelve fuse carriers, all of which take 60-A h.r.c. cartridge fuses, are mounted in two banks, one above and the other below the two phase busbars, which are assembled in line horizontally and have an insulating fillet fitted between them. The connections between the twelve fuseways and the busbars are made by passing flexible copper conductors through holes drilled in the busbar and clamped in position with screws. The

Method of obtaining phase selectivity

free ends of the flexible conductors are then inserted into the fuse-carrier terminals, one in the upper and the other in the lower bank. The complete assembly of fuses and busbars is mounted in the box in front of, and separated from, the rising-main conductor clamp fittings.

Connection is made between the main cable conductors and the busbars by inserting a suitably drilled brass block between the selected rising-main connecting clamp and the busbar and bolting the three components firmly together; the same procedure is adopted for the other phase busbar. When using mineral-insulated cables the copper sheaths of the cables must be bonded together both above and below the box and a connection taken to the box casting. There are no soldered connections in the box.

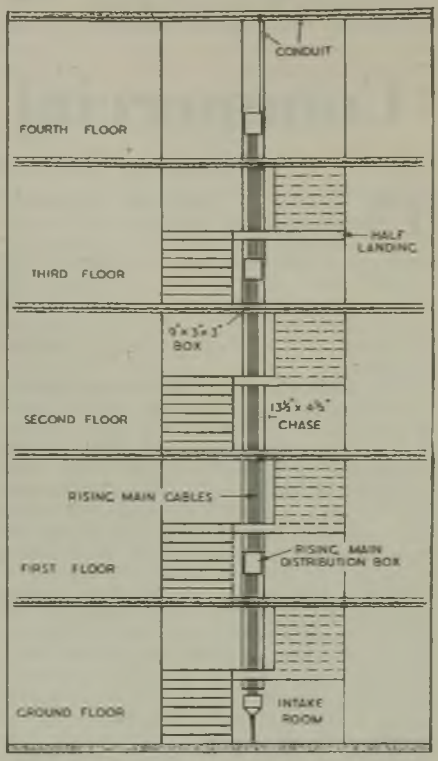
Selection of Phases

Although three phase conductors are passed through the box, connections are made to only two of these, the third phase being available as an alternative. To obtain selectivity of phases, the two busbars are of unequal length so that when the short busbar is mounted to the left of the box, it will reach only to the red-phase clamp, while the long busbar will pass over both the white and blue phase clamps. A choice is thus obtained of either red and white or red and blue phases by merely inserting the brass connector blocks in the red and either white or blue phases.

Similarly, when the busbars are mounted with the short bar to the right of the box, that is, by turning the complete assembly through 180 deg., it will reach only to the blue phase clamp, while the long bar will pass over the red and white phase clamps, thus giving a third combination, white and blue. The neutral busbar is fitted between the top bank of the fuse carrier and the top of the casting and is mounted on moulded insulators. This bar is drilled to accommodate twelve consumers' neutral cables (up to 7/·064 in. conductors), each cable being clamped by two screws. The neutral busbar is connected to the rising neutral by inserting the split clamp round the neutral conductor immediately behind the busbar. The two components are thus bolted firmly together.

The maximum time to effect a phase change is estimated at fifteen minutes, for which purpose the rising main would have to be made dead; experience indicates that this operation is seldom necessary, although the facilities are desirable.

A typical rising-main layout for a five-storey block of flats is shown in the accompanying drawing. The multi-core underground service cable at the intake position terminates in heavy duty cut-outs fitted with h.r.c. fuses; the top connectors of the cut-outs are suitable for connection to either mineral-insulated cables, solid copper p.v.c.-covered or any other form of insulated copper rod. The rising mains would then be run to the first box situated on the first half landing. From this box, conduit is shown running down to a 9 by 3 by 3 in. conduit inspection



Rising main for five-storey block of flats

box to which would be connected the conduits feeding various flats on the ground floor. Likewise a 2-in. conduit rising from the top of the box would feed flats on the first floor. This arrangement is again repeated for the second and third floors by the installation of a box on the third half landing, and finally a terminal box on the top floor to provide for the fourth floor consumers.

This layout would cater for six flats per floor. If, however, there were between seven and twelve flats per floor, a box would be fixed on each half landing and two conduits taken away from the top of the box. The consumers' main fuses would be in the rising-main box and no additional fuses would be provided in the flats.

If an installation were carried out in a five-storey block of flats (say thirty tenants) and it was decided to use mineral-insulated

cable, then a 0·1 sq. in. conductor would provide a suitable cross-sectional area, with a service cable of 0·15 sq. in. section. If, however, a ten-storey block (say sixty tenants) were to be catered for, then the rising-main mineral-insulated cable should have a cross-sectional area of 0·2 sq. in. with a service cable of 0·3 sq. in. section. When cables other than mineral-insulated are used, the conductors could advantageously be manufactured in standard cross-sectional areas, namely, 0·1 sq. in. and 0·2 sq. in., for which standard clamps (and sleeves to accommodate the smaller area) will be suitable.

I would like to express my appreciation to the members of the staff who have assisted in the development of the box.

Commercial Thermostats

General Survey of Available Types

THE scarcity of books on commercial thermostats, the literature of the subject appearing principally to consist of papers and pamphlets concerned with special aspects, adds value to MR. R. GRIERSON'S lengthy survey of temperature-sensitive devices at the special summer meeting in London of the Institution of Heating and Ventilating Engineers.

The author stresses, as a matter of urgency at the moment, the necessity for the issue of a B.S.S. at no very distant date covering classification, nomenclature, rating, leading dimensions and performance. He then proceeds to definitions, general principles and classification into six types, of which three are electrical, covering the whole commercial range of temperatures from above 3,630 deg. F. down to minus 330 deg. F.

Above 1,300 deg. F. the heat energy radiated from a hot body (furnace, for example) might be focused on to a thermo-couple by means of a concave mirror, which could be situated 3 ft. or more away from the source of heat. For the 0 to 2,550 deg. F. range a series of thermo-couples could be constructed of base and rare metals. At least one manufacturer is prepared to offer a standard bi-metal instrument of the stem or immersion type for up to 1,830 deg. F., but the more usual limit is 600 deg. Of the "filled" class, there is the mercury-in-steel type, for from 1,110 to minus 40 deg. F. and the vapour pressure (volatile liquid) type for from 650 to minus 5 deg. F.

When the temperature to be controlled does not exceed 1,000 deg. F. devices operating on the variation of electrical resistance principle are considered suitable for many purposes. Where electrical circuits are concerned thermostats may conveniently be grouped according to the method by which control is exercised such as on-off, two-position, or high-low ordinary bi-metal types and the three-position high-off-low mercury switches.

Space restriction has confined the author's consideration to bi-metal types. He discusses the ambient-thermal condition, performance inconstancy and operating differentials in fine regulation, leading up to an analysis of the thermostat cycle. Commercial forms of stem (immersed) types are dealt with; the viscosity of temperature-controlled fluids and the possibility of chemical action; also the degree of mixing of temperature-controlled fluids, accuracy of scale calibration and reliability in service.

Next in order of discussion are multiple contact thermostats and the control of electric air heaters; surface type thermostats and factors that influence the performance of space-heating regulators; thermostat performance tests; heat accelerated (anticipating) and "wander" (accelerated) thermostats as well as the effects of radiant warmth and ambient air temperature on the performance of space-heating regulators.

After explaining that the automatic adjustment of the surface temperature of space heaters is an important addition to the thermal comfort of electrically warmed rooms and buildings because it assists in "heat levelling," the author comments on the determination of positions for fixing space-heating thermostats, with final references to reliability in service. He states that the information on which his survey is based was collected for the Northmet Power Co.

Data on Metals

MECHANICAL properties of many metals and numerous alloys are set out in Circular C447 of the U.S. National Bureau of Standards, which is a bound volume of 481 pages obtainable from the Government Printing Office, Washington, D C., price $1.50. Such information is rarely found in systematic form; hence this valuable compilation, which is based on a comprehensive survey of the literature of the subject. It is up to date and arranged for quick reference, data at normal, high and low temperatures being presented in tabulated form although graphical representation is used to indicate the effects of changing composition and conditions. Electrical properties are included and the tables of conductivities (electrical and thermal) and expansion will be specially useful to welders.

Organisations of the Industry—III

Incorporated Association of Electric Power Companies

THE Incorporated Association of Electric Power Companies, which holds an important place in the electricity supply industry of this country, was incorporated nearly 40 years ago with the object of encouraging, expediting and facilitating the development of the supply of electricity for power, light and other purposes. The Association originally consisted of seven members, which number increased from time to time as the usefulness of the Association became apparent. It now has nineteen members, being all the power companies in this country, and also five associate members.

By William McGill, J.P.
(Past President of the Association)

Mr. J. S. Highfield, M.Inst.C.E., M.I.E.E., Mr. R. P. Sloan, C.B.E., M.I.E.E., and Sir James Devonshire, K.B.E., M.I.E.E., have been elected honorary members in recognition of their services to the electricity supply industry in general and to the electric power companies in particular. Sir James Devonshire was one of the original founders of the Association.

The expression "power company" as defined by Section 36 of the Electricity Supply) Act, 1919, means any company or person (other than a railway company being the owners or lessees of a railway generating station) authorised by special Act to supply electricity to authorised distributors and lighting authorities or to other persons for power purposes, whether with or without a subsidiary power to supply electricity for lighting purposes.

The legislation by which power companies were established dates back to the beginning of the century when the power companies were incorporated by Special Acts. Each power company operates under its own special Act and the general Electricity (Supply) Acts and in brief it can be said:—(1) That the statutory powers of power companies under the special Acts authorise them to supply electricity in extensive areas, which are mainly rural or semi-rural, for the purposes described in Section 36 of the Act of 1919, *i.e.*, to consumers for industrial purposes and to authorised distributors and lighting authorities; (2) that these statutory powers are held in perpetuity; and (3) that the undertakings established by the power companies under the special Acts are not subject to purchase by local authorities.

Almost without exception, the power companies subsequently obtained subsidiary statutory powers, by provisional and special Orders, to enable them to supply electricity for all purposes in the areas defined in the special Acts. The undertakings under the Orders, unlike the undertakings under the special Acts, are purchasable by local authorities at the dates and on the terms prescribed by the various Orders.

The power companies can with pride claim to be the pioneers of modern developments in the generation and distribution of electricity, such as the centralisation of generation in large steam stations, the utilisation of water-power resources in Scotland and North Wales for the generation of electricity at large hydro-electric stations, the adoption of extra-high-voltage long-distance transmission lines and the use of overhead lines and of three-phase distribution. The power companies have, by their progressive and enterprising policy, established a widespread and efficient business of generating and distributing electricity and in their respective areas they provide a cheap and abundant supply of electricity for all purposes.

The importance of the power companies may be gathered from the fact that the areas of supply of those companies and their associated undertakings extend in the aggregate to approximately two-thirds of the territory (88,745 square miles) of England, Scotland and Wales and that they own and operate nearly one-half of the plant installed (8,658,000 kW in 1939, now considerably increased) at the selected generating stations which are operated under the direction of the Central Electricity Board. The selected generating stations belonging to the companies are amongst the most modern and efficient in this country and the aggregate of the capital expenditure of the companies exceeds £250,000,000.

Work of the Association

The Association has, since it was incorporated, contributed to the successful administration and development of the business of supplying electricity in the areas of power companies by securing, preparing and disseminating information for its members and by providing a medium for the mutual exchange of views and experience.

Throughout the 40 years of its existence, every major question, and many of the

minor ones, which have affected power companies in any way have been considered by the Association as they have come to the fore. In addition, many suggestions for the development and improvement of electricity supply have originated with the constituent companies and such questions have been the subject of discussion and consideration. The Association has, when necessary, represented power companies in discussions with Government Departments, the Electricity Commissioners and the C.E.B. and has entered into consultation and co-operation with kindred organisations.

The work of the Association is carried on by a Council which is fully representative of the constituent companies, since each company has a representative on the Council. There are several standing committees dealing with technical, parliamentary and commercial matters and special committees are formed from time to time to consider particular matters of interest to the members. The subjects with which these special committees are at present dealing include public relations and the standardisation of tariffs, voltages and systems of supply.

Brig.-Gen. R. F. Legge President, I.A.E.P.C.

The Association has devoted considerable attention to post-war development, with particular reference to the electricity supply industry, in which the power companies must play an important part, and on November 24th, 1943, it presented to the Minister of Fuel and Power a memorandum with regard to the electricity supply industry in Great Britain. The recommendations contained in this memorandum follow closely those set out in the report of the McGowan Committee of May 8th, 1936, which has been the only Government committee appointed specifically to bring electricity distribution in this country under review.

President and Vice-Presidents

The officers of the Association have, since 1926, been a president (also chairman of the Council) and two vice-presidents. The President is Brig.-General R. F. Legge, C.B.E., D.S.O. (North Wales Power Co., Ltd.), and the previous holders of that office have been as follows:—

1926-1929: Mr. R. P. Sloan, C.B.E., M.I.E.E. (North-Eastern Electric Supply Co., Ltd.).

1929-1932: The late Mr. W. B. Woodhouse, M.Inst.C.E., M.I.E.E. (Yorkshire Electric Power Co.).

1932-1935: Mr. C. D. Taite, M.I.E.E. (Lancashire Electric Power Co.).

1935-1938: Captain J. M. Donaldson, M.C., M.Inst.C.E., M.I.E.E. (Northmet Power Co.).

1938-1941: Mr. William McGill, J.P. (Leicestershire & Warwickshire Electric Power Co.).

1941-43: Lt.-Col. S. E. Monkhouse, M.I.E.E. (North-Eastern Electric Supply Co., Ltd.).

The vice-presidents are Major Harry Richardson, M.C., J.P., M.I.E.E. (Metropolitan Electric Supply Co., Ltd.) and Mr. James Paterson (Clyde Valley Electrical Power Co.).

The Association has well-appointed offices at 58, Abbey House, Victoria Street, London, S.W.1, at which meetings of the Council and the various committees are held, and the secretary is Mr. J. A. MacKerrell, who was recently appointed following the death of the late secretary, Mr. Andrew Home-Morton.

Variation in Output

DR. S. WYATT and four assistants, working for the Industrial Health Research Board, Medical Research Council, have prepared "A Study of Variations in Output." (Stationery Office, price 4d.) It was found that the chief causes of fluctuations were changes in the type or design of product; mechanical difficulties and machine breakdowns; variations in the quality and quantity of material used; progressive improvements in the methods or conditions of work; changes in the type and lay-out of machines; and personal factors, *e.g.*, dissatisfaction with the method or rate of payment and occasional friction between the management and the workers.

Fifteen out of twenty groups covered showed an hourly increase of output due mainly to small but progressive improvements in the methods or conditions of work, but in some groups it was accelerated by fairly large scale measures of reorganisation.

It is fairly certain that, for the type of work and within the limits of reduction of hours dealt with in the investigation, a shortened working week may be expected to be followed by a tendency to increasing output. Nevertheless, other conditions frequently obscure the effect of reduction of hours and this effect is not readily determinable without rigid control of the other factors, and, within the limits of practicability, it may not be great. At present sweeping statements connecting reduction of working hours with either marked increase or decrease of output are not warranted, according to the authors of the report.

Fuel Economy

From the Ministry of Fuel and Power we have received a copy of Fuel Efficiency Bulletin No. 31 "Fuel Economy by Water Saving" which sets out a number of ways in which water (and thereby fuel) may be saved in factories. Among other things, it suggests means of reducing boiler-feed demand and deals with economies in cooling systems.

CORRESPONDENCE

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

High-Frequency Heating Costs

REPLYING to the letter from Mr. Oram in your issue of June 9th regarding the prices of British high-frequency heating equipment given in my article of May 26th, I thought I had made it clear that Figs. 5 and 6 and the table of prices were derived from a paper presented by Mr. J. F. Taylor before the *American* Society of Mechanical Engineers. In fact, in the various articles I have written on h.f. heating, I have gone to considerable pains to give bibliographies.

As everyone knows, high-frequency heating is not new, and it is only fair that the original workers should get most of the credit. I am one of the late-comers ! My interest in the subject is due to my friendship with the late Captain Jarrard who produced, so far as my experience goes, some of the earliest h.f. heated laminated wood samples.

I may be an entirely false prophet, but I think that h.f. heating will stimulate the production of laminated plastics in general, in the same way as, for example, phenol-formaldehyde glue films have encouraged the expansion of the laminated wood industry in particular. If British h.f. heating equipment prices do turn out to be approximately one-half, or one-third, the corresponding American prices it will be a very good thing for our export trade.

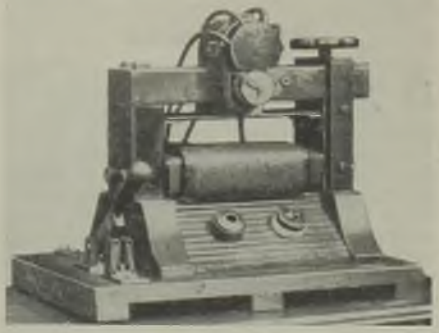
With high-frequency costs so reasonable I look forward to the day when every housewife will do her cooking by this method. I have already met one gentleman who testifies personally to the excellence of h.f. heated liver and bacon. Whether the system is suitable for steaks has not yet been decided, but perhaps some of the younger engineers will live to see their reappearance and will experiment with them.

*London, E.C.*1. A. E. L. JERVIS.

Wartime Makeshift

IN this part of the world, as elsewhere, war restrictions on supplies of materials have compelled us to make our own machinery. I have accordingly built the remagnetising machine shown in the enclosed photograph, which gives splendid results in reconditioning magnetos of cars, trucks and motor cycles.

Most of the parts I have picked up in second-hand shops. For winding the magnetising coil, 8-lb. No. 16 SWG double-cotton-covered wire has been used. An ordinary bungalow lighting switch and pilot indicator lamp are fitted on a ½-in. thick ribbed wooden battery separator. The soft-iron block on the right-hand side can be moved by turning the water-valve wheel shown so as to deal with magnetos of different sizes and shapes. To operate the magnetising



Home-made re-magnetiser

coil, which requires 15 A at 110 V DC, a heavy knife switch is fitted on the left-hand side.

Colombo, Ceylon. J. B. DE MEL.

Power Point Positions

THERE still appears to be a considerable controversy over the position of power and lighting plug points since it was first suggested that these should be fitted 30 in. from the floor level. Major Lloyd George is heading in the right direction by advocating this method of fitting, as in spite of any disadvantages it may possess, the advantages far outweigh them.

With regard to "decorating" the home with flexibles as mentioned by Mrs. A. Milne, surely a collection of twisted flexibles on the floor, mixed up with the legs of the chairs, trapped under furniture and trodden on is less advantageous than having the flexibles to various electrical apparatus shorter than previously and fitted to a plug point at a convenient height, since most of the apparatus used is not normally operated on the floor.

Amongst points for consideration are the location of switch-plugs for use to the best advantage, having regard to the anticipated disposition of the furnishings of the rooms, and the choice of colours of fittings and flexibles to blend with the decorative scheme. The correct choice of switch-plug to employ for any particular situation is of primary importance ; in most circumstances a flush or recessed pattern would be most suitable.

It is left in the hands of the consumers to

approve or disapprove of changes that may be suggested as a result of the initiative of enterprising electrical contractors in their post-war plans in breaking away from the old methods and creating a new and more acceptable form of service. It is certain that manufacturers would co-operate in the design of fittings to support the scheme if it were once set afoot, as they did when improved lighting fittings first replaced plain pendants.

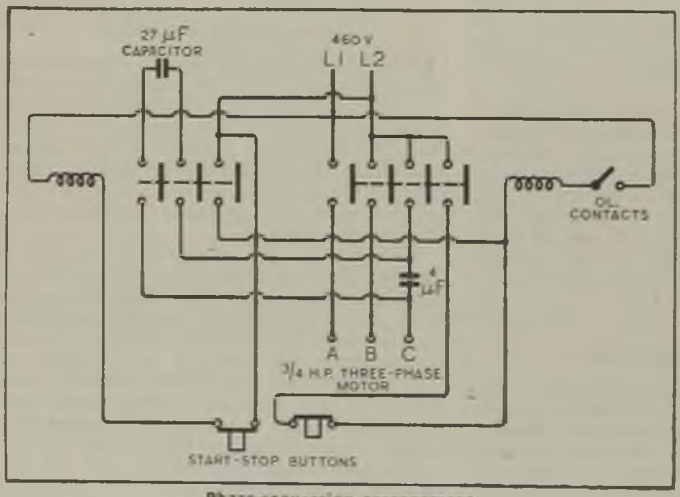
Loughborough. R. W. RAPSON.

Phase Conversion

A FRIEND of mine who owns a small factory recently asked my advice on the following problem, the solution of which might interest some of your readers.

A single-phase supply only at 460 V was available from the mains and it was desired to operate a 400–440-V three-phase motor, which formed an integral part of the equipment of a machine tool. Several devices were tried, with varying degrees of success, and the arrangement shown in the accompanying diagram was finally adopted.

The circuit is self-explanatory, the only point calling for mention being the 27 μF capacitor, which is used during starting only and enables a heavy starting current to be made available during this period. The motor operates perfectly on the 4 μF condenser once full speed has been attained, this taking approximately 75 sec.; the temperature rise is negligible, and no fault can be found with the performance of the unit, four full day and night shifts now having been completed.



Phase-conversion arrangement

Particular attention must be paid to the overload settings, as, if the start button is not depressed for a sufficiently long time (*viz.* 0·75 sec.) the motor fails to run up to speed. The overloads must be arranged to drop out and stop the motor when this occurs. It is quite simple to arrange this, and the arrangement is foolproof. I should be pleased to forward any of your readers further particulars of construction and settings on receipt of a stamped addressed envelope.

112, *Ridgeway Road, Sheffield.* G. MCAULEY.

Plugs and Sockets

HAVING been associated with electrical installation work for the past forty-five years, I can say from experience that more trouble is caused both to the consumer and the installer by the multiplicity of plug types and sizes than any other part of the installation.

In existing circumstances, one should logically connect standard lamps and wireless sets to 2-A plugs; kettles, toasters, etc., to 5-A; and electric fires to 15-A; and each circuit to the last-named should be run back to a separate fuse-way on a distribution board. In any but a very small house, 2, 5 and 15-A outlet facilities should be available at several positions in a room, a clumsy and costly arrangement—unless one socket at each position can satisfactorily be used in place of all three.

Explaining that it is bad practice at present to use a single outlet for all purposes—with adaptors to enable wireless, heating or other apparatus to be connected to the same socket—is the cause of much waste of time, and many headaches, especially when such "practice" has been followed by an enthusiastic amateur who claims that "no trouble has resulted."

I have had an opportunity of reading the brochure illustrating and describing the new plug and socket referred to by Mr. R. Amberton, and subject to the claims therein being substantiated in actual practice, I consider that officially sponsored standardisation of such a fitting would tend to provide greater safety and convenience, at a considerably lower installation cost.

I have not seen a sample of the new fuse plug and socket, much as I should like to do so, but I should judge from the description that it would be a very difficult matter for an amateur to replace the fuse with a piece of copper wire, as suggested by your corres-

pondent Mr. A. Milne. Were it possible for it to be done, it would be on the doer's own responsibility.

I presume that the makers would make available a suitable two-way or even three-way adaptor, in which event the present-day domestic plug troubles should disappear when homes are provided with the proposed new equipment as standard.

Croydon. J. H. ROBINSON.

MR. AMBERTON seems to have misread my letter; I was not criticising the fuse or plug (not having seen either), I was disagreeing with Mr. Illingworth's use of a 13-A fuse on an electric clock circuit. My expression "spluttering of molten metal" was meant to refer to the fault itself, not the fuse. I must admit that I should have made this point a little clearer.

In my opinion the possible fault current should be restricted to the lowest possible value. The manufacturers of the plugs used by Mr. Illingworth seem to hold similar views, as it appears they produce various colour coded fuses.

I regret that in his letter Mr. Andrews has degraded a technical discussion between engineers by sarcastic personal remarks. In his third paragraph, Mr. Andrews refers, in parenthesis, to the range of 2-, 5-, 10- and 13-A fuses, "for those who prefer definite fuse protection," and endeavours, in the next paragraph, to prove that only the 13-A is necessary. (But why stop at 13-A?) Surely a fuse designed to carry 13 A continuously has to have a current greater than 13 A passed through it before it will melt, and will not this current be considerably greater than the blowing current of a fuse designed to carry ½ A (the size which I said was considered desirable for an electric clock)?

If a 13-A fuse is carrying a normal load of, say, 12 A, then there is no spare capacity in the fuse for an additional destructive fault current, but if the fuse is supplying a load of, say, 1½ A or less, the spare capacity of the fuse will permit the fault current to rise to a much higher value. Mr. Andrews refers to the difference between the clearing times of the 13-A and 2-A fuses, but he is silent upon the actual values of the respective blowing currents. I should be interested to see oscillograms showing these values.

Mr. Andrews' concluding paragraph shows that he has not grasped the facts of the accident to which I referred. It was, in fact, the excellent earthing of the motor which was one of the causes of the flash. If the motor had not been earthed there would have been no apparent results when the bolt head cut the insulation. The machine was not portable, and was fixed on a hardwood floor.

Oldham. E. H. K. PALMER.

A Service Man's Views

MAY I, as a humble corporal in the R.A.F., make a few comments on the recent correspondence regarding compulsory registration and plugs and sockets.

Mr. Milne, in his call for compulsory registration, admits that it will not be infallible. What is his personal motive in this "fight for right" as he calls it, in safeguarding the public? Is it the "big stick" towards the small contractor? Who is to pay for this new officialdom—the consumer? All praise to the I.E.E. for its sound judgment! If there is to be registration at all, it should be in the form of safeguarding the apprentice and craftsman who may wish to start business on their own, and not just creating a privilege for the few.

With regard to the new 3-kW plug, I have not yet seen one, of course, but the remarks in favour of it have convinced me of its value, especially in post-war housing schemes. By tapping direct to a ring main it will be possible to offer a more efficient service to the householder, besides initial economy.

Those in civilian life, who at the moment are responsible for the guidance of domestic development, have a grave responsibility to us at present in the forces. We hope that they will not fail us by getting tied up with red tape and displaying a lack of imagination. This is an opportunity to introduce new methods and so pave the way to all-electric homes. Remember our chief competitor is not standing still!

CYRIL W. RICHARDSON.

Royal Air Force.

Conduits for Services

I AM obliged to you for the reference in your issue of June 30th to the suggestion made in my address to the members of the Hampshire Sub-Centre of the Institution of Electrical Engineers, that a conduit should be laid by the builders of new property.

It might be of interest to note that some representatives of the Post Office Telephone Department called on me and suggested that the conduit should be a four-way one. Apparently the substitution of underground cables for overhead lines in new areas is being considered, and the third conduit way, which would be spare, assuming that either electricity or gas only, and not both, will be permitted in new houses, would be available for the telephone service. Might not organisation be carried somewhat further in the new towns which it is suggested should be built in the future, and definite positions allocated to public utility mains laid under footpaths? In many cases to-day gas and water mains are put under footpaths and the use of concrete roads in the future will make this arrangement generally advisable. Normally the electricity distribution mains

are laid somewhat shallower than gas or water mains, and I would suggest that the following should be the order to be adopted:—

Starting from the front wall or boundary of the property, electricity, water, gas and telephone. These should be kept reasonably compact, leaving room for working between each set and space between the telephone cable and the kerb for future requirements. A footpath width of 10 ft. might be adopted as a minimum, and a grass verge left for tree planting.

Portsmouth. A. G. HISCOCK.

PERSONAL and SOCIAL

News of Men and Women of the Industry

AN education officer to develop and control training in the Engineering Division is required by the British Broadcasting Corporation. His duties will include the control of an engineering training school and instructional staff. The post is advertised in our "Situations Vacant" section; a salary up to £1,250 is offered.

The Electrical Power Engineers' Association is advertising for two assistant secretaries, for the Northern Area (Edinburgh) and the North-Western Area (Manchester). It is stipulated that applicants should have had experience in the electricity supply industry, preferably on the technical side.

In anticipation of an appreciable expansion of its activities after the war the Illuminating Engineering Society is inviting applications for the position of secretary. This does not portend any diminution of the work or status of **Mr. J. S. Dow**, whose time will continue to be fully occupied in his capacity as honorary secretary.

The Sheffield Electricity Department is advertising for a stations superintendent. The salary offered is in accordance with Class J, Grade 3, of the N.J.B. Schedule—£713 rising to £748.

Lieut. L. C. H. Porter, R.N.V.R., son of the late Mr. Geoffrey Porter who was borough electrical engineer of Worthing for thirty-four years, has been awarded a second bar to his Distinguished Service Cross.

Flight-Sgt. H. C. Clayton, son of Mr. Harry Clayton, Preston Corporation's transport manager, has been awarded the D.F.M. for his part in photographing enemy targets during bombing sorties.

Lieut.-Col. W. H. Adcock, B.Sc., A.M.I.E.E., who before the war was a member of the staff of the General Electric Co., Ltd., in India, is now serving as a C.R.E. with "Paiforce" and was recently mentioned in dispatches for gallant and distinguished services.

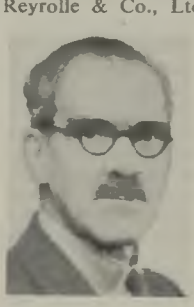
Mr. Richard H. Fox, who relinquished his dual post as secretary and solicitor of the Central Electricity Board at the end of June, has been presented with a silver inkstand as a parting gift from the staff.

On several occasions the Metropolitan-Vickers Dramatic and Operatic Society, as a tribute to its standing in the amateur dramatic field, has been called upon to sponsor a performance by a C.E.M.A. (Council for the Encouragement of Music and Arts) company. The most recent occasion was on June 27th, when the M-V Society engaged the Sale Town Hall for a memorable rendering of Clemence Dane's play "A Bill of Divorcement." The public were able to enjoy to the full the artistic pleasure derived from C.E.M.A. activities.

Mr. William R. Murray, borough electrical engineer, of Stirling, is to retire for reasons of health on August 15th. Mr. Murray's health has been poor for some time and he wished to retire in 1942, but at the Electricity Committee's request he has continued in his post.

As his successor, **Mr. G. T. Allcock**, is unable to take over his new duties until the end of August, **Mr. Percy E. Rycroft** has accepted the invitation of the Great Yarmouth Corporation to retain control of the electricity undertaking until that date.

Mr. C. A. Stephens who, as reported in our last issue, has been appointed a director of A. Reyrolle & Co., Ltd., joined the company in 1921 as a sales engineer, and was later appointed sales representative for the Midlands area. He subsequently became overseas contracts manager, responsible for the whole of the Reyrolle organisation overseas, and he has travelled extensively on the company's business in all parts of the world. Soon after the outbreak of war he was appointed deputy contracts manager, with responsibilities for war contracts, and has recently become acting works manager.



Mr. C. A. Stephens

At the annual meeting of J. Stone & Co., Ltd., last week, **Messrs. Powell-Jones, R. Preston** and **A. P. H. Aitken** were elected directors as the result of a poll.

On June 24th a party of about fifty members of the North Staffordshire Institute of Mining Engineers visited the Stafford works of the English Electric Co., Ltd. The visitors included Mr. James Cadman, president, and Mr. F. Rylance, secretary. They were received by Mr. J. W. C. Milligan (manager, Stafford Works) and Mr. E. B. Banks (deputy commercial manager); later during the tour of the works the party was joined by Sir George Nelson (chairman and managing director of the English Electric Co.). The visitors were shown over the whole of the works, including the Research Laboratory. They were entertained to lunch, in the course of which Mr. Cadman expressed his thanks for the courteous reception they had

received and for the very interesting visit. In his reply, Sir George Nelson welcomed the visitors and emphasised the great importance which he attached to research. He also indicated his intention of continuing to co-operate most closely with the mining industry.

Messrs. C. F. Bamkin, chief engineering assistant, and **H. G. Garrett,** mains foreman, have just retired after many years' service with the Salisbury Electric Light & Supply Co. On behalf of their colleagues presentations have been made to them by Mr. R. A. McCulloch, the engineer and manager.

Mr. Victor F. Saulet has been appointed engineer and technical representative to the Industrial & Engineering Development Association. He is well known to steam users both at home and in France, having represented Bennis Combustion, Ltd., for over twenty-eight years in both countries.

Mr. C. Lacy-Hulbert has been appointed a joint managing director of the Simplex Electric Co., Ltd. Mr. Lacy-Hulbert, who was educated at Oundle and Clare College, Cambridge, joined the Tube Investments group in 1930 and for the next four years was engaged in research work on electrical welding and the development and design of electrical and domestic and other appliances. In 1934 he established the Simplex Company's subsidiary concern in South Africa and since his return to this country in 1939 until now he has been engaged in the production of steel tubes. He has also been appointed joint managing director of Mersey Cable Works, Ltd.

Mr. Walker Robinson has retired from the directorate of Rashleigh Phipps & Co., Ltd., after fifty-two years' service with the company, and **Mr. John L. Dingley** has been appointed to the board.

Mr. Godfrey Ernest Rhodes has been appointed a director of the Craigpark Electric Cable Co., Ltd.

Mr. W. Hadley, London district sales manager for E. H. Jones (Machine Tools), Ltd., since September, 1938, is shortly leaving the company to take up a new position elsewhere.

Alderman Richard Mayne, chairman of the Newcastle-on-Tyne Transport and Electricity Committee for twenty-nine years, has resigned, but will continue as a member of the Committee. Alderman Mayne has been a member of the City Council for forty years and was appointed chairman of the Committee in 1915. Under his chairmanship a scheme was begun for converting the tram service to trolley-buses, and many routes have already been changed over.

Mr. A. Richardson, rolling stock engineer in the Newcastle-on-Tyne transport department is to retire in October after forty years' service.

Mr. Sidney F. Luckly, mechanical maintenance superintendent to Leeds Corporation Electricity Department, has been appointed to fill a vacancy on Horsforth Council.

Obituary

Dr. R. Dowson.—We deeply regret to record the sudden death on June 28th at his home at Tranwell Woods, near Morpeth, of Dr. R. Dowson, for many years an associate of the late Sir Charles Parsons in the development of the steam turbine. Dr. Dowson, who was fifty-six, was educated at Oundle School, later becoming an external student at the University of London. During the college vacation periods he joined the staff of C. A. Parsons & Co., Ltd., at Heaton as a student apprentice and on obtaining his B.Sc. degree became attached to the company's turbine design department. In 1929 he became manager of the Technical Development Department and in 1943 was appointed chief research engineer. He visited the Continent in the interests of the company many times, and was able to obtain much valuable information on turbine practice abroad. In conjunction with Sir Charles Parsons he read a paper at the Second World Power Conference in Berlin in 1930 entitled "The Use in Power Stations of Steam Turbines Having with their Auxiliaries Large Overload Capacities."

Dr. Dowson contributed many valuable papers to technical institutions throughout the country and articles to the technical Press. His most notable works in this connection were his articles entitled "Development of the Steam Turbine," published in the Dictionary of Applied Physics, Vol. 1, 1922, and "Steam Turbines," in the Encyclopædia Britannica, 14th Edition, 1929. He was a member of the Institutions of Civil and Mechanical Engineers. He represented his company on various committees of the British Electrical and Allied Industries Research Association, being chairman of the Condenser Research Section, chairman of the Sub-Committee on Ferrous Condenser Tubes, a member of the Corrosion Research Sub-Committee, a member of the Steam Power Plant Section, and a member of the Sub-Committee dealing with the Properties of Steam. In 1942 he obtained the Ph.D. degree in the Faculty of Engineering of the University of London.

Miss A. Curtis.—We regret to report that Miss Anne Curtis, a director of Technical & Power Publicity, Ltd., lost her life on June 20th due to enemy action. Miss Curtis had been a director of the company since its inauguration in 1937, having previously been with International Combustion, Ltd.

Mr. E. Seddon.—We learn with regret that Mr. Edwin Seddon, who retired in 1940 from the post of city electrical engineer and manager at Edinburgh which he had held for sixteen years, died in a nursing home on June 30th.

Mr. Seddon served his engineering apprenticeship in Manchester, and later held posts with the Blackpool, Hanley, Eastbourne, and West Ham undertakings. He entered the service of Edinburgh Corporation in 1912 and twelve years later was appointed to manage the undertaking. The capital expended upon it at that time was £3,000,000, and in 1940, when Mr. Seddon retired, it had risen to over £7,000,000. Progress in the last ten years of Mr. Seddon's managership can be judged from the fact that the quantity of electricity sold was more than doubled. When he retired the Public Utilities Committee recommended the payment to him of £1,000 for the work which he had done in connection with the design of three large extensions of the Portobello station.

At the last meeting of the Committee Councillor Edward, the chairman, paid a tribute to Mr. Seddon's great work.

Although Mr. Seddon held many offices he did not confine himself to purely electrical

interests and was at one time President of the Scottish Society of Arts. In 1936 he was president of the Incorporated Municipal Electrical Association, and he was also a past-president of the Scottish Centre of the I.E.E. He was sixty-four years of age and is survived by his wife, and a son, who holds an army commission, and by a daughter.

Mr. P. S. Turner.—The memorial service at St. Michael's, Cornhill, E.C., on June 29th, to the late Mr. P. S. Turner (Associated Electrical Industries, Ltd.) was attended by many representatives of the companies with which he was connected including Sir Felix Pole, Sir George Bailey, and Messrs. H. C. Pierson, I. R. Cox and D. McArthur. Also present were Sir Harry Railing, Sir Leonard Pearce, Sir George Nelson, Sir Alan Rae Smith, Sir Sven Hansen and Lady McKinstry. Mrs. Turner was prevented by illness from attending.

Mr. S. H. Hodgkin.—We regret to learn of the death on June 29th, at the age of eighty-five, of Mr. Stanley Howard Hodgkin, chairman of the Pulsometer Engineering Co., Ltd.

NEW BOOKS

Diesel Electric Shunting Locomotives. By V. Finegan, B.E. Pp. 192; figs. 84. George Newnes, Ltd., Tower House, Southampton Street, Strand, W.C.2. Price 7s. 6d.

The Diesel engine has, in recent years, proved itself to be an efficient and reliable alternative to the steam engine for the powering of railway locomotives. Considerable difficulty has, however, been experienced in devising a flexible system of control between the engine shaft and the driving wheels of the locomotive, and while toothed gearing and hydraulic couplings have both been tried with a certain measure of success, the electric drive has undoubtedly proved itself to be superior to both of these, particularly for shunting engines. It was only a few weeks ago that Mr. C. E. Fairbairn presented a paper to the Institution of Locomotive Engineers in which he testified to the success which after 10 years' experience has followed the adoption of this type of shunting engine on the L.M.S. Railway of which he is the acting chief mechanical engineer and electrical engineer. In the course of his paper Mr. Fairbairn asserted that there can be no doubt of the success of the Diesel electric shunters and he expressed the opinion that a greater use of these may be expected in normal times.

Thus, the book under review may be said to make a very timely appearance, particularly as, so far as we can discover, it is the first to be published in this country dealing exclusively with Diesel electric shunting locomotives. Written primarily for drivers, maintenance fitters and electricians, the book is thoroughly practical in its outlook and it can be recommended to all engineers who are interested in the applications of electricity to traction problems. The electrical side of the locomotive is very well covered not only as regards the generators and motors but also the control equipment, brake gear and so on, while the problems of routine maintenance and overhaul are adequately dealt with. Illustrated descriptions of various types of Diesel electric shunting locomotives are given and the wiring diagrams, which are very clearly drawn, constitute a valuable feature of the book.—A.R.

Engineering Materials Annual and **Engineering Production Annual.** Pp. 106 and 102. Edited by H. H. Jackson, A.F.R.Ae.S., M.I.E.I. Paul Elek (Publishers), Ltd., Africa House, Kingsway, London, W.C.2. Price 8s. 6d. each.

The purpose of these Development Reference Annuals is to provide concise reviews of developments in various branches of engineering during the past year, together with adequate references to detailed information. Each chapter or section is, practically speaking, a brief summary of the recent literature on the subject followed by a list of references. In the materials volume the sections cover iron and steel, non-ferrous metals, plastics, natural and synthetic rubbers, solid and gaseous fuels, ceramics, lubricants, glass, plywood and adhesives, precious metals, and refractory substances.

The references are not in all cases adequate, nor even representative of the subject. Thus for sintering plant practice, there are six references, while on the subject of the solidification of steel, described in the text as "an ever-open subject of research," there is reference to one Iron and Steel Institute paper only. The adequacy of the text and references indeed varies from subject to subject according as the writer of the section is a recognised expert on the subject or a compiler.

In the production manual a similar arrangement is adopted, the subjects covered being machine tools, cutting tools, cutting oils, quality control, deep drawing and pressing, surface hardening and heat treatment, hard facing, soldering and brazing, bearing metals, and powder metallurgy. Both books suffer from over-compression of the text matter and inadequate searching of the literature. It is a little difficult to believe that "managers, executives, designers and engineers will find that the reviews indicate latest progress and the trends of advancement" when confronted with such a statement as "the acute shortage of tool alloys has given a remarkable impetus to methods of conservation such as tool tipping and butt welding of cutting metal to steel shank, and has directed attention to the economies which can be effected by skilful design." Efficient managers, executives, etc., do not, in the fifth year of the war, need to be told about such matters: the inefficient do not buy technical books.—W.E.B.

Prosperity Wages and Free Enterprise. By A. Grant McGregor. Pp. 120. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, W.C.2. Price 3s.

Proposals are made by the author which aim at treating the underlying causes of economic ills. He contends that in America prices fell and prosperity ended because wages were not raised enough to maintain prices firm at the prosperity level and thus to maintain consuming power in step with ever-rising production power.

COMMERCE and INDUSTRY

Emergency Wire Specification.

Indoor Cleat Wire

A YEAR ago WE/B.S. 1096 specified a type of cable suitable for installation on insulating cleats inside buildings with just sufficient covering to afford a certain degree of mechanical protection and to ensure reasonable freedom from the risk of electric shock under all normal conditions of indoor atmospheric humidity. Rubber covering was not demanded, only varnished cambric braid and compound.

Since then two further types of lightly-insulated cleat wire have been provided for; one is "bitumen-faced taped and braided and compounded," while the other is "polyvinyl chloride covered braided and compounded." Details of their construction are given in a revised and enlarged edition of B.S. 1096, obtainable from the British Standards Institution, 28, Victoria Street, London, S.W.1, price 6d.

A Review of Standards

A new quarterly publication has been started by the British Standards Institution entitled *Standards Review*. In a foreword Sir Percy Ashley, chairman of the General Council, expresses the hope that a periodical review of standardisation activities in this and other countries will lead to a better understanding of its real nature. The first number has 40 pp. and contains 17 items, including one on "Electrical Standardisation—the Post-War Outlook," with particular reference to installation equipment, 10-A plugs, cables, telephony and television. The *Standards Review* is free to members (additional copies 1s. post free or 3s. 6d. per annum); the price to non-members is 2s. per copy or 7s. per annum.

Post-War Export Requirements

At a recent meeting of the Export Committee of the Gauge and Tool Makers' Association, it was decided to approach the trade counsellors and commercial attachés in London of various Empire, Dominion and foreign Governments with a view to ascertaining their post-war requirements of British tools and gauges, jigs and fixtures, moulds and dies, etc., and to determine the most satisfactory means of supplying those needs. The Committee appointed its chairman, Mr. H. Madeley, and Captain L. H. Barton, to attend the interviews in company with the secretary. So far discussions have taken place with representatives of Argentina, Russia, China, Turkey, Australia, Belgium, Sweden, Brazil and India.

Advantages of Free Enterprise

Pointing out that for the price of a 1½d. bus fare enough electricity is supplied to light a room for a whole day, an advertisement which Edmundsons Electricity Corporation, Ltd., is placing in national and provincial papers this month draws attention to the work being done by a free enterprise in bringing cheap lighting and power to very large rural areas in England and Wales. At the same time emphasis is laid on the need for saving electricity until the war is over. This is one of a series comparing the cost of electricity with that of other everyday things such as a slice of bread, a match, etc.

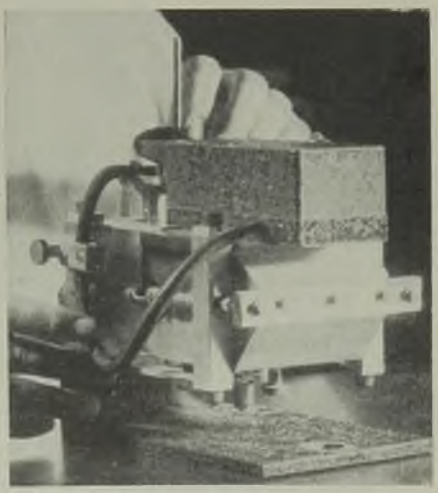
Luton Apprenticeship Scheme.

Lighting a Butter Factory

Colour, intensity of light, shadows and glare had all to be considered in a re-lighting scheme which was prepared recently for a national butter blending and packing factory. "Sieray" 80-W fluorescent tubes, in slotted top reflector fittings were substituted for the existing standard tungsten filament lamps to illuminate the packing machines. Although the loading was reduced considerably a high intensity of illumination was provided with good colour discrimination, not only on the machines and scales, but for general shop lighting also. The direction of light upwards results in an illuminated ceiling, thus disposing of overhead gloom and eliminating glare. The scheme was planned by Siemens Electric Lamps and Supplies, Ltd., Illuminating Engineering Department, in collaboration with the proprietors' engineering staff, and the installation work was carried out by R. J. Farmer & Co.

Low-speed Balancer

A new low-speed balancer for machines that rotate slower than 600 times a minute is now being used to test the weight balance of the 40,000-HP Westinghouse motor built for the



Westinghouse low-speed machine balancer

U.S. Army Air Corps' wind tunnel at Wright Field, Dayton, Ohio. It indicates the positions of heavy or light regions in the motor's 50-ton rotor and in the two 40-ft. fans driven by the motor, being capable of measuring vibrations as small as one-thousandth of an inch in

machines rotating as slowly as 100 times a minute. The first urgent demand for a new slow-speed balancer came to the Westinghouse Research Laboratories from Panama, where such a device was needed to eliminate vibration from Diesel engine generators installed to supply electricity to machinery along the canal.

There are instruments for balancing high-speed machines, but to adjust the Panama machines at 200 RPM they would have to be about ten times as large and heavy. The new design is based on the principle of the inverted pendulum, a weight supported by springs in a steel framework, which is bolted firmly to the casing of the machine. Thus both vibrate together, but the spring-supported weight stands still. With each vibration, a magnetic coil is moved back and forth inside a hole in the weight. The movements set up an electric current that is transmitted through a cable to a meter which discloses the part of the machine that is unbalanced.

Luton Apprenticeship Scheme

At its last meeting Luton Town Council, on the recommendation of the Electricity Committee, approved an apprenticeship training scheme for engineering and trade courses. Under the scheme practical training for electricity supply work will be instituted concurrently with theoretical training at Luton Technical College, where the apprentices will attend both day and evening classes. Facilities will be provided for trade apprentices showing special personality and attainments after two years of their course to transfer to engineering apprenticeship. It is further proposed that, as a complete training in electricity work cannot be obtained without a broad knowledge of manufacturing processes and plant, all engineering apprentices shall spend a year in one of the large electrical manufacturing concerns.

Boiling Plate Patent Extended

In the Chancery Division on June 30th Mr. Justice Morton had before him an application for an extension of the term of patent No. 307,221 for an invention of improvements in boiling plates for electric cookers. The application was made on behalf of Florence U. Howard and Bernard U. Taylor, being the personal representatives of Mr. J. A. J. Howard (deceased), Leonard V. Turner and the Revo Electric Co., Ltd.

His Lordship made a re-grant of the patent for four years on the ground of loss due to the war.

Purchase of Wolfram

The Ministry of Supply gives notice that the arrangement announced in July, 1942, for the purchase of wolfram concentrates by Non-ferrous Minerals Development, Ltd., at Plympton, South Devon, will be terminated on December 31st, 1944, and that no concentrates will be accepted by the concern after November 30th.

Switchgear Maintenance

Maintenance instructions for air-break circuit-breakers are given in a 20-page illustrated booklet (publication ACB/M) compiled by J. G. Statter & Co., Ltd., 82, Victoria Street, London, S.W.1, for inclusion with all switchgear of appropriate types despatched by the company. The booklet (price 3s. 6d.) is available gratis to all present users of the company's air-breakers on application by quoting the serial number on the rating plate of the gear.

Wages in the Contracting Industry

As a temporary measure, to facilitate negotiations towards a settlement of certain matters relating to wages and general working conditions in the electrical contracting industry, it has been decided that during the current three months a further 1d. per hour shall be paid as from the first pay-day in July (for the period covered by that pay-day) making the cost-of-living (war) additions as follows:—Labour over 21 years of age, 5¾d. per hour; between the ages of 18 and 21, 3d. per hour; under the age of 18, 1½d. per hour.

Unauthorised Extension

For laying an electric line from one building to another without consent, Mr. R. Cole, electrician, Cleveleys, was fined 40s. at Blackpool on June 27th. Counsel said the Corporation regarded the offence as serious, as there was always danger of explosions or fire through interfering with Corporation wiring.

Sick Pay at Blackpool

Blackpool Corporation has agreed to adopt for a trial period a sick pay scheme recommended by the Joint Industrial Council, for employees in the Transport Department. The same principle is to be applied to the Gas and Electricity Departments. The cost is estimated at from £15,000 to £20,000 a year.

TRADE MARK APPLICATIONS

APPLICATIONS have been made for the registration of the following trade marks. Objections must be lodged within one month of June 28th:—

MANIFLEX. Class 6, No. 628,104. Bi-metallic strips consisting principally of an alloy of manganese, copper and nickel in one part.—Mallory Metallurgical Products, Ltd., 78, Hatton Garden, E.C.1.

AVEX. Class 9, No. 626,434. Electrical instruments and apparatus and parts thereof, none being goods included in other classes.—Davies & Essex, Ltd., 29, Enford Street, W.1.

HIPERSIL. Class 9, No. 626,934. Electric induction apparatus, electric transformers and cores therefor, and electric relays.—Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., U.S.A. Address for service c/o G. Raymond Shepherd, 2, Norfolk Street, Strand, W.C.2.

TERRATERTIA. Class 9, No. 628,464. Electric testing apparatus and instruments.—Electro Methods, Ltd., 112, Brent Street, Hendon, N.W.4.

PANELEC. Class 11, No. 627,173. Electric heating apparatus of the panel type.—British Insulated Cables, Ltd., Prescot, Lancs.

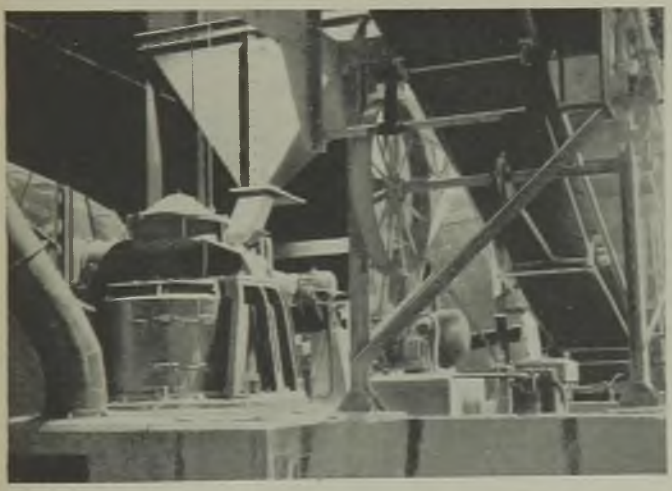
VENTIFLEX. Class 17, No. 627,297. Electric insulating material.—Morgan Crucible Co., Ltd., Battersea Church Road, S.W.11.

Limestone Grinding

Electrical Operation at a New Oxfordshire Plant

BY the employment of electrical drives and control at a new agricultural limestone grinding plant established by Cawood Wharton & Co., Ltd., at Holton Quarry, Wheatley, near Oxford, production is rendered completely automatic, from the initial feeding-in of the raw stone to the dispatch of the final product.

The raw stone, which is drilled, blasted and broken at the adjacent quarry face to approximately 8-in. pieces, is fed by an inclined chute into a Thomas & Foster combined crusher and granulator which, driven by a 30-HP, 970-RPM motor, reduces it to one-inch size and under in one process. By means of a continuous bucket elevator (5-HP, 720-RPM motor) the material is then carried to a Bristowe oil-fired horizontal rotary dryer, where the moisture is reduced to ensure efficient grinding and screening. From the dryer it passes over an inclined reciprocating cooling tray where it is subjected to a blast of cold air in order to reduce the temperature. The same 14-HP, 1,440-RPM motor which drives the dryer through a system of belting and worm wheels also operates a fan for providing forced draught for the dryer and the cooler.



The mill and (right) the lower portion of the dryer plant

The cooled stone is then taken by a second bucket elevator to the feed hopper of the mill. It is fed from this hopper at a controlled rate by means of an electrically driven feed table (1½-HP, 960-RPM motor) into a "Junior Hercules" mill. This machine, which is manufactured in the United States by the Bradley Pulverizer Co. and supplied under Lend-Lease, is one of the first of these large-capacity pulverisers to be installed in this country, although many are successfully operating in America. Grinding to agricultural fineness, this mill produces ten to twelve tons per hour.

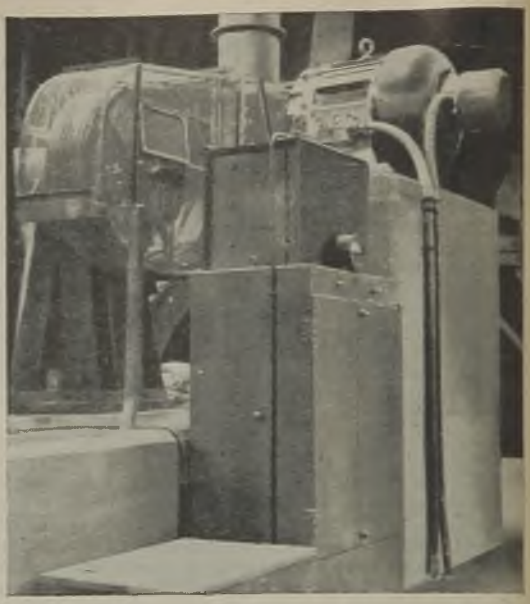
The grinding principle employed is based on the very old and simple idea, the pestle and mortar, the pestle in fact being triplicated in the form of three vertically suspended rolls, while the mortar is represented by a hard steel grinding ring fixed in a heavily constructed pan forming the base of the mill. The rolls are rotated and swing out against the vertical face of the grinding ring, the crushing force being generated by centrifugal action which is sufficiently powerful to pulverise the hardest stone.

The ground material is discharged through a screen fitted around the mill grinding chamber, whence it falls through ports in the outer periphery of the mill base into a conical chamber case in the concrete foundations immediately below the mill. The mill drive is by means of V-belts from a 100-HP motor running at 980 RPM. A separate 1½-HP motor drives the mill feeder. These motors are interconnected through an automatic control panel whereby the mill load controls the feeder motor. Thus when the mill is overloaded the feeder is cut out and *vice versa*. This automatically ensures continuous full load production.

A horizontal screw conveyor delivers the ground limestone from under the mill to a third elevator discharging into the final ground storage hopper. The screw conveyor and elevator are both driven by the same 5-HP, 720-RPM motor. The hopper is designed to ensure rapid discharge for either bagging or bulk supplies. Two automatic sack-filling machines fitted on either side of it are each capable of bagging 10 to 12 tons per hour into 1-cwt. paper sacks. The sack-filling machines, which are belt driven by 5-HP, 1,440-RPM motors, were

supplied by Sack Fillers, Ltd. They are used in conjunction with W. & T. Avery weighing machines.

All the electric motors employed are of Brook Motors construction and are of the totally enclosed fan-ventilated type. The automatic control gear for the crusher mill and weighing machines was made by Vlasto, Clark & Watson, Ltd., the smaller units having Airedale star-delta starters. Push-buttons are provided for individual emergency stopping of all plant. The whole installation is remarkably compact in spite of its large capacity and good spacing around all equipment to provide ease of accessibility everywhere, ensures efficient continuity of operation with a minimum of labour. Another noteworthy feature of the installation is the high-intensity non-glare illumination furnished by B.T.H. reflectors housing 1,000-W lamps. The electrical contractors were Shaw Dale & Co., Ltd., working to the specifications prepared by Mr. John H. Ward, of Leeds. The consulting engineer was Mr. T. Linstrum.



The 100-HP motor and control gear operating the mill

Damage to Post Office Cables

Proposals for Settlement of Claims

FOR some years the General Post Office has claimed from authorities the reimbursement of expense incurred in the repair of damage to cables alleged to have been damaged by the electrolytic action of stray currents from tramway systems. A joint committee of the Associations concerned was set up to deal with these claims and eventually a settlement was arrived at providing for the payment of a third of the amount of the claims outstanding at December 31st, 1935, totalling £40,972.

A Joint Technical Sub-Committee was also appointed to consider the technical matters involved. It recommended that the cost of repairing electrolytically-damaged cables should be borne by tramway undertakings only when the voltage limit laid down in proposed new regulations or specified in the existing regulations was infringed; when stray current was present in the cable sheath, typical of traction leakage; when a chemical analysis demonstrated electrolytic corrosion; and when stray current typical of traction leakage current was absent when the tramway system was shut down.

Consideration of this report has been delayed by war conditions and about three years ago as the result of further discussions the Joint Committee proposed to the Post Office that it should accept a third of the amount of claims arising between December 31st, 1935, and the date on which the new regulations became effective and that claims occurring after this period and for two years after the termination of hostilities should be settled on a 50 per cent. basis.

The Post Office put forward counter-proposals that all claims in which the before-mentioned conditions were satisfied for damage arising before the war should be paid in full; that claims arising between the outbreak of war and the institution of the new regulations or the date declared to be the termination of the "emergency" under the Emergency Powers (Defence) Act, 1939, whichever date was the later, should be paid to the extent of one-half; and that thereafter claims for the repair of damaged cables should be paid in full.

New Offer to be Submitted

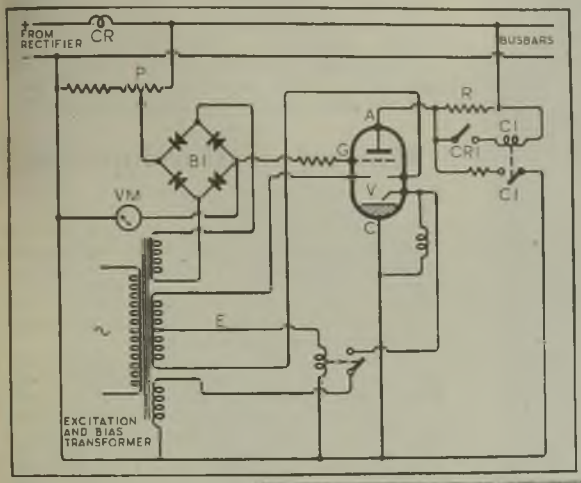
Further examination of the subject by the Joint Committee has been made in the light of developments since 1935, and particularly the worsening of conditions with respect to electrolytic damage during the war. It is now proposed that the Post Office should accept one-third of the admitted amounts of claims in respect of the period from January 1st, 1936, until the new regulations are put into operation; and that from the latter date until two years after the termination of the "emergency" the Post Office should accept one-half of the amount claimed. The I.M.E.A., from whose *Journal* we take this information, has agreed to the submission of these proposals to the Post Office.

Regenerated Energy

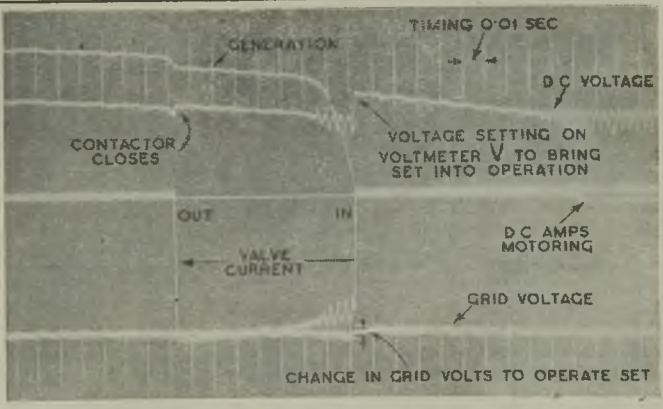
Methods of Absorption on DC Traction Systems

By J. C. Milne, M.A.I.E.E.
Chief Rectifier Engineer, Electric Construction Co., Ltd.

WHEN a DC motor operating on a traction system has its field suddenly increased for regenerative braking purposes it will automatically act as a generator and its back EMF will increase rapidly, thus giving excessive voltage unless the energy can be absorbed by the system, a characteristic it shares with lift and crane motors.



Regenerative control circuit and oscillograph record showing rapidity of operation



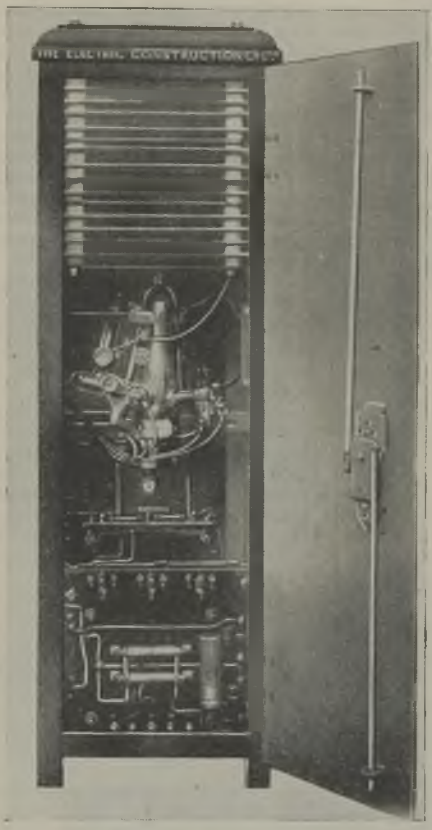
When the energy cannot always be so absorbed a loading resistance is usually inserted across the DC busbars, normally by means of relays, which close contactors when the DC voltage is in excess of normal busbar voltage. The time taken for this to happen is in practice a matter of half to one second. The time constant of a traction motor is very small compared with the delay in the contactor system closing the resistance, and the regenerated voltage often increases from 50 to 100 per cent. above normal busbar voltage. This can cause considerable damage to the system and very high stresses on the insulation of the various components.

By the use of special high-speed relays and contactors, the time could probably be brought down to a matter of 0·25 sec., but the relay setting is delicate. One method which reduces the period required to a few milli-seconds is to employ a thyratron to operate an ignitron which in turn inserts a resistance across the bars, a contactor coming in later to short-circuit the ignitron. The thyratron itself, which is the main control element and equivalent to the sensitive voltage relay, has its grid connected to a potentiometer across the DC system. As soon as the voltage rises above a figure predetermined by the potentiometer, the thyratron will fire, start up the ignitron and cause it to fire, and insert a resistance across the bars.

Another method employs a special grid-controlled mercury-arc rectifier valve, which comes into operation and inserts the loading resistance in approximately 0·0001 sec., preventing the voltage from building up to a dangerous figure. The equipment for this consists of a mercury-arc rectifier valve V, with its auxiliary excitation circuit E; in series with the anode or anodes of this valve is connected resistance R, the whole being connected across the busbars.

Bias B1 is used to bias the grid or grids at a negative potential, and a potentiometer P is used for pre-selecting the voltage at which the equipment will come into operation. Across the rectifier valve is connected a contactor C1, and a current relay CR is connected in the main busbar circuit. The operation of the equipment is as follows.

With the rectifier on and busbars at normal voltage, the voltage across potentiometer P is set to oppose but to be slightly less than the bias B1 (the setting of P being adjustable)



Typical installation designed for dealing with regenerated current of 40 A at 250 V from small traction motor

and predetermines the voltage indicated by the voltmeter VM, at which the regenerative equipment comes into operation. Normally B1 biases the grid of the valve at negative potential to its cathode and, therefore, no electrons can flow from the cathode to the anode and there is no circuit through R.

When regeneration occurs the voltage across P overcomes bias B1 and the grid of the valve is made positive. Electrons will then immediately flow from the cathode to the anode of the valve and a circuit through R will be made, R being connected across the busbars and absorbing the regeneration.

The current relay CR is set to open its contacts at the current taken by R at normal DC volts. Since the current taken by R during regeneration will be flowing from the traction motors, the contact CR1 on current relay CR will be closed and, therefore, as soon as R is inserted by the operation of the valve V the contactor C1 will close and "short" the valve. When regeneration ceases the current taken by R will flow through CR which will open its contact CR1 and contactor C1 will drop out.

In the meantime, the bias B1 will again have taken over control of the grid of the valve and the equipment will be ready for further operation. The equipment itself is simple and compact, employing only the one valve which is permanently energised and, therefore, ready for immediate operation.

Control of Development

THE Minister of Town and Country Planning has prepared a draft of the Town and Country Planning (General Interim Development) Order, 1944, which defines and regulates the powers of control over development to be exercised by local authorities between the date of the coming into force of a resolution to prepare a planning scheme and the coming into operation of that scheme.

The Order specifies five categories of development which are ordinarily to be permitted. These include development by a local authority or by statutory undertakers which has been sanctioned by any Government Department before the commencement of the Order; and certain classes of development carried out by statutory undertakers and certain other authorities specified in a schedule to the Order.

This schedule includes the carrying out by electricity undertakings of (1) development of any description below the surface of the ground; (2) the installation of any plant inside a building or the installation or erection within the premises of a generating station or substation established before the commencement of the Order of any plant, etc., required in connection with the station or substation; (3) the installation or erection of additions, replacements or extensions to existing plant, etc., including the installation in an electrical transmission line of substations, feeder pillars or transformer kiosks, but not including the erection of overhead lines for the supply of electricity or the installation of substations, feeder pillars or transformer kiosks of stone, concrete or brickwork; (4) the provision of overhead service lines in pursuance of any statutory obligation to provide a supply of electricity; and (5) any other development except the erection of buildings, plant or structures and reconstruction and alterations which would materially affect the design or external appearance of buildings and the formation or alteration of any means of access to a highway.

Aerodrome Lighting

Pre-war Practice and Probable Future Trend

By M. Gaughan, B.Eng.
(Lighting Section, B.T.H. Co.)

CONSIDERABLE progress had been made before the war in arriving at some measure of international agreement on the lighting of aerodromes under the ægis of the International Commission on Illumination. This was accomplished in spite of a large number of factors operating against complete agreement such as:—(a) variations of local conditions and established practice in different countries; (b) continual developments in lighting technique and equipment; (c) developments in aircraft and in radio and other aids, calling for revised lighting requirements.

B.S.S. No. 563 was issued in 1934, under the title of "Land Aerodrome and Airway Lighting." This Specification was revised in 1937, so that it may be taken to cover up-to-date pre-war practice in this country.

Pre-War Equipment

On approaching the aerodrome, the first lighting aid to be picked up by the pilot was the beacon. This would be followed by the whole pattern of the airport lighting, including floodlights, boundary lights, obstruction lights and illuminated wind tee. The aerodrome beacon gave the pilot a ready means of recognising the aerodrome. B.S.S. 563 called for the light to be red and of an intensity of not less than 2,000 candle-power in angles from the horizontal to 60 deg. above. A particular aerodrome was normally recognised by the beacon flashing the first two letters of its name.

1,000-W line-filament projector lamp

Two main types of beacon were in common use, one using neon tubes arranged in a squirrel-cage formation, and the other a filament lamp in a lantern employing an optical system designed to produce a beam or series of beams. The former type was flashed by switching, and the latter by rotating the optical system about a vertical axis, thus sweeping the air with a series of beams and producing a flashing sensation at the pilot's eye.

Landing area floodlights were in general arranged to throw wide beams of light in the direction of flight, so that the pilot was not dazzled while landing or taking off. The directional feature was obtained either by having a number of floodlights around the landing area, and switching on only those required, or by having mobile floodlight units which could be moved into the correct positions relative to any individual landing direction.

The B.S.S. specified a vertical illumination of not less than 0·2 ft.-candle over an area not less than 1,500 by 750 ft. the greater dimension being in the direction of flight.

Again, two main types of floodlight were used. The first employed 1,000-W line-filament lamps in mirrored-glass parabolic trough reflector units. The units were mounted in batteries, a common arrangement being nine units in three rows of three. The whole battery had a common base which could be rotated about a vertical axis and each horizontal row of three units could be tilted about a horizontal axis to give universal adjustment.

2,000-W flat-grid-filament projector lamp

The second type of floodlight employed a single high-power filament lamp of up to 10-kW rating with cylindrical refracting glass. Universal adjustment was also provided. It was much less commonly employed than the multi-unit type. A certain amount of work was also done on floodlights using high powered water-cooled mercury-discharge lamps, but equipment of this type was only in an experimental stage.

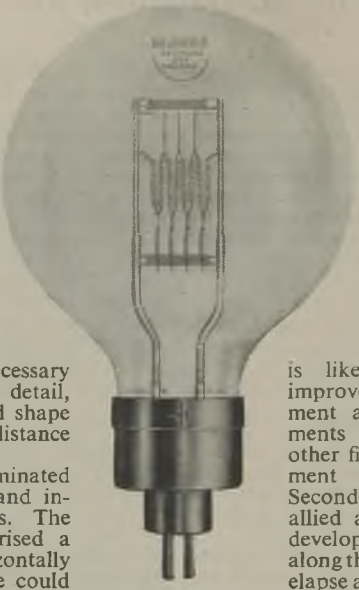
Boundary lights placed around the periphery of the aerodrome were intended to show the pilot, when landing, the whole outline of the airport and also to indicate the boundary when taxi-ing. They were aviation yellow, emitting light in all directions above horizontal and to 5 deg. below it. Lamps of different types and up to 100 W were used. The B.S.S. gave a minimum output of 60 lumens of yellow light. The spacing laid down was 300 ft. between lights and the height above ground level was in general restricted to a maximum of 3 ft. 3 in. and a minimum of 2 ft. A special mechanical and electrical construction ensured ready collapse of the whole light in the event of a

plane colliding with it and at the same time cut off all electrical connection below the point of collapse. Some designs used low-voltage series-burning lamps fed from series transformers buried in the ground below each fitting. With this arrangement a collision with one unit did not affect the supply to other lights.

Obstruction lights were placed on all objects which might be dangerous to aircraft in flight. The colour was aviation red, emitting light in all directions above the horizontal and to 30 deg. below it. Lamps commonly used were 60 to 100 W. To guard against lamp failure, duplicate fittings, or two-lamp fittings were used at each position. The circumstances in which obstruction lights were necessary were laid down in great detail, according to the height and shape of the obstruction and its distance from the landing area.

A number of designs of illuminated wind tee were produced, and installed at various aerodromes. The general arrangement comprised a large metal tee placed horizontally on the flying field. The tee could rotate about a vertical axis and a wind vane made it respond to differing wind directions. It was illuminated either by a series of small lamps along the upper surface of the tee, or by a single large lamp fitted in a reflector which was mounted a few feet above the tee.

An alternative type of wind-direction indicator, consisting of a smoke generator (which could be illuminated for night use), was installed in one or two instances.



10,000-W flat-grid-filament projector lamp

Indicating Wind Speed

Wind-velocity indicators were in an experimental stage and comparatively few were installed before the war. The most usual type was a two-figure number board with lamps arranged to show miles per hour. These were automatically changed in accordance with the actual wind speed by a small windmill driving a governor which operated a series of mercury switches controlling the lamps.

There were a few installations of contact lights notably at Heston and Manchester (Ringway). Their purpose was to outline a definite landing strip and they consisted of a mushroom-shaped fitting having a heavy glass lens on top. The units were let flush into the ground, either on both sides of the runway, as at Heston, or on one side only, as at Ringway. In both installations, the spacing was 50 ft. throughout the whole length of the runway. Green, white and red lights were used at the start, middle and end of the runway, respectively, so that the pilot when landing was able to see how much of the runway he had traversed.

Future Possibilities

In considering the probable future trend of aerodrome lighting practice, a number of factors have to be taken into account. In the first place aerodrome lighting may be expected to have shared fully in the greatly increased activity that occurs in scientific developments in time of war. The effect is likely to be twofold; *viz.*, improvements in the equipment actually used and improvements in lighting technique in other fields, including the development of new types of lamps. Secondly, other countries, both allied and enemy, will have made developments that are not necessarily along the same lines. A long time will elapse after the end of the war before it can be decided which of the numerous systems is to be adopted for international standardisation.

A third point is that in many countries lighting systems have been designed with black-out restrictions as a cardinal feature in order to avoid revealing the positions of aerodromes to enemy planes. Radical modifications may therefore be required when it becomes necessary to provide the best and safest form of lighting. Possibly there will be some difficulty in convincing pilots and others concerned that the systems they have become accustomed to are capable of improvement.

The next consideration is that when peace returns there will be a big increase in street lighting, signs and floodlighting. It may be necessary greatly to increase illumination in aerodromes in the vicinity of large centres of population, in order to avoid confusion and because of the reduced dark-adaptation of the pilots. Another factor is the increased size, weight and number of aircraft that may be expected, necessitating larger aerodromes and long concrete runways which will present fresh lighting problems. Finally, vast strides will have been made in radio aids, which may affect lighting requirements.

The illustrations show typical "Mazda" projector lamps used in aerodrome lighting equipment.

ELECTRICITY SUPPLY

District Heating at Darlington. Difficulties in Eire.

Bath.—RATE AID.—Out of the past year's profits of the Electricity Department a sum of £6,265 is to be applied to rate relief.

Darlington.—DISTRICT HEATING.—The Water Committee has asked the Electricity Committee to consider a plan for using surplus heat from the electricity works for the purpose of supplying hot water to houses near the works.

Edinburgh.—NO BRIGHTER LIGHTING.—The Corporation Streets and Buildings Committee on June 29th learned of the refusal of the Ministry of Home Security to allow the Council to install modified street lighting of a strength similar to that being experimented with in Liverpool. The Ministry stated that it was not possible at this juncture to authorise street lighting in Edinburgh of a standard higher than the "star-lighting" agreed to at the end of last year.

Leeds.—YEAR'S DEFICIT.—According to the *Yorkshire Post*, owing to the increase in the price of coal the Corporation Electricity Department's accounts for the past year show a substantial loss. Some time ago application was made to the Minister of Fuel and Power for permission to increase charges by 10 per cent., but an advance of only 5 per cent. was allowed; this operated for only four months of the past financial year. Authority was also obtained for a coal price adjustment clause, which did not come into force until April. The Committee has recommended that application be made for permission to increase tariffs by an extra 5 per cent.

Nottingham.—FURTHER LOAN NEEDED.—The Electricity Committee has asked the City Council to apply to the Electricity Commissioners for sanction to borrow £150,000 to be expended from time to time on general work on mains and services, meters and apparatus for hire, the assisted wiring scheme, etc. The Committee says that the £150,000 loan sanctioned in July, 1941, is nearing exhaustion.

Stockport.—ELECTRIC WASHING MACHINES.—The Town Council is to install two electric rotary washing machines at the Bann Street Wash House.

Overseas

Eire.—SUPPLY POSITION.—Further questions on the electricity supply situation have been answered in Dail Eireann by Mr. Sean Lemass, Minister for Supplies. He has stated that the existing charges are insufficient to meet the Electricity Supply Board's expenses which have greatly increased. He does not propose to set up a Consumers' Council to advise the Board and he says that the recent restrictions on consumption have not produced the expected economies. He knows of no more suitable or equitable rationing plan than that in force.

He will be prepared to ask the E.S.B. to consider the position of consumers who are paying a high fixed charge and using little electricity. The revenue derived from consumers on the valuation tariff in the year ended March 31st last was £918,147; of this £520,975 represented the fixed-charge portion. Mr. Lemass points out that reduction in consumption does not mean a corresponding decrease in the Board's costs.

Mr. Lemass has also stated that the estimated cost of the Poulaphouca (Liffey) hydro-electric scheme was £1,272,000. The final cost is expected to exceed the original estimate by 60 per cent., due partly to the expansion of the original project.

New Zealand.—COBB RIVER PLANT.—The Cobb River hydro-electric power scheme, which has been under construction in the mountains south of Golden Bay for the past seven years, is now providing energy to Nelson City and all the northern and central areas of the Nelson Province including the Golden Bay Cement Company's plant at Tarakohe. A transmission line is being constructed over the eastern range to connect with the Marlborough system, which is supplied at present from the hydro-electric plant at Benhopai.

The Cobb River scheme was commenced in 1937. The plant is situated in extremely rough country, much of it 300 ft. high, covered with forest and under snow in winter. Many miles of difficult road had to be built to give access to various parts of the scheme, some lengths being gouged out of sheer rock faces. In the early stages, all plant had to be hauled over a rope tramway to the site of the dam. The latter gave a great deal of trouble, as drilling failed to reach a rock bottom on one side of the river, and eventually a new site had to be adopted. There a small temporary dam was erected, and is now in use.

Water is carried to the power house by a pipeline with a fall of 190 ft., the greatest in New Zealand. On its way the pipeline traverses a tunnel 7,250 ft. long. The generating plant consists of three 3,000-kW units, with a fourth as a standby. Without water storage it can supply 4,000 kW with a 50 per cent. load factor, and when the dam is completed the station will be capable of development to 48,000 kW under the same conditions. The total peak load of the Golden Bay, Nelson and Marlborough districts a year ago was 5,000 kW.

TRANSPORT

Canada.—PROPOSED MONTREAL SUBWAY.—*Electrical News and Engineering* (Toronto) reports that Mr. R. N. Watt, president of the Montreal Tramways Co., has submitted a report to the Great Montreal Economic Council on the cost of installing subways in the city. Two main lines are visualised running respectively north to south and east to west and the cost is put at $59 million. The capital could not be obtained from private sources and would have to be provided from civic, Provincial or Federal funds.

India.—PURCHASE OF CALCUTTA TRAMWAYS.—A *Reuter* message from Calcutta states that the Calcutta Corporation has notified the Calcutta Tramways Co. of its intention to purchase the tramways undertaking on January 1st, 1945, by virtue of the agreement of December, 1899.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

W. T. Henley's Telegraph Works Co., Ltd., held their annual meeting on June 30th. Sir Montague Hughman (chairman) in the course of his speech said that a considerable proportion of the work which they were doing at present was quite outside their ordinary peacetime business. They had been able to render fine war service by the manufacture on an extensive scale of special requirements some of which were the results of their own inventions.

After referring to the institution of the company's non-contributory sickness and accident benefit scheme, Sir Montague said that the works councils had continued to function very well and afforded an admirable means of bringing the management and the workpeople together. The rubber cable works, the paper cable works and the engineering department had been busily employed and he congratulated the managers, Messrs. McArthur and Judge on the results. The research and technical departments had done excellent work during the year. Sir Montague recalled that the company organised research laboratories twenty-five years ago.

The chairman reviewed the accounts (*vide* our June 2nd issue) and said that overseas business had been maintained on the whole. The proportion of this to the total business in 1943 was 14·5 per cent., as compared with 28 per cent. before the war. The Tyre Company had had another successful year.

The Chloride Electrical Storage Co., Ltd., reports that the net profit for the year ended March 31st last amounted to £517,672, after providing for E.P.T. The figure for the previous year was £519,806. After allowing for fees and income tax, including an estimate for 1944-45, the balance is £267,672 (£289,806). Employees' funds absorb £27,000 (£26,000), extension of pension scheme to subsidiaries £10,000 (£20,000), general reserve nil (£25,000) and reserve for development and research £50,000 (nil). A final dividend on the "A" and "B" ordinary stocks of 5 per cent. is to be paid, making 10 per cent. (same), with a bonus of 5 per cent. (same), leaving £176,905 (£163,258) to be carried forward. The profit mentioned includes the profits of subsidiaries to the extent of the gross dividends declared and income from other investments.

The Philco Radio & Television Corporation of Great Britain, Ltd., proposes to increase its authorised capital from £540,000 to £700,000 by creating £150,000 new £1 6 per cent. cumulative preference shares and 1,000,000 2s. ordinary shares and to raise the borrowing powers to £750,000. It is intended to offer present shareholders 100,000 new preference shares at 20s. 6d. per share (two for each seven held) and 250,000 ordinary shares at 10s. 6d. each (one for each four held). These will raise the issued capital to £575,000.

Recently the company has made good progress. No ordinary dividend has been paid since 1936 but it is proposed to pay 6d. per share on the existing shares in respect of 1943-44. The company's business now includes the production of radio, telecommunication and remote control equipment, electric motors, generators and associated apparatus.

Cable & Wireless (Holding), Ltd.—At the annual meeting on June 29th Lord Pender, governor and managing director, pointed out that the company's holdings, apart from British Government stocks, were for the most part represented by investments in undertakings within the British Empire. The present prosperity of these undertakings was attributable to war conditions and might be expected to be sustained for a period after the war by a world-wide demand for goods and services. This period might, he felt, furnish an opportunity, which might not recur, to dispose of some at any rate of the questions which must be settled before international trade could be expected to flourish under more normal conditions.

Cable & Wireless, Ltd.—Sir Edward Wilshaw (chairman), in a statement made at the annual meeting last week said that the expansion and improvement of the system and a further reduction of rates were dependent on the continuance of Empire support for an Empire policy in communications. It would not be possible to plan or carry out a policy of long-term development unless apart from the normal incidence of world economic conditions there was some stability of structure. At the end of 1943 the company had £11,000,000 invested, in addition to £8,250,000 earmarked for tax purposes, so that payment of taxation would still leave ample liquid resources available, among other things, for development schemes and research and for further reduction of rates. To overcome difficulties caused by wireless fading the company had proceeded with the erection of large wireless relay stations overseas.

Marconi's Wireless Telegraph Co., Ltd.—Admiral H. W. Grant, chairman and managing director, stated at the annual meeting on June 29th that the accounts showed a strong liquid position, with a further increase in stock and contracts in progress which reflected the increased output of the company's factories.

Venner Time Switches, Ltd., report that for the year ended January 2nd the net profit, before deduction of taxation, was £56,342 (against £75,593). The balance after providing for depreciation, Schedule A tax, N.D.C. and war damage contributions, and after writing off expenditure on new patents, is £50,677, as compared with £69,045 for the previous year. Income tax takes £22,000 (£27,400), dividends on 8 per cent. cumulative preference shares £2,400 (same) and war contingencies reserve £10,000 (same). A dividend of 15 per cent. is again to be paid, leaving £15,733 (£15,656) to be carried forward.

The Mexican Tramways Co., Ltd.—Speaking at the annual general meeting in Toronto on June 27th the chairman, Mr. Marcel Ronge, said that the reduction in the operating loss

for 1943 was no indication of any basic improvement but was due to present war conditions. There was urgent need for the immediate revision of the extraordinarily low tram fares to enable the company to meet its greatly increased general expenses, as well as other heavy expenditure resulting from social and emergency laws regarding wages.

The Harland Engineering Co., Ltd., announces a profit for 1943, after meeting expenses, depreciation, taxation, etc., of £15,593 (against £15,432). A sum of £7,000 is again placed to reserve and after other allocations a dividend of 6 per cent. (against 5 per cent.) is to be paid on the ordinary shares. The balance carried forward is £13,996 (against £14,312). In a statement to be presented at the annual meeting on July 10th the chairman (Mr. F. Carleton Anderson) says that the past year's turnover was many times greater than the pre-war figure. The company faces the future with confidence that its enterprise will enable it to serve ever-widening markets. They have not been unmindful of research and development work.

The Southern Areas Electric Corporation, Ltd., reports a net profit of £21,620 for 1943, as compared with £29,615 for the previous year. Tax reserve received £12,000 in 1942, but no allocation is made this year under this heading. A first and final dividend of 5 per cent. again takes £19,587 and general reserve receives £4,800 (£8,000), leaving £17,274 (£20,041) to be carried forward. The board has accepted a recent offer to purchase the company's shareholding in the Britannic Electric Cable & Construction Co. at approximately £12,672 above book value.

The Brazilian Traction, Light & Power Co., Ltd.—Speaking at the annual meeting in Toronto last week (June 27th) Sir Herbert Couzens stated that the board hoped, and would endeavour to maintain, the present dividend on the common shares rather than repeat the fluctuating payments of the past. He added that the main problem confronting the company at present was to obtain an increased volume of new business sufficiently large to cover wage increases and other additional costs.

Franco Signs, Ltd., announces that the combined trading profits of subsidiaries for the year to March 31st last, after meeting depreciation and taxation, were £28,578 (against £19,550) and the net dividend received amounted to £10,000 (against £7,500). The company is to pay a dividend of 10 per cent. (against 7½ per cent.) and £11,467 (against £11,387) is carried forward.

E. K. Cole, Ltd., are holding an extraordinary meeting to-day (Friday) to consider resolutions for the conversion of 61,224 ordinary 5s. shares (issued in connection with the acquisition of the Ensign Lamps share capital), and any further stock which may be issued, into stock transferable in 5s. units.

Ward & Goldstone, Ltd.—The report for the year to March 31st last shows a net profit of £47,190 (against £47,636 for 1942-43). After meeting directors' fees, etc., and transferring £1,500 to employees' provident scheme and £5,000 to reserve for deferred repairs, etc., and adding £40,101 brought forward, the amount available for distribution is £68,431. The ordinary dividend is maintained at 20 per cent by a final payment of 10 per cent., £10,000 (against nil) is put to taxation reserve, and £46,194 is carried forward. Last year £10,000 was transferred to general reserve.

The meeting is to be held on July 11th and in his statement circulated with the report the new chairman (Mr. A. A. Goldstone) refers to the death of Mr. M. H. Goldstone in November last. The company is making steady progress in the development of plastics for electrical and allied uses and the experience gained should be of direct benefit after the war. It will be advisable, the chairman says, when conditions warrant it, to consider adjusting the nominal capital of the company to make it more in keeping with the appraised value.

The Palestine Electric Corporation, Ltd., is maintaining its dividend at 5 per cent., tax free, on the ordinary and "A" ordinary shares. The net profit for the year ended December 31st last was £125,687 (against £112,785 in the previous year), after providing £175,000 (£155,000) for taxation and £20,000 (same) for war emergency reserve.

W. & T. Avery, Ltd., are paying a final dividend of 10 per cent., again making 15 per cent., for the year ended March 31st last. The net profit was £139,377, as against £138,150 for 1942-43.

Brisbane City Council is to redeem the whole of the Brisbane Tramways 5¼ per cent. stock 1944-45 at par on October 1st, the earliest permissible date.

The United River Plate Telephone Co., Ltd., is maintaining its final dividend at 3 per cent., making 6 per cent. for the year (same).

Companies' Returns

Increases of Capital

Lee & Plunkett, Ltd.—The nominal capital has been increased by the addition of £500 in £1 shares beyond the registered capital of £500.

Calnorth Manufacturing Co., Ltd.—The nominal capital has been increased by the addition of £13,000 in £1 ordinary shares beyond the registered capital of £2,000.

Mortgages and Charges

Grant Switchgear, Ltd.—Assignment of proceeds of contracts, dated June 12th, to secure all moneys due or to become due from the company to Midland Bank, Ltd.

Holden & Hunt, Ltd.—Satisfaction in full on March 24th, of second debenture dated June 14th and registered July 5th, 1941, securing £6,300.

Kenyon Electrical Co., Ltd.—Satisfaction in full on July 7th, 1943, of debenture dated November 23rd, 1939, and registered December 8th, 1939. (Notice filed June 19th.)

Brightglow, Ltd.—Satisfaction in full on April 26th, of debenture for £470 dated November 17th, 1934, and registered November 26th, 1934.

Meeting of Creditors

Reliance Lift & Engineering Co., Ltd.—A meeting of creditors was to be held at Commerce House, Cheapside, Bradford, on July 3rd, under Section 238 of the Companies Act, 1929.

STOCKS AND SHARES

TUESDAY EVENING.

PRICES of Stock Exchange securities at the end of the first half of the year, which finished last Friday, show a large majority of improvements, in some cases substantial, over the quotations which obtained at the beginning of 1944. Repetition to the point of monotony of the statement that money is plentiful, and that supplies of stock for its employment are scarce, has been one of the outstanding points of the six months just ended. Current quotations for the ordinary shares in many industrial companies are the highest reached over a period ranging from five to ten years. Every day, one or another price beats the previous high record attained in the past decade.

Home Railways' Rent

In the Home Railway market prices were unfavourably affected, though to no great extent, by the explicit statement in the House of Commons that the Government considers the rental agreement with the railway companies to be fair and just, and that it is opposed to any revision.

This brought in a few selling orders. It is assumed in the market that the statement automatically confirms the impression that dividends now being paid upon Home Railway stocks will be continued until one year after the end of the war. These dividends provide a rate of interest on the money sufficient to compensate—at least partially—for possible risk of depreciation in prices when the agreement expires.

Communication Stocks

The chairman's speech at last week's meeting of Cable & Wireless (Holding) gave an interesting survey of the Combine's manifold activities. Prices of the two stocks are unaltered. Oriental Telephones hold their rise to 49s., being regarded with favour on account of the favourable developments of the campaign in the East. International "Tel. & Tel." put on a further $1\frac{1}{2}$ to $22\frac{1}{2}$, New York having recently been in a cheerful frame of mind.

G.E.C.

The dividend for the year ended March 31st last on General Electric ordinary shares will be announced about July 18th, and will compare with $17\frac{1}{2}$ per cent. in each of the three preceding years. Since 1936, the dividend has been an annual 10 per cent., accompanied by a bonus that varied from 5 per cent., in 1936, to 10 per cent. in each of the three years 1938 to 1940 inclusive. Earnings on the ordinary shares rose to 25 per cent. in 1938; those for the year ended March, 1943, were $17\frac{1}{2}$ per cent. The balance sheet of the G.E.C. is notable for its soundness and stability. If the $17\frac{1}{2}$ per cent. dividend is repeated, the yield at the present price of 96s. will be £3 13s. per cent. on the money. If the dividend should be raised to 20 per cent., as some hope that it may, the return at 96s. would come to about $4\frac{1}{4}$ per cent.

Revo Electric

Revo Electric ordinary shares are of 10s. each, and of the authorised amount of £500,000 there is issued £367,500. The company has declared a final dividend of 10 per cent. and a cash bonus of $2\frac{1}{2}$ per cent., making, once more, $17\frac{1}{2}$ per cent. for the year, the same as that in each of the past two years and, also, in 1939. In 1938 there was a capital bonus. In 1940, the dividend fell to 5 per cent., to be raised to 20 per cent. in 1941. The price of the shares has hardened to 43s., the highest since 1936. At one time in 1940, shares could have been bought at 11s. 6d. The year ends with March 31st, and the trading profit has shown a progressive annual increase in the three years ended March, 1943.

Price Fluctuations

Radio shares have been on the reactionary side. E. K. Cole fell 1s. to 31s. and A. C. Cossor show no rally from their previously-lowered price of 25s. 6d. E.M.I. have kept fairly steady around 33s. 9d. The anticipated Philco new issue is on the point of submission to shareholders. Vactrics were something of a minor feature, gaining a florin at 16s. 6d. The company's financial year ends with March. After being out of the dividend list for four years, the ordinary shares received last October an interim dividend of $7\frac{1}{2}$ per cent., in respect of the current year. Thorn Electric 5s. shares are up 1s. at 26s. Hopkinsons, now 68s. 3d., have risen $\frac{1}{16}$. Reyrolle at 70s. 6d. are the pence to the good. Brush ordinary hardened to half a guinea. Amongst other shares showing improvement are Walsall Conduits, 49s. 6d., Laurence, Scott, 13s. 3d., and Strand Electrics, 8s., while on the other side of the sheet small falls are marked in Ever Ready, 43s. 9d., Automatic Telephones, 66s. 6d., and London Electric Wire, 39s.

Overseas

Brazilian Traction ordinary shares have been advancing upon dividend hopes. At the annual meeting, held in Toronto last week, the chairman stated the board's policy to be a maintenance of the present dividend on the common shares. It is generally thought that this dividend will be $2 per cent. per annum, at which the return would be reasonably good for a share of this nature. Amongst other overseas shares, Palestine Electrics are steady at 41s. on the maintenanee

(*Continued on page* 34)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend Previous	Dividend Last	Middle Price July 4	Rise or Fall	Yield p.c. £ s. d.
Home Electricity Companies					
Bournemouth and Poole	12½	12½	61/6	..	4 1 2
British Power and Light	7	7	38/–	..	4 4 10
City of London	7	5½	29/–	..	3 14 7
Clyde Valley	8	8	41/6	..	3 17 0
County of London	8	8	42/–	..	3 16 0
Edmundsons:					
7% Pref.	7	7	34/6xd	..	4 1 4
Ord.	6	6	29/6	..	4 1 4
Elec.Dis.Yorkshire	9	9	45/6	..	3 19 6
Elec. Fin. and Securities	12½	13½	57/6	..	4 13 9
Elec. Supply Corporation	10	10	47/–	..	4 5 0
Isle of Thanet	Nil	Nil	18/–	..	—
Lancs. Light and Power	7½	7½	36/–	..	4 3 4
Llanelly Elec.	6	6	26/–	..	4 12 4
Lond.Assoc.Electric	3	4	24/6	..	3 5 3
London Electric	6	6	28/6	+6d.	4 4 3
LondonPowerRed. Deb.	5	5	104½	..	4 14 7
Metropolitan E.S.	8	8	41/6	..	3 17 0
Midland Counties	8	8	41/–	..	3 18 0
Mid. Elec. Power	9	9	44/–	..	4 1 9
Newcastle Elec.	7	7	31/–	..	4 10 4
North Eastern Elec.:					
Ordinary	7	7	34/–	..	4 2 4
7% Pref.	7	7	35/–	..	4 0 0
Northampton	10	10	48/6	..	4 2 6
Notting Hill 6% Pref. (£10)	6	Nil	11	..	—
Northmet Power:					
Ordinary	7	7	39/6	..	3 11 0
6% Pref.	6	6	30/6	..	3 18 8
Richmond Elec.	6	6	25/6	..	4 14 1
Scottish Power	8	8	41/–	+6d.	3 8 0
Southern Areas	5	5	23/–	..	4 7 0
South London	7	7	28/–	..	5 0 0
West Devon	5	5	23/6	..	4 5 1
West Glos.	4½	5½	24/6	..	2 17 4
Yorkshire Elec.	8	8	43/–	..	3 14 5
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	7/9	..	—
Calcutta Elec.	6*	6*	44/6	+3/–	2 13 9
Cawnpore Elec.	10	7	37/–xd	+1/6	3 15 9
East African Power	7	7	33/6	..	4 3 7
Jerusalem Elec.	7	5	29/–	..	3 9 0
Kalgoorlie (10/–)	5	5	10/6	..	4 15 3
Madras Elec.	4*	Nil	25/6	+2/–	—
Montreal Power	1½	1½	23	–½	6 7 8
PalestineElec."A"	4*	5*	41/–	..	2 8 9
Perak Hydro-elec.	6	7	11/–	..	—
ShawiniganPower	83cts.	90cts.	16¼	–½	—
Tokyo Elec. 6%	6	6	20	–1	—
VictoriaFallsPower	15	15	4½xd	..	3 12 7
WhitehallInv.Pref.	—	6	24/6	+6d.	4 18 0

Company	Dividend Previous	Dividend Last	Middle Price July 4	Rise or Fall	Yield p.c. £ s. d.
Public Boards					
Central Electricity:					
1955–60 (Civil Defence)	3	3	100	..	3 0 0
1955–75	5	5	115	..	4 7 0
1951–73	4½	4½	107	..	4 4 1
1963–93	3½	3½	103½	..	3 7 8
1974–94	3½	3½	100	..	3 5 0
London Elec. Trans. Ltd.	2½	2½	97	..	2 11 3
London & Home Counties1955–75	4½	4½	113	..	3 19 8
Lond.Pass.Trans.:					
A	4½	4½	121½	..	3 14 1
B	5	5	121½	..	4 2 4
C	3	3½	72	..	4 10 3
WestMidlandsJ.E.A. 1948–68	5	5	108½	..	4 12 4
Telegraph and Telephone					
Anglo-Am. Tel.:					
Pref.	6	6	120½	..	4 19 7
Def.	1½	1½	30	..	5 0 0
Anglo-Portuguese	8	8	27/–	..	3 18 6
Cable & Wireless:					
5½% Pref.	5½	5½	114	..	4 16 6
Ord.	4	4	80	..	5 0 0
CanadianMarconi$1	Nil	4cts.	10/3	..	—
Globe Tel. & Tel.:					
Ord.	8½*	5*	40/–	..	2 10 0
Pref.	6	6	30/–	..	4 0 0
GreatNorthernTel. (£10)	Nil	Nil	24½	..	—
Inter. Tel. & Tel.	Nil	Nil	22½	+1½	—
Marconi-Marine	7½	7½	34/3	..	4 7 7
Oriental Tel. Ord.	16	10	49/–	..	—
Telephone Props.	6	Nil	17/6	..	—
Tele.Rentals (5/–)	10	10	12/–	..	4 3 4
Traction and Transport					
Anglo-Arg. Trans.:					
First Pref. (£5)	Nil	Nil	2/6	..	—
4% Inc.	Nil	Nil	6	..	—
Brit.Elec.Traction:					
Def. Ord.	45	45	1315	..	3 8 6
Pref. Ord.	8	8	180	..	4 9 0
Bristol Trams	10	10	56/6	..	3 10 10
Brazil Traction	$1	$1¼	28¼	+¼	6 4 0
Calcutta Trams.	5½	6½	60/–	+7/6	2 3 4
Cape Elec. Trams	5	6	25/6	..	4 14 1
Lancs. Transport	10	10	45/6	..	4 8 0
Mexican Light:					
1st Bonds	5	5	104½	..	4 15 7
Rio 5% Bonds	5	5	105½	..	4 14 9
Southern Rly.:					
5% Prefd.	5	5	79	..	6 6 9
5% Pref.	5	5	118½	..	4 4 9
T. Tilling	10	10	59/6	..	3 7 3
West Riding	10	10	44/6	..	4 10 0

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend Previous	Dividend Last	Middle Price July 4	Rise or Fall	Yield p.c.
Equipment and Manufacturing					
					£ s. d.
Aron.Elec.Ord. ..	10	15	61/–	..	4 18 4
Assoc. Elec. :					
Ord.	10	10	55/–	..	3 12 9
Pref.	8	8	40/6	..	3 19 0
AutomaticTel.&Tel.	12½	12½	66/6	–6d.	3 15 2
Babcock & Wilcox	11	11	51/9	+6d.	4 5 3
British Aluminium	10	10	48/3	..	4 3 0
British Insul. Ord.	20	20	5 7/8	..	3 11 9
British Thermostat (5/–)	18½	18½	21/–	..	4 8 1
British Vac. Cleaner (5/–)	15	30	30/–	..	5 0 0
Brush Ord. (5/–)	8	9	10/6	+3d.	4 5 10
Burco (5/–) ..	15	17½	16/–	..	5 9 5
Callender's ..	15	20	5 7/16	..	3 13 8
ChlorideElec.Storage	15	15	85/–xd	+1/–	3 10 7
Cole, E. K. (5/–)	10	15	31/–	–1/–	2 8 5
ConsolidatedSignal	24	27½	6½	..	4 4 6
Cossor, A. C. (5/–)	7½*	10*	25/6	..	1 19 3
Crabtree (10/–) ..	17½	17½	40/–	..	4 7 6
Crompton Parkinson Ord. (5/–) ..	20	22½	32/3xd	..	3 9 6
E.M.I. (10/–) ..	6	8	33/9	..	2 7 4
Elec. Construction	10	12½	54/–	..	4 12 7
Enfield Cable Ord.	12½	12½	57/6	..	4 7 0
English Electric	10	10	53/3	..	3 15 2
Ensign Lamps (5/–)	25	15	21/3	..	3 10 8
Ericsson Tel. (5/–)	22*	20*	56/3	..	1 15 7
Ever Ready (5/–)	40	40	43/9	–6d.	4 11 6
Falk Stadelmann	7½	7½	33/6	..	4 9 7
Ferranti Pref. ..	7	7	32/–	..	4 7 6
G.E.C. : Pref.	6½	6½	34/–	..	3 16 6
Ord.	17½	17½	96/–	–6d.	3 13 0
General Cable (5/–)	15	15	15/–	..	5 0 0
Greenwood&Batley	15	15	45/–	..	6 13 4
HallTelephone(10/–)	12½	12½	29/–	..	4 6 3
Henley's (5/–) ..	20	20	26/9	..	3 14 9
4½% Pref. ..	4½	4½	24/–	..	3 15 0
Hopkinsons ..	15	17½	68/3	+ 1/16	5 2 6
India Rubber Pref.	5½	5½	23/6	..	4 13 9
Intl. Combustion	30	30	6 1/8xd	+1/–	4 10 8
Johnson & Phillips	15	15	74/6	..	4 0 6
LancashireDynamo	22½	22½	97/–	..	4 12 9
Laurence,Scott(5/–)	12½	12½	13/3	+3d.	4 14 2
London Elec. Wire	7½	7½	39/–	–1/–	3 17 0
Mather & Platt..	10	10	52/6	..	3 16 4
Metal Industries(B)	5	8	50/–	..	3 4 0
Met.Elec.CablePref.	5½	5½	21/3	..	5 3 6
Murex	20	20	105/9	..	3 15 6
Pye Deferred (5/–)	25	25	30/–	..	4 3 4
Revo (10/–) ..	17½	17½	43/–	+6d.	4 1 4
Reyrolle ..	12½	12½	70/6	+6d.	3 11 0
Siemens Ord. ..	7½	7½	34/6	..	4 7 0
Strand Elec. (5/–)	7½	10	8/–	+3d.	6 5 0
Switchgear & Cowans (5/–) ..	20	20	18/6	..	5 8 1
T.C.C. (10/–) ..	5	7½	22/6	..	3 6 8
T.C. & M. ..	10	10	55/–	..	3 12 6
TelephoneMfg.(5/–)	9	9	11/9	..	3 16 8
Thorn Elec. (5/–)	20	20	26/–	+1/–	3 17 0
Tube Investments	20	20	97/6	..	4 2 0
Vactric (5/–) ..	Nil	Nil	16/6	+2/–	—
Veritys (5/–) ..	7½	7½	8/3	..	4 11 0
WalsallConduits(4/–)	55	55	49/6	+6d.	4 9 0
Ward & Goldstone (5/–)	20	20	27/3	..	3 13 6
WestinghouseBrake	12½	14	75/–	..	3 14 9
West, Allen (5/–)	7½	7½	7/3	..	5 3 5

* Dividends are paid free of Income Tax.

Stocks and Shares (*Continued from page* 32)

of the dividend at 5 per cent. tax free. Anglo-Argentine Tramways are dull, following upon a circular issued by the directors of the company in which they condemn the attitude of the Argentine authorities for non-fulfilment of promises.

Calcutta Trams

Optimism with regard to the taking over of the Calcutta Tramways Company by the Calcutta Corporation turns out to be justified. The Corporation is to purchase the undertaking on New Year's day next. Details are awaited as to the price which Calcutta Tramways shares are likely to receive. Estimates range from 62s. 6d. to 75s. The price of the shares at the beginning of this year was 36s. against the present price of £3, a gain of 7s. 6d. on this week. Two years ago, they could have been bought for 10s.

Miscellaneous Movements

The startling rise in the price of Calcutta Tramways has had an exhilarating effect upon that of Calcutta Electric Supply. This has gained 3s., at 44s. 6d.; part of the buying is said to come from India. Also in sympathy, though more indirect, Madras Electrics rose 2s. to 25s. 6d. Cawnpore Electrics recovered the dividend deducted from the price. The Home Electricity shares show little variation. London Electric Supply hardened to 28s. and Scottish Power to 41s. The overseas group, apart from the Indian shares, is undistinguished. Tokyo Electric sixes eased off to 20. A rise of 6d. in Whitehall Electric preference left the price at 24s. 6d.

Telephone Manufacturing

The Telephone Manufacturing Co. manufactures automatic exchanges, electric clocks, telephone and other electrical apparatus. It has an interest in Radio Rentals, Ltd., formed to acquire certain of the company's assets. The next dividend, making 9 per cent. for the year, is payable on July 31st. The 9 per cent. dividend has been paid annually since 1935 out of earnings of considerably greater amount except those for the year 1938, which were a little under 11 per cent. The issued capital of £385,000 is in 5s. shares, now quoted at 11s. 9d., and giving a return of £3 16s. 8d. per cent.

NEW PATENTS

Electrical Specifications Recently Published

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

AGA Baltic Aktiebolag.—"Frequency-modulated transmitters." 7247/42. June 3rd, 1941. (561993.)

Automatic Telephone & Electric Co., Ltd., C. Gillings and L. J. Murray.—"Telephone systems employing cross-bar switches." 3717. March 8th, 1943. (562115.)

British Thomson-Houston Co., Ltd.—"Electric contact elements combined with magnetic blow-out devices." 289/43. January 14th, 1942. (561984.) "Resinous condensation products." 6941/42. May 27th, 1941. (561992.) "Safety switches for electrically heated appliances." 17570/42. December 16th, 1941. (562020.) "Thermally operated electric control means for an electric motor." 18302/42. December 31st, 1941. (562066.) "Inductive windings provided with electrostatic shields." 1926/43. February 10th, 1942. (562070.) "Vibration measuring devices." 1927/43. February 11th, 1942. (562071.) "Switches for starting electric-discharge devices." 15821/42. November 12th, 1941. (562031.)

E. K. Cole, Ltd., and M. Freund.—"Electric lighting fittings." 1518. January 29th, 1943. (562069.)

Electro Metallurgical Co.—"Apparatus for producing magnesium." 17579/42. January 9th, 1942. (562037.)

Gwynnes Pumps, Ltd., and G. A. Wauchope.—"Starters for three-phase electric motors." 17635. December 11th, 1942. (562041.)

J. E. Hall, F. A. W. Benham, J. Alexander, S. Quilter and Automatic Coil Winder & Electrical Equipment Co., Ltd.—"Wire-tensioning devices for use with coil-winding machines." 17374. December 7th, 1942. (562016.)

J. F. Heuberger.—"Current collectors or sliding contacts." 15706/42. December 22nd, 1941. (561972.)

W. C. Holmes & Co., Ltd., T. Coe and N. Skovgaard.—"Means for preventing arcing in connection with tramway trolley wires and the like." 3613. March 5th, 1943. (562112.)

International Combustion, Ltd. (T. Kruger).—"Pulverised fuel burners." 2884. February 22nd, 1943. (Convention date not granted.) (562078.)

Johnson & Phillips, Ltd., and W. H. A. Belliss.—"Circuit-breaker reclosing mechanisms." 18509. December 30th, 1942. (562045.)

Johnson & Phillips, Ltd., and W. J. Welsh.—"De-taping devices for cables and the like." 18148. December 21st, 1942. (562106.)

Marconi's Wireless Telegraph Co., Ltd.—"Colour television systems." 3672/43. June 28th, 1941. (562113.)

Marconi's Wireless Telegraph Co., Ltd., and C. S. Cockerell.—"Holder for piezo-electric crystal." 15885. November 10th, 1942. (562032.)

Mavor & Coulson, Ltd., J. B. Mavor and W. S. Galloway.—"Mining machines." Cognate applications 15864/42 and 18076/42. November 10th, 1942. (562006.)

Philco Radio & Television Corporation.—"Automatic phonographs." 17451/42. January 7th, 1942. (561979.)

Philips Lamps, Ltd. (Naamlooze Vennootschap Philips' Gloeilampenfabrieken).—"Electric arc welding." 202. January 5th, 1943. (562067.)

J. S. Pole, A. P. Glenny and Sperry Gyroscope Co., Ltd.—"Navigation-aiding course-indicating instruments." 1768. February 3rd, 1943. (562049.)

Self-Changing Gear Co., Ltd., A. G. Wilson and A. A. Miller.—"Driving of dynamos." 12934. September 14th, 1942. (562095.)

J. W. Shelmerdine and A. Mulley.—"Vehicle headlamps." 1683. February 2nd, 1943. (561990.)

P. A. Sporing and Telegraph Condenser Co., Ltd.—"Tubular containers for electrical condensers." 16132. November 14th, 1942. (562100.)

Standard Telephones & Cables, Ltd., and W. A. Gold.—"Tuning arrangements for thermionic valve circuits." 17428. December 8th, 1942. (561977.)

Sturtevant Engineering Co., Ltd., and J. M. Scott.—"Electromagnetic controlling devices for mixing machines." 12787. September 10th, 1942. (561968.)

Superheater Co., Ltd. (Superheater Co.).—"Heat-exchange tubes and apparatus for use in their manufacture." 17514. December 9th, 1942. (562018.)

B. Tenenbaum.—"Piezo-electric crystals." 15952. November 11th, 1942. (562034.)

Western Electric Co., Inc.—"Reproducing apparatus for sound films." 3026/43. March 10th, 1942. (562081.)

H. D. Wheeler and P. A. H. Mossay.—"Controllers for electric motors supplied on the variable voltage system." 730. January 14th, 1943. (562068.)

Whessoe Foundry & Engineering Co., Ltd., K. W. Francombe, A. Puttick and W. E. Putnam.—"Electrical dust-precipitators for use with mobile producer-gas plants." 17886/7. December 16th, 1942. (562043/4.)

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the makers of the following:—

VASOGINE waxed or impregnated paper.

KUTEE fire.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

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

Belfast.—July 27th. Town Council. Supply and delivery of (1) armature coils; and (2) steel pinions for tramcars. Forms of tender, conditions, etc., from the acting general manager, Transport Department, Sandy Row, Belfast.

Orders Placed

Stockport.—Electricity Committee. Accepted. Repairs to works battery (£164).—Tudor Accumulator Co. One "Connersville" meter (£1,290).—W. C. Holmes & Co.

Warrington.—Electricity Committee. Accepted. Transformers for a further year; Electric Construction Co.

Contracts in Prospect

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

Bolton.—Works alterations, High Street; R. Watson & Co., Ltd.

Brechin.—School cooking centre, Nursery Lane; borough engineer.

Bury.—Bakery extensions; W. Hibbert, Back Princess Street.

Cheetham.—Factory and offices; A. M. Isaacs, architect, 136, Middleton Road, Crumpsall, Manchester.

Chorlton-cum-Hardy. — Bakery additions, Barlow Moor Road; Drury & Gomersall, architects, 11, Imperial Buildings, Oxford Road, Manchester.

Coatbridge.—Houses (20), Waddell's Park and Woodside; town clerk.

Croydon.—Extensions, Selhurst Grammar School; education officer, Katharine Street.

Darlington.—Offices for the Whessoe Foundry Co., Ltd.; own architects.

Durham.—Twenty central kitchens in various parts of the county in connection with the school meals plan; county architect, 34, Old Elvet, Durham.

Eccles.—Rebuilding Bull's Head Hotel, Church Street; J. Holt, Ltd., Derby Brewery, Cheetham, Manchester.

Bungalows (14) and houses (94), Peel Green; borough engineer.

Gravesend.—Office extensions (£1,300); borough engineer.

Grimsby.—Extensions, nurses' quarters, Scarthoe Road Infirmary; borough engineer.

Hyde.—Premises, for British Legion; G. A. Dishman, secretary to the local branch, Russell Street.

Isle of Wight.—Biology laboratory and kitchen, Newport Secondary School; county architect.

Kirkcaldy.—Houses (20), with electrical work, Hayfield East; burgh engineer.

Lancashire.—Central school kitchen, Taylor Lane, Denton (£4,444); E. C. Coleman, Ltd., builders, Washway Road, Sale, Ches.

Leicester.—Day nursery, Sparkenhoe Street, and nursery staff hostel, Welford Road; city surveyor.

London.—ST. MARYLEBONE.—Offices, Dorset Street; Montague Evans & Son.

Flats, Marylebone Street (£7,566) and reconditioning property, Carlton Hill and Clifton Hill (£15,275); borough engineer.

Factory, Clipstone Street and Hanson Street; Lewis Solomon & Son.

Consulting rooms and flats, 43, Wimpole Street; Sutcliffe, Taylor & Millard.

Longsight.—Works additions; H. S. Fairhurst & Son, architects, 55, Brown Street, Manchester, 2.

Maidstone.—Workshops, College Avenue (£2,000); engineer, Kent Rivers Catchment Board.

Manchester.—Bakery and food preparation room for Robinson & Smith, Ltd.; C. Hartley, architect, 128, Buxton Road, Great Moor, Stockport.

Middlesbrough.—Cold storage room, Marton Road, for the Middlesbrough Co-operative Society; C.W.S. Architects' Department, 90, Westmorland Road, Newcastle-on-Tyne.

Middlesex.—Additions, Clare Hall Hospital (£7,080), and nurses' home, Pield Heath Road, Hillingdon (£6,000); county architect.

Montgomeryshire.—Canteen kitchen, etc., Newtown; director of education, County Education Offices, Newtown.

Newcastle (Staffs).—Conversion of premises, Chesterton, to maternity hospital; borough surveyor.

Northants.—Canteen kitchen, Braybrooke; county architect.

Nottinghamshire.—Central kitchen, Kimberley; county architect.

Nuneaton.—Out-patients' department, General Hospital; W. T. Smith, chairman of General Hospital Board of Management.

Oldham.—Refuse disposal works; borough engineer.

Oxfordshire.—Three new blocks, Osler Pavilion, Manor Road, Oxford; county architect.

Patricroft.—Works extensions; Mitchell, Shackleton & Co., Ltd.

Pickering.—Houses (75); R.D.C. surveyor.

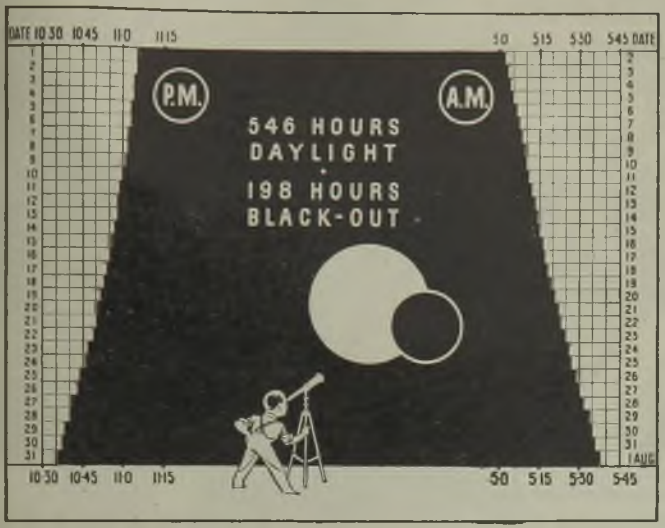
Preston.—Extensions, Park Council School; G. Hill & Sons (Preston), Ltd., builders, 24, Cannon Street.

Redditch.—Completion of 46 houses, Batchley estate; U.D.C. surveyor.

Rochdale.—Extensions, transport garage and workshops, Mellor Street, for Transport Committee; borough surveyor.

The Time to Plan . . . .

BLACK-OUT CHART FOR JULY



★*Times shown are those for the London area.*

Reproduced from the Nautical Almanac by permission of the Controller of H.M. Stationery Office.

Summer it may be, but black-out hours are lengthening again. It is time to think of lighting and how best it can be applied to assist output during the still darker months. Does your lighting system need any revision? . . . If so, complete your plans in good time. The subject of lighting always brings Osram to mind — for wherever you find good lighting, there you will find OSRAM.

Osram

A G.E.C. PRODUCT

THE WONDERFUL LAMP

Adm of The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2

"E.C.C. at your service"

WHETHER BY TELEPHONE, TELEGRAM OR LETTER

***BUT** in present emergency do not use trunk call if letter will do (Government request)*

ELECTRIC-CONSTRUCTION ENGINEERS ARE READILY AVAILABLE FOR CONSULTATION AND INTERVIEW

E C C

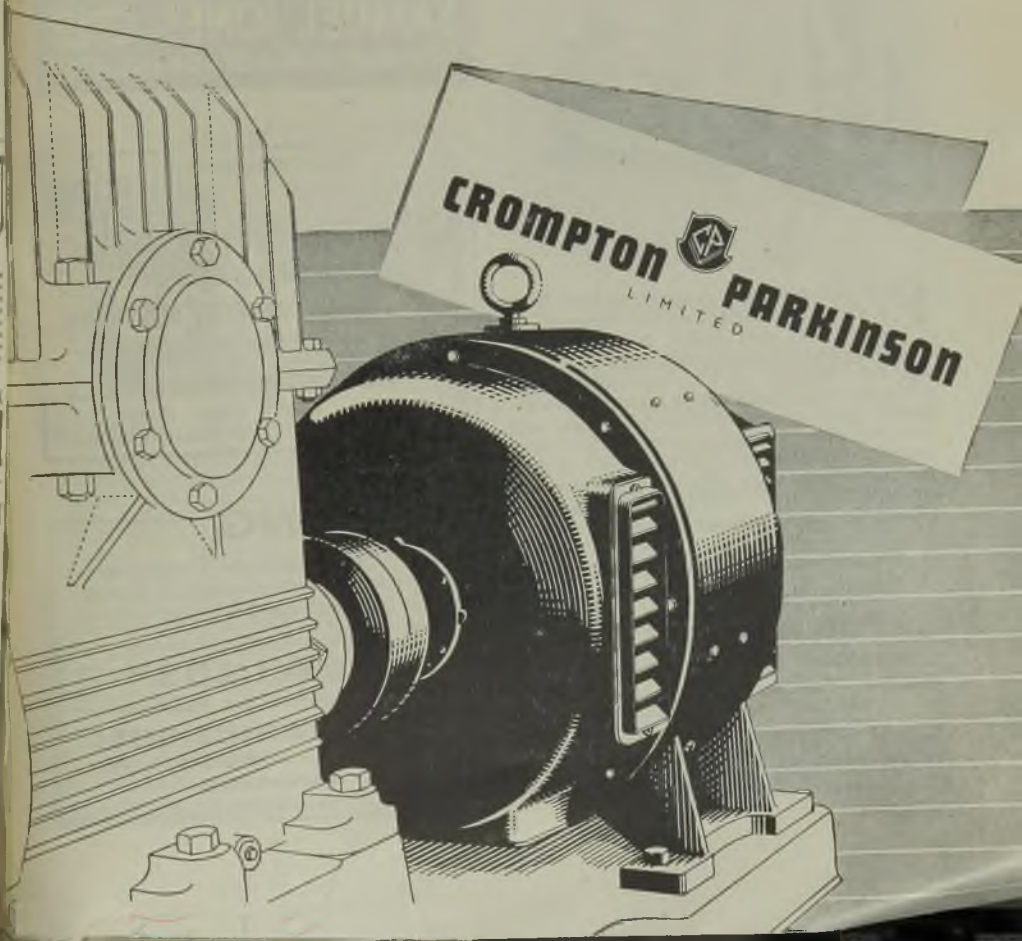
The **ELECTRIC** *Construction Co, Ltd.*

WOLVERHAMPTON

MOTORS
GENERATORS
TRANSFORMERS
SWITCH & CONTROL GEAR
MERCURY-ARC & METAL-PLATE RECTIFIERS

TELEPHONE: WOLVERHAMPTON 21455
TELEGRAMS: "ELECTRIC, WOLVERHAMPTON."

PAPER CONTROL. The fine control of speed required by paper machine drives is assured by this Crompton 125 h.p. D.C. Motor. Crompton's made some of the first D.C. machines in this country.



The Light

In peaceful To-morrow, we must not grope in the darkness of Ignorance or stumble in the labyrinth of Misunderstanding. And we shall not. For the light of Victory that gleams ever brighter, is also the light that has shown us the errors of Yesterday. We face a future of new ideas and new ideals. It is to be our reward for long years soured by the bitterness of War . . . The creative genius of electrical science has not slept through the agony of conflict. It has never paused since the days of Ohm and Watt, Franklin and Faraday, Cavendish and Kelvin. It did not cease even when the wonder of ship talking to ship, plane to plane, and nation to nation had been achieved. It continues to flourish and fill with awe and admiration, all those who witness its work. And proud of their place in the field of electrical science are A.T.M. Engineers who, in developing still further those inventions which help neighbour talk to neighbour, hope thereby to further the cause of Freedom.

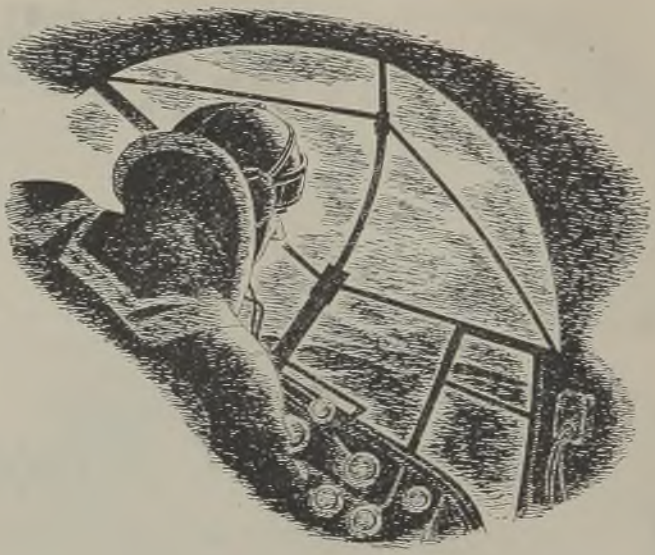
AUTOMATIC TELEPHONE & ELECTRIC CO. LTD.

MANUFACTURERS OF AUTOMATIC TELEPHONE EQUIPMENT, CARRIER TELEPHONE EQUIPMENT, A.T.M. REMOTE CONTROL EQUIPMENT, ELECTRO-MATIC VEHICLE ACTUATED TRAFFIC SIGNALS, MINE SIGNALLING EQUIPMENT, RYTHMATIC CONTROL, A.T.M. STREET FIRE ALARM EQUIPMENT, AND APPARATUS INVOLVING LIGHT-CURRENT SIGNALLING TECHNIQUE.

London & Liverpool

ATM

H



USE YOUR BLACK-OUT TO BEAT THE BOMBER

—don't let it beat you too—

Black-out atmosphere—overheated, unventilated air—undermines operatives' energy and enthusiasm, slows down effort and affects production. Health suffers. Unless efficient ventilation is installed the black-out will beat you. Consult the G.E.C., whose ventilation engineers will give expert advice on ventilation equipment specially designed for black-out conditions.

CONSULT THE *G.E.C.* ON VENTILATION

with GENALEX EXHAUST FANS

Advt. of The General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2 Gen. 14

CLASSIFIED ADVERTISEMENTS

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

THE CHARGE for advertisements in this section is 2/- per line (approx. 8 words) per insertion, minimum 2 lines 4/-, or for display advertisements 30/- per inch, with a minimum of one inch. Where the advertisement includes a Box Number there is an additional charge of 6d. for postage of replies.

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

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

Original testimonials should not be sent with applications for employment.

SITUATIONS VACANT

None of the vacancies for women advertised in these columns relates to a woman between 18 and 41 unless such woman (a) has living with her a child of hers under the age of 14, or (b) is registered under the Blind Persons Acts, or (c) has a Ministry of Labour permit to allow her to obtain employment by individual effort.

ELECTRICAL POWER ENGINEERS' ASSOCIATION

Vacancies for Assistant Secretaries

THE NATIONAL EXECUTIVE COUNCIL invites applications for two appointments of Assistant Secretary on the Official Staff of the Association, one, for the Northern Area (location Edinburgh), to be made immediately, and the other, for the North-Western Area (location Manchester) to be made in the near future.

Applicants should have had experience in the Electricity Supply Industry, preferably on the technical side.

The duties will comprise the conduct of negotiations on behalf of members, propaganda work, etc. Salary scale (basic), £350 rising to £500, subject to the operation of Clause 33 of the National Joint Board Agreement; present commencing salary, £401.

The successful applicants will be required to pass a medical examination and to contribute to the Association's Staff Pension Scheme.

Applications, in writing, giving full particulars including age, and endorsed "ASSISTANT SECRETARY," should be addressed to—

The General Secretary,
Electrical Power Engineers' Association,
102, St. George's Square,
London, S.W.1,

and should be received not later than Friday, the 11th August, 1944. 349

SECRETARY

THE Council of the Illuminating Engineering Society will shortly be considering the appointment of a Secretary. Applications are invited from suitably qualified candidates. Applicants should give particulars of age, qualifications and experience (secretarial and otherwise), salary desired, and approximate date when services would be available. Knowledge of Illuminating Engineering is desirable.

Applications should be sent to the Honorary Secretary of

THE ILLUMINATING ENGINEERING SOCIETY,

32, VICTORIA STREET, LONDON, S.W.1. 356

A most excellent line for Travellers calling upon electricians and electrical accessories factors, commission basis, most districts. When replying state fullest particulars.—Box 316, c/o The Electrical Review.

SHEFFIELD CORPORATION ELECTRICITY DEPARTMENT

Appointment of Stations Superintendent

APPLICATIONS are invited for the position of Stations Superintendent. Owing to the retiral of staff in the near future, good prospects of promotion are open to suitable men.

Applicants must have had a thorough mechanical engineering training, preferably including experience in a manufacturing engineering works, and possess a degree or equivalent technical qualifications admitting to Corporate Membership of the Institution of Mechanical and/or Electrical Engineers.

The successful candidate, whose age should preferably not exceed 45 years, will be required to take charge of the operation and maintenance of one of the Department's Generating Stations with any extensions thereto, together with the necessary clerical work, under the supervision of the Power Stations Engineer.

The salary will be in accordance with Class J, Grade 3, of the National Joint Board Scale, Supplemental Schedule "B" (£713 rising to £748).

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

Form of application may be obtained from the undersigned.

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

The latest date for receipt of applications is MONDAY, 17th July, 1944.

JOHN R. STRUTHERS,
General Manager and Engineer.

Commercial Street,
Sheffield, 1.
26th June, 1944. 367

PERSONNEL CONTROLLER

LARGE Engineering Works in the North of England requires a Personnel Controller whose experience and ability would enable him to deal with the problems of an expanding organisation in all that pertains to the control and well-being of all grades of personnel. Effective guidance in the transition to post-war conditions and outlook will be of particular importance. Apply, giving details of age, experience and background, to—Box 209, c/o The Electrical Review.

APPRENTICE CONTROLLER

LARGE Engineering Works in the North of England requires an Apprentice Controller whose experience and ability would enable him to deal with the problems of an expanding organisation in all that pertains to the selection, training and well-being of apprentices. Effective guidance in the transition to post-war conditions and outlook will be of particular importance. Apply, giving details of age, experience and background, to—Box 208, c/o The Electrical Review.

BRITISH Broadcasting Corporation. Applications are invited for the post of Education Officer to develop and control technical training within the Engineering Division. While it is desired to make the appointment immediately, if possible, applications are nevertheless invited from candidates who will not be available until the cessation of hostilities. Candidates, who must be of British nationality and parentage, should possess first-class technical and educational qualifications and be capable of organising training schemes for all categories of the Corporation's technical staff. The duties of the post will include the control of an Engineering Training School and instructional staff at Corporation premises throughout Great Britain and Northern Ireland. Commencing salary will be in accordance with qualifications and experience, and will, subject to satisfactory reports, rise by annual increments to a maximum of £1,250 per annum. Applications, giving full details of age, education, qualifications and experience, should be sent to the Engineering Establishment Officer, Broadcasting House, London, W.1, by 8th August, 1944. 354

CHIEF Inspector required for factory producing telephone and similar equipment. Responsible for maintaining accuracy of all machine shop output, sub and final assembly lines. Must be conversant with methods of electrical testing, plating and other finishes; good disciplinarian and able to maintain continuous inspection to prevent rather than reject faulty components and able to train unskilled female labour as viewers. Salary £450 per annum and annual bonus. Location Midlands. Write in first instance, giving fullest possible particulars of positions held, age, and include copies only of references.—Box 6017, c/o The Electrical Review.

ELECTRICAL Draughtsman required North-East Coast area. Applicants should have experience with turbo-type alternator plant and be capable of preparing complete detail and arrangement drawings for this class of machinery. Write, giving full details of experience, to—Ministry of Labour and National Service, R.O.5A(1), Ref. 27, 28, Great North Road, Newcastle-upon-Tyne, 2. 347

ELECTRICAL Wholesalers require a Clerical Assistant, conversant with trade and materials as handled.—London Electrical Co. (Blackfriars) Ltd., Blackfriars Road, S.E.1. 24

ENGINEERING Sales Assistant required for Glasgow branch of large manufacturing firm making heavy electrical equipment. State age, salary, experience.—Box 283, c/o The Electrical Review.

PROGRESSIVE Cinematograph Theatre circuit requires services of qualified Electrical Engineer. Must be capable of preparing plans and specifications of electrical installations for new theatre projects and of controlling existing technical staff. Knowledge of modern plenum, heating and ventilating systems would be an advantage. Consideration would be given to post-war appointment. Replies, which should give age and detailed particulars of applicant's career, salary, etc., will be treated in strictest confidence.—Box 351, c/o The Electrical Review.

REPRESENTATIVES wanted by large manufacturer, must have first-class connections with supply undertakings and factors for the sale of non-association rubber cables. Lancashire, Yorkshire and Northumberland areas.—Box 312, c/o The Electrical Review.

SALES Engineer required for London office of firm specialising in high-class radio, telegraph and allied apparatus. Successful applicant would be required to handle sales correspondence and telephone enquiries and take charge of office. Permanency with good post-war prospects. Reserved. Reply, giving full details of age, experience and salary required, to—Box 286, c/o The Electrical Review.

SALES Representative. Permanent progressive position for man with knowledge of power application of A.C. and D.C. Motors. Apply—Higgs Motors, Kingsway, W.C.2, or Birmingham, 6. 326

SWITCHBOARD Attendant required at once with experience in the running and operation of extra high tension, 3-phase, D.C. switchboard. Salary, Class H, Grade 9A. Application as soon as possible to—Power Station Superintendent, Northmet Power Co., Taylors Lane, Willesden, London, N.W.10. 366

TOOL Planning Manager, with experience of press tools, assembly jigs and fixtures, and knowledge of tool-room and machine shop process engineering, required for North London district. Knowledge of light electrical-mechanical assemblies and radio engineering practice essential. Good post-war prospects. Write, stating full particulars and salary required, to—Box C.W.2, c/o 5, New Bridge Street, London, E.C.4. 364

WELL-educated Woman required for London office of Electrical Engineers. Conversant with terms used in electrical engineering and capable of handling enquiries on own initiative. Details of experience and salary required to—Box 287, c/o The Electrical Review.

APPOINTMENTS FILLED

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

SITUATIONS WANTED

ADVERTISER has 30 years' experience of the manufacture of precision electrical apparatus, measuring instruments, f.h.p. motors, radio components, etc., 15 years of above as supervising experience as foreman, superintendent, production manager and works manager, experienced at toolmaking, tool and mould design, rate-fixing, planning and estimating with up-to-date plant, desires position as Chief Engineer or Works Manager with firm prepared to offer 4-figure salary.—Box 5998, c/o The Electrical Review.

ADVERTISER having splendid contacts Northern Counties, especially with supply authorities, seeks additional agencies or would represent reputable firm. Specialised knowledge of water heating, cookers and domestic appliances generally over 24 years. Can furnish the very highest credentials as to past record. Alternatively open to consider executive position.—Box 5997, c/o The Electrical Review.

AGE 43 years, experience electrical generation, distribution and maintenance, 28 years, medium plants, desires change as Foreman, Representative or Service Engineer with post-war prospects.—Box 5989, c/o The Electrical Review.

A.M.I.E.E. (30), acting as technical adviser during war, desires post-war appointment with electrical power company, manufacturer, or large scale contractor. Experienced in E.H.T. and L.T. transmission, distribution, and associated maintenance. Experience also in electro-mechanical and electro-acoustic circuits, and instruments.—Box 6003, c/o The Electrical Review.

A.M.I.E.E. (49), 25 yrs.' experience mains work supply coys., consider change position of real responsibility. Used to executive work and organising.—Box 6019, c/o The Electrical Review.

CHARTERED Electrical Engineer, 35, electrical contracting 10 years, consumers' engineer London Supply Undertakings 5 years, provincial and rural undertaking 4 years with management of commercial and contracting departments, wide experience in design and layout of and specifications for lighting and power installations in domestic, commercial and industrial premises, specialised heating, water heating, refrigeration and power applications, comprehensive knowledge of application various fuels to these purposes, extensive administrative and commercial experience with control of large manual and non-manual staff, requires responsible, permanent post-war position in London area.—Box 6021, c/o The Electrical Review.

CONSTRUCTIONAL Engineer (36), holding executive position, desires change. Extensive experience supply companies, electrical contractors, in planning construction, maintenance, etc., of overhead and underground mains, office routine, etc. Supply co. preferred, but not essential.—Box 6004, c/o The Electrical Review.

ELECT. Engineer, Assoc.I.E.E., desires post as tech. asst., sales or maintenance charge. Cardiff or South Wales area preferred, but not essential.—Box 6006, c/o The Electrical Review.

ELECTRICAL Engineer, shortly open to transfer, desires executive post in the repair and maintenance of power plant, personally known to power plant merchants throughout the country.—Box 5985, c/o The Electrical Review.

ELECTRICAL Engineer, university trained, with wide experience, England and abroad, in design and production, seeks responsible executive position.—Box 5996, c/o The Electrical Review.

ELECTRICAL Lieutenant-Commander, area chief of Admiralty engineering department, with 12 years' first-class commercial experience (sales/publicity), seeks directorship in concern preparing to develop in Devon/Cornwall after war. Highest references.—Box 6002, c/o The Electrical Review.

ENGINEERING Executive (30), Int. A.M.I.P.E., G.I.E.E., with design, D.O., estimating and time study experience, desires position as chief engineer or works manager in progressive electrical company, Manchester area pref. Min. salary £600.—Box 6018, c/o The Electrical Review.

EXPERIENCED Sales Engineer (exempt, with extensive connections and proved organising ability, would consider position with small and progressive electric motor manufacturers needing sales organisation.—Box 6008, c/o The Electrical Review.

FOREMAN Electrician seeks berth, all branches, distance no object.—Box 6016, c/o The Electrical Review.

PHYSICIST (26), honours degree, engineering apprenticeship, 3 years' research experience, shortly free to undertake work with post war application.—Box 6015, c/o The Electrical Review.

SALES executive position desired with progressive concern by competent Electrical Engineer (36), fully conversant all types rotating electrical machinery, switchgear, transformers, rectifiers, but other industrial plant representation considered. Excellent education, practical training, 14 years' technical sales experience. Utmost integrity, tact and enthusiasm. Fair remuneration expected for specialised services. Qualifications and further details exchanged in confidence. Midlands or South preferred.—Box 6012, c/o The Electrical Review.

FOR SALE

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

FRACTIONAL H.P. ELECTRIC MOTORS MADE TO CUSTOMERS' SPECIFIC REQUIREMENTS

MANUFACTURERS wish to contact firms requiring assistance with their main contract, or who require quantities of special driving units with reduction gear, impeller fan or pump, etc. Capacity available in up-to-date machining and coil winding shops, under personal supervision of working directors.

Write—

GENERAL REWINDS & ENGINEERING CO.,
BENTLEY HEATH, KNOWLE,
BIRMINGHAM.

6011

REBUILT MOTORS AND GENERATORS

LONG deliveries can often be avoided by purchasing rebuilt secondhand plant. We can redesign or replace surplus plant of any size.

SEND US YOUR ENQUIRIES.

OVER 1,000 RATINGS ACTUALLY IN STOCK HERE.

DYNAMO & MOTOR REPAIRS LTD.,
Wembley Park, Middlesex.
Telephone: Wembley 3121 (4 lines).

Also at Phœnix Works, Belgrave Terrace, Soho Road, Handsworth, Birmingham.
Telephone: Northern 0898.

20

MODINSTAL ELECTRIC COMPANY LIMITED

INDUSTRIAL INFRA-RED APPARATUS FOR PAINT DRYING.
COMPLETE EQUIPMENTS OR SINGLE UNITS PROVIDED.
GUARANTEED HEAT GENERATORS.
OLDHAM WORKS, OLDHAM TERRACE, ACTON, W.3, LONDON.
Telephone: Acorn 3504/5.
M.E.C. APPARATUS, DULL EMITTER SYSTEM.

46

ARC WELDING MACHINES FROM STOCK

WE offer our latest type No. 2 Max-Arc Welder for immediate delivery, 15/250 amperes. Operates off any A.C. supply voltage. Send for details.

MAX-ARC WELDERS LTD.,
190, THORNTON ROAD, CROYDON.
THOrnton Heath 4276-8.

35

COX & DANKS LTD.

Plant & Machinery Department (London Area) offer the following Electric Motors from stock.

220 volts, 2-phase, 50 cycles.

Maker.	H.P.	Speed.	Type.	Brgs.
Higgs	20	725	S.R.	B.B.
Crompton	15	710	S.R.	B.B.
Brooks	10	750	Sq. Cage	B.B.
	Above with Starters.			
Crompton	25	705	S.R.	*B.B.
Mackie	6	1,000	S.R.	R.O.

*Totally enclosed.

D.C Motors.

Maker.	H.P.	Speed.	Wdg.	Volts.	Type.
Ind. Elec.	14	900	—	420	R.O.
Verity	8	650	Compound	500	B.B.
B.T.H.	7½	590/1,040	Compound	460	R.O.
Higgs	7	700/1,500	Shunt	480	B.B.
Newton	7	975	Compound	460	R.O.
Electro S.	5	700	—	500	B.B.
Electro	5	900	—	500	R.O.
Crompton	5	1,200	Compound	500	R.O.
Brooks	3	900	Compound	440	R.O.

Motor Generator Sets.

(2) 7-kW Motor Generator Sets by Newton, 70 volts, compound wound, direct coupled to 15-h.p., 400-v., 3-phase, 50-cycles, 950-r.p.m. Slip Ring, R.O. bearings.

Extraction Fan.

Sturtevant No. 3, 18", 5.5-h.p., 440-v., 3-phase, 50-cycles, 2,800-r.p.m. Sq. Cage, ball bearing.

Switchgear.

800-amp. Switch Fuse, 3-pole, neutral, fitted with H.R.C. Fuses by Lucey, as new.

For full details and prices of above items apply to

COX & DANKS LTD.,
Plant & Machinery Department (London Area),
Faggs Road, Feltham, Middlesex.
Tel.: Feltham 3471.

360

WATER TUBE BOILERS IN STOCK

Three	12,000 lbs.	evaporation,	200 lbs. W.P.
One	12,000 ,,	,,	160 ,, ,,
One	4,000 ,,	,,	160 ,, ,,

We install complete, including brickwork. Economisers, Pumps, Piping Valves, Generating Sets and Motors in stock. Please send us your enquiries; we can give immediate delivery.

BURFORD, TAYLOR & CO. LTD.,
Boiler Specialists, Middlesbrough.
Telephone, Middlesbrough 2622.

32

ECONOMISERS IN STOCK

TWO Green's Economisers, 208 tubes, 250 lbs. W.P.
ONE Green's Economiser, 128 tubes, 185 lbs. W.P.

All guaranteed re-insurable and first-class condition only, low prices. Quotations per return. Installations delivered and erected complete.

BURFORD, TAYLOR & CO. LTD.,
7, Commercial Street, Middlesbrough. Telephone 2622.

65

SCREWED BRASS AND STEEL STUDDING

USERS unable to obtain the longer lengths of B.A. and Whit. Screws are advised to use Screwed Studding. Supplied in 12" lengths in 0, 2, 4, 6, 8 and 10 B.A. sizes, and 3/16", ¼", 5/16" and ⅜" Whit. Brass and Steel.

Ditto Nuts. Any Quantities. Immediate Delivery.

APEX SALES, 6, Leaside Road, London, E.5.
Sta. 7131. 6013

ARTICLES WANTED

GEORGE COHEN, SONS & CO. LTD.
Engineers and Machinery Merchants
(Established 1834)

REQUIRE TO PURCHASE

GOOD Surplus PLANT AND MACHINERY, either single items or Complete Works. Please inform our nearest Area Office:—

GLASGOW: Cogan Street, Pollokshaws.
NEWCASTLE-ON-TYNE: 12, Grey Street.
MANCHESTER: Cobden Street, Pendleton.
SHEFFIELD: Coborn Works, Tinsley.
BIRMINGHAM: 191, Corporation Street.
BATH: Lower Bristol Road.
SWANSEA: Prince of Wales Dock.
SOUTHAMPTON: Princes Street, Northam.
REDRUTH: 25, Albany Road.

Or Chief Offices and Depots:
Southern: WOOD LANE, LONDON, W.12.
Northern: STANNINGLEY, Nr. LEEDS.
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RICKMANSWORTH AND UXBRIDGE VALLEY WATER COMPANY

THE company would be glad to learn of any reliable and efficient plant of modern type which may be available for disposal as follows:—

Diesel Generator Sets, 200/240 volts D.C., speed not exceeding 500 r.p.m., in units of from 100/440 kW. complete, if possible, with switchboard and auxiliaries.

All communications to be sent to
The Secretary,
Rickmansworth and Uxbridge Valley Water Co.
Batchworth,
Rickmansworth, Herts.
348

ACCUMULATOR Plates (old) and lead Peroxide; as actual smelters we pay top price. Also old storage batteries, transformers and whole installations purchased.—Elton, Levy & Co. Ltd., 18, St. Thomas Street, S.E.1. Hop 2825-6. 39

ENGINEERING Technical Books (new or secondhand) wanted in any quantity. Attractive cash offers. Call—Third floor, 356, Oxford Street, W.1, or "Stoneleigh," St. George's Avenue, Weybridge. 62

MERCURY (Quicksilver) wanted. Write for packing instructions. Gold, Silver and Platinum also purchased.—Collingridge & Co. Ltd., Riverside Works, Riverside Road, Watford (Tel. 5963). 339

URGENTLY wanted: 1,000-kW Convertor Plant, output 230 volts D.C., input if possible 400 volts, 3-phase, 50 cycles, but will consider high tension or any other voltage.—Box 352, c/o The Electrical Review.

WANTED, Motor, 230 volts, 50 cycles, 5 h.p., single-phase, approx. 1,450 r.p.m., suitable for remote control. Price and full particulars to—Craven & District Electrical Construction Co., Skipton, Yorkshire. 330

WANTED, new or second-hand Dynamo, 10-15 volts, 150/250 amp., with or without motor. Write—Box 492, c/o Streets, 8, Serle Street, W.C.2. 359

WANTED, Rotary Converters, any size.—Universal, 221, City Road, London, E.C.1. 22

WANTED urgently, Bridge Megger or Ohmmeter for measuring low resistances, also recording Ammeter for A.C.—Box 362, c/o The Electrical Review.

WE are licensed by the Ministry of Supply to purchase any used Electrical Machinery up to 1,000 h.p./kW. Please offer your surplus to—J. Gerber & Co. Ltd., Wembley, Middlesex. 371

1 ¼-h.p., single-phase, 200/230-volt, 960 or 720-r.p.m. Motor.—Box 6007, c/o The Electrical Review

1/10 to ½-h.p. commutator type A.C. or A.C./D.C. Motors wanted. Suitable for variable speed control by series resistor.—Godfrey Industries Limited, Brundall, Norwich. Telephone, Brundall 70. 319

WORK WANTED AND OFFERED

ARMATURE, Rotor and Stator rewinds and repairs; fractional to 60 h.p. Prompt deliveries.—T. A. Boxall & Co., Horley, Surrey. Phone 654. 5971

TRANSFORMERS, single and three-phase. All types up to 10 kVA.—Woden Transformer Co. (Phone Bilston 41959), Moxley Road, Bilston, Staffs. 11

MOTOR REPAIRS

REWINDING and Repairs. Small Motors and Electric Tools rewound and repaired by firm having long experience in this work. Guaranteed work and prompt service. Large assortment of Motors available from stock.

SOUTHERN IGNITION CO., LTD.,
190, THORNTON RD.,
CROYDON.
THOrnton Heath 4276-8. 37

MACHINING Work, for Centre Lathes up to 6½ in. centres and medium-sized milling (good grade work preferred).—The London Electric Firm, Croydon. Uplands 4871. 50

WE have an up-to-date plant for Vacuum Impregnating large or small motors, transformers, etc. Enquiry is invited.—Brandon Electrical Engineering Co. (Leeds) Ltd., A.I.D. Approved No. 5145/43, Nancroft Mt., Chapel Lane, Armley, Leeds, 12. 325

AGENCIES

MANUFACTURERS' Agent desires to contact firms interested in post-war development Lancs and Cheshire. Extensive connection, wholesalers, industrial, large stores, etc. 25 years' electrical exp. and sales record. At present engaged on A.M. and W.D. apparatus. Exclusive representation considered. Switchgear, cables, conduit, fittings, heating and domestic apparatus, accessories, small motors, radio and P.A. systems, medical apparatus, etc.—Box 365, c/o The Electrical Review.

MANUFACTURERS' Agents, covering the whole of Great Britain and Colonies, are desirous of contacting manufacturers with a view to sole selling rights (either commission or buying), post-war arrangements considered.—Box 23, c/o The Electrical Review.

MANUFACTURERS desirous of opening up or extending trade connections in Scotland should communicate with the advertiser, who is an able administrator and has wide experience of the electrical radio business. Energetic and reliable representation is assured. Buying agencies also considered. Replies treated in confidence. Address—2661, Wm. Porteous & Co., Glasgow. 6014

MANUFACTURERS of Electrical Measuring Instruments require an Agent for each of the following areas: Newcastle, Manchester, Leeds, Birmingham and Cardiff. Must be technically qualified and have connections in the industrial and radio field. Give full details stating territory covered and agencies held.—Box 302, c/o The Electrical Review.

MISCELLANEOUS

AN ANNOUNCEMENT

THE Association of Scientific Workers announces that it has recently signed a recognition agreement with the Engineering and Allied Employers National Federation, whereby the Federation recognises the A.Sc.W. as the appropriate body to negotiate on behalf of scientific and technical workers in the engineering industry.

The Association has already over 5,000 members in the engineering industry, and a total membership of 15,000. Its two main aims are the improvement of the conditions of employment of scientific workers, including engineers, and the best use of their work for the benefit of the community.

The agreement which has now been signed gives all scientific and technical workers in the engineering industry a new opportunity to improve their status and working conditions by joining the

ASSOCIATION OF SCIENTIFIC WORKERS.

Head Office:
Hanover House, 73 High Holborn, London, W.C.1

Area Offices:
London: 99, Albion House, 59, New Oxford St., London, W.C.1.
North West: A.Sc.W. Office, 62, George St., Manchester, 1.
West Midlands: A.Sc.W. Office, Unity Chambers, 262, Corporation Street, Birmingham.
Scottish: A.Sc.W., Room 257, 11 Rothwell St., Glasgow, C2.
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BATTERY Chargers Modernised. Your old Charger made like new by specialists. Conversion from valve to metal rectification. Send for interesting leaflet "Q.D." on this service.—Runbaken Electrical Products, Manchester, 1. 45

EDUCATIONAL NOTICES

COMPANY MEETINGS

CABLE & WIRELESS LTD. [The Operating Company]

RECORD traffic receipts of £9,420,000 in 1943, an increase of nearly £150,000, and additional income of more than £140,000 from other sources, enabled Sir Edward Wilshaw to announce to the annual meeting of Cable & Wireless Ltd., which was held on June 29th in London, that for the first time the company's gross receipts had risen above the £10,000,000 mark. But profit was down by £50,000, due to expenses having risen and to increased provision of £100,000, making £2,000,000 for Excess Profits Tax. The chairman estimated that at the end of 1943 some £7,500,000 was payable for taxation, against which the company held Tax Reserve Certificates valued at £5,650,000, since increased by £800,000 to £6,450,000.

Commenting that this high taxation bore particularly hardly on the company, since when the war started it was beginning to benefit from the progressive policy of the previous two years, Sir Edward added that the war effort of the Empire as a whole, engaged in a common purpose, had to be paid for, and money not forthcoming in this way would have to be found by other means.

Much of the development policy, which was in full tide before the war, had had to be held in abeyance, but the company was proceeding energetically with those aspects which were helpful to the war effort.

Sir Edward attacked the "popular misconception" that cables and wireless are rivals, and cited the London Transport Board as an apt illustration of the advantages of unified control of alternative but complementary means of communication. "The whole of our experience since the merger into one system of all British wireless and cable services," he added, "has given us a growing realisation of the extent to which they are complementary to each other, giving, under unified control, a strength and flexibility which is invaluable in handling peak loads and urgent traffic over a world-wide system."

Continued Empire support was essential. The company could not continue responsibility for carrying the main burden of maintaining Empire communications if Empire support were withdrawn and financial resources diverted into other hands—a disastrous policy. Yet the company had not been taken into the confidence of the Commonwealth Communications Council, but had been asked only to give evidence; it had not yet been officially informed of any report or recommendations. Sir Edward announced that funds had been set aside for considerable developments throughout the Colonial Empire.

Planning ahead had been necessary to maintain communications with Advanced Army H.Q. on the various fronts. Several women operators had already gone overseas in the new uniformed Telcom organisation. The Minister of Information had accepted Sir Edward's offer to carry free of charge during the war all pictures sent to or from the Ministry. The Army Council had released a senior member of the Technical Staff to become Press liaison officer, to ensure quick transmission of Press messages. A Public Relations Department had been opened to effect closer liaison with the general public.

Sir Edward concluded by welcoming five new directors, and paid a special tribute to the staff for its devotion to duty in difficult war conditions. 358

COMPANY MEETINGS—*Continued*

CABLE & WIRELESS (HOLDING) LTD.

THE Annual General Meeting of the above company was held on June 29th in London.

The Rt. Hon. Lord Pender (the Governor and Managing Director), who presided, said: During the last year it has been our great pleasure to welcome to the Court of Directors the Rt. Hon. Lord Reith, P.C., G.C.V.O., G.B.E., and Sir John Wardlaw-Milne, K.B.E., M.P., whose wide experience will be of the greatest value in the deliberations of their colleagues. Equally pleasing is the more recent advent to the court, with the title of director resident in Canada, of Mr. A. H. Ginman, general manager in Canada of Cable & Wireless Limited and president of the Canadian Marconi Company.

I feel, too, that I should not let this occasion pass without reiterating our warm congratulations to the Rt. Hon. Lord Courtauld-Thomson and to Mr. F. R. S. Balfour on the honours graciously conferred on them since our last meeting by His Majesty: to Lord Courtauld-Thomson on his elevation to the peerage and to Mr. Balfour on being created a Commander of the Royal Victorian Order.

The profit for the year 1943 is £1,220,976, which exceeds the Preference dividend already paid and the Ordinary dividend of 4 per cent. now proposed, together amounting to £1,197,488, by £23,488. The undistributed balance on revenue account brought forward from 1942 was £279,120, which, when added to £23,488 just mentioned and £10,000 from excess profits tax account to be mentioned below, provides an amount of £312,608 unappropriated, to be carried forward to 1944.

The dividends received from subsidiary companies are the same as for the previous year and amount to £1,263,965. The dividend received from Cables Investment Trust again amounts to £50,000, whilst the income from other investments at £41,837 shows a reduction of £13,715, due to the sale of investments in 1942 in order to finance the purchase of further shares of Marconi's Wireless Telegraph Company.

A new feature this year is the group excess profits tax account, which relates to the years from 1939 (when this tax first became operative) up to and including the year 1942. In the circumstances which have happened, there is a sum of £4,180,000 to be recovered by the holding company from companies liable within the group for the years 1939 to 1942. The liability of the group (after deducting deficiencies of companies not liable) is estimated to amount to £3,360,000, leaving a surplus of £820,000, upon which £360,000 is due to be paid for income-tax. This leaves a balance of £460,000, of which £450,000 has been transferred to the sinking fund for the Funded Income Stock, and £10,000 has been added to the balance brought forward on revenue account as already mentioned.

With the above addition of £450,000, the unexpended balance of the sinking fund for the funded income stock is £470,000, and this will be applied to the purchase for cancellation, or to the redemption, of that stock. If the necessary purchases cannot be made in the market at or below par by the end of September it will be necessary for stock to be redeemed by means of a drawing in accordance with terms of the deed under which the stock was created. It does not need to be pointed out how this large reduction in a prior charge on capital and income improves the security of the Preference stockholders and the prospects of the Ordinary stockholders.

The book value of the securities held by the group amounted to £19,729,017, with a market value of £19,565,260. The income received by the group from the investments in 1943 amounted to £701,230, compared with £584,881 in 1942.

I reaffirm the valuable part the companies continue to play towards the achievement of final victory, and endorse the warm tribute to the staff throughout the companies' system for their loyal and sustained effort in the national interest.

The report and accounts were adopted.

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W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.

THE Annual General Meeting of the above company was held on 30th June in London.

Sir Montague Hughman (the chairman), presiding, said: This is the fifth occasion since the outbreak of war on which I have had the honour of presiding at your annual general meeting. When I think of the happy pre-war general meetings when I was able to give an account of our stewardship of the Henley group of companies—years during which we were carrying on our ordinary peace-time business at home and overseas—years when living conditions were easy and taxation was not too heavy—when I was happy to be able to report year after year fine progress in the development of our business—I cannot help comparing the past with the present.

In 1942 we again had a record turnover, and remember we are over 107 years old; our rate of profit, however, is far from a record.

The question of benefits to long-service employees has been considered by the board on many occasions, and during the year a sickness and accident benefit scheme was introduced. The benefits apply to all hourly paid employees, both male and female, with 20 or more years' service with the company, and during absence due to sickness or accident an employee who has qualified receives full normal pay, less the amount of statutory benefits under the National Insurance scheme or Workmen's Compensation Act, for 13 weeks. If the absence continues beyond that period further payments are made for each year of service.

As an example, an employee with just 20 years' service receives considerable benefit in times of absence due to ill-health or accident for a period of 33 weeks, whilst an employee with 40 years' service (and we have many with that length of service) would receive benefit for over one year. Should the absence unfortunately continue beyond the period for which benefits are provided the case would be reviewed by the board.

The scheme is non-contributory, the only qualification being length of service with the company, and no deduction is made in respect of benefits which the employees receive through their membership of private sick clubs. This means no employee is penalised through personal thrift and foresight.

Last year I was able to tell you that the Works Councils had done splendid work. It gives me great pleasure to say that these councils continue to function very well indeed.

Our rubber cable works have been very busily employed, and notwithstanding severe labour shortage and many changes in personnel of workpeople our high efficiency has been maintained.

Our paper cable works and our engineering department have been working all out during the whole of the year, and the production has not only been extremely large but of a very high standard. Our research and technical departments have done excellent work during the year. When this company organised research laboratories 25 years ago we at once attained a prominent place in the forefront of electrical manufacturers in its provision for scientific research.

The balance on trading account is £438,209. This profit, which includes income from investments, has been struck after providing for contingencies and for our liability to taxation on the profit earned to the end of 1943. This provision includes an estimated amount for income tax on the profit for 1943, which, however, will not become payable until 1945. It has been our practice for many years past to provide for taxation on the whole of the profits earned irrespective of the date due for payment.

The profit for the year shows an increase of approximately £18,000 compared with 1942. I am pleased to be able to say that this additional profit has been earned mainly as the result of a further expansion in our business. Production at our works has been at a very high level, which has only been possible by the maintenance of a high standard of efficiency of both personnel and plant. In this connexion it is interesting to note that during the year we have spent approximately £61,000 on the maintenance of our plant.

Our business overseas has on the whole been maintained. Many markets are, of course, still closed to us, and restrictions upon export of our goods from this country are still in operation; nevertheless, we have been able to obtain and carry out a substantial amount of business abroad, the proportion of our total business being 14.5 per cent. compared with 15.4 per cent. in 1942. In the years just before the war 28 per cent. of our business was overseas.

Our Tyre Company has had another successful year and the results are very satisfactory indeed.

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

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Index to Advertisers

(*Continued from page* 76)

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this Journal should not be taken as an indication that they are necessarily available for export

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ELECTRICAL REVIEW

July 7, 1944

"Services First!"

says

GENERAL CABLE

V.I.R., T.R.S., P.V.C., L.C., etc., etc.

At a recent interview at his H.Q. in Surrey, General Cable explained that, although his company produced many thousands of miles of cables each year, in present circumstances the greater portion of the output was required for the prosecution of the war.

"But," he said, "as soon as we're demobilised we'll have a service for industry that will be complete in every detail, comprising virtually every type of cable-armoured, rubber-covered or thermoplastic."

"And what's more," added the General, "our technicians are hard at work on current problems which will be of benefit and interest to everybody who uses cables."