DISTRIBUTION SYSTEM AT COAL SITE

ELECTRICAL REVIEW

FOUNDED 1872

Vol. CXXXVI. No. 3525 JUNE 15, 1945 9d. WEEKLY

IN SUPPORT OF THE MINISTRY OF FOOD HERE IS ANOTHER RECIPE FOR YOUR DEMONSTRATIONS:

The Jackson

COOKING CABINET

Coated Cake

Ingredients :

½ lb. flour (self-raising).
¼ lb. sugar.
level teaspoonful of salt.
2 ozs. fat.
¼ pint of milk.
1 reconstituted egg.

Method :

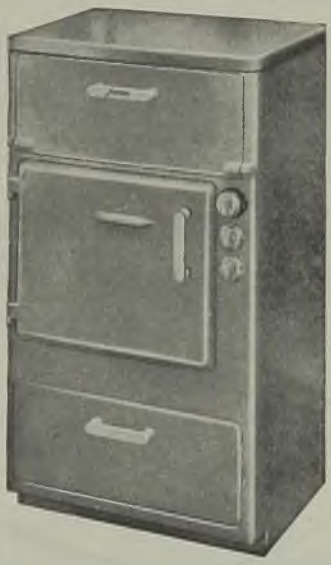
Mix together the dry ingredients. Melt the fat in the milk—add eggs. Mix into the dry ingredients and put the mixture in a greased tin.

Ingredients : COATING.

1 oz. sugar.
½ teaspoonful spice.
2 tablespoonsful breadcrumbs.
1 oz. margarine.
2 tablespoonsful flour (self-raising).

Method :

Cream the margarine and sugar, add the other ingredients, mix well. Sprinkle over the entire top of the cake and bake at 425°. If in a 7″ diam. cake tin, allow 45 minutes.



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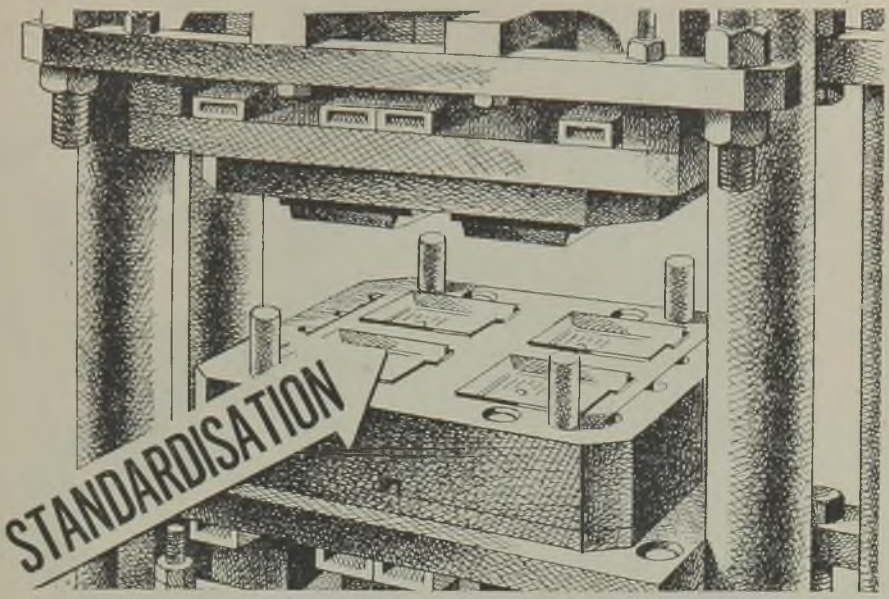

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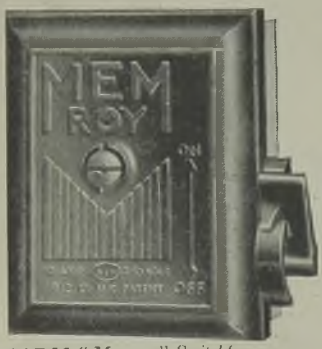

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ELECTRICAL REVIEW

June 15, 1945

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXVI. No. 3525. JUNE 15, 1945 9d. WEEKLY

Rural Electrification

The Need For Definition

WE have recently heard the electrical press taken to task for being too willing to accept the present situation relating to rural electrification, it being implied that the understanding and courage necessary for voicing the need for financial assistance to farming and other rural enterprises are seriously lacking, and that the present rate of development is grossly inadequate.

We flatly refute these suggestions so far as the *Electrical Review* is concerned, and we do not think there is any need to remind our readers of our constant efforts to record the facts, to elucidate the problems and to give the various aspects in their correct proportions.

Consumers' Obligations

In a leader in the *Electrical Review* of June 2nd, 1944, we dealt fully with the very question of financial assistance. We gave warning that an unhealthy condition would be brought about if subsidisation did not succeed in stimulating the industry concerned. We contended at the same time that if rural enterprise is to benefit from electrification this will ultimately prove a remunerative investment to the rural consumer who, in consequence, should be prepared to accept financial assistance in some form of loan or credit from the Government, the electrical industry or some suitable organisation outside.

The point we wish specially to emphasise here, however, in order that the above considerations may be viewed in their true perspective, is the need for defining what is meant by rural electrification. Many people, including electrical men, are using the term too loosely, each with a particular set of conditions in mind—no doubt often those associated with his own district.

The time has long since passed when reference to electrification in other fields, *e.g.*, city, urban, industrial, residential, and built-up areas, automatically implied a specific set of conditions. Would any responsible supply engineer now think of the concentrated-load districts of Sheffield in the same terms as he would think of the comparatively light-load districts of Bedford? Of course not. Similar clarification is absolutely necessary in connection with rural electrification if meaning is to be given to such aspects as subsidisation, long-term loans, etc.

Each rural district has its own set of conditions, and the differences between them are so wide in many cases as to place such aspects as revenue production and financial assistance on entirely different planes.

Load Building

There are the sparsely populated areas with only a few sheep farms which offer little more than cottage lighting; similar areas with dairy farms which use electricity extensively for milking, washing, sterilising, fodder preparation, etc.; both sheep-farm and dairy-farm districts which are also "good class" (or otherwise) residential districts; and others which are associated with rural industry, often heavy industry like collieries and steel works—to quote only a few of the very many.

All these circumstances are further complicated by their relationships to the sources of supply—power stations, sub-stations, primary and secondary transmission lines and low-voltage feeders. They all represent different load-building characteristics and should therefore be handled by the man who has the necessary appreciation of the commercial-technical problems peculiar to the supply industry behind every sales transaction. It is one thing to build a network or line and another thing to load it—properly.

Small Water Powers

THE claim of the Marytavy station of the West Devon Co., with its installed turbine capacity of some 2,600 kW, to be the largest hydro-electric plant in England illustrates the paucity of water-power resources in this part of the United Kingdom. It also illustrates what might possibly be done in other instances. The output of the undertaking (in which is included that of some smaller interconnected hydro-stations) last year reached the useful total of 15 million kWh, compared with 11 million originally expected. An especially notable point in Mr. F. E. Pitt's chairman's address to the I.E.E. Devon and Cornwall Sub-Centre was the arrangement adopted for operating the plant in conjunction with a bulk supply from the grid, to which it was connected at 33 kV about three years ago.

"Peak Lopping"

AT Marytavy water storage is provided for the equivalent of 11,000 kWh—enough to cope with the daily peaks, leaving a margin for drought. The base load is supplied from the grid, as it would be in the case of thermal stations, so that maximum demands may not be carried by the transmission system. This implies an overall economy in paying the grid running charges, even at the present high price of coal, rather than in making the fullest use of "free" water entailing expenditure on greater storage capacity.

Levelling Up

IN some quarters the idea is being fostered that the public ownership of electricity undertakings would lead to uniformity of charges and a general reduction. Those who know anything about the business are aware that any attempt at securing uniformity of charges (as distinct from tariffs) could only be a form of averaging and that would mean that in many districts prices would have to go up. This point is made by a correspondent in the *Richmond Herald* who says that about half of the Richmond Parliamentary constituency is supplied by the Barnes Council whose charges are among the lowest in the country. He suggests that any national arrangement would mean higher prices to these consumers and considers that they should think well before supporting any policy which would deprive them of the advantages of the efficient management of the local electricity undertaking.

Ownership of Utilities

As we have frequently mentioned, the United States also has its publicly *v.* privately-owned utility question. The Federal Government, with its huge hydro-electric schemes, has become an important factor in the generation of electricity supply. On the distribution side, apart from the "co-operatives" formed to take supply from Government sources, there is very little to compare with our municipal-authority undertakings. Nevertheless there is a movement in the States for public ownership based largely on a false picture of the nature of the utility companies. According to the *Electrical World*, advocates of public ownership are making headway by means of propaganda that is not adequately countered by the utilities which should get together on a national basis to place their case before the public.

Services for Temporary Houses

As the I.M.E.A. report for the past year indicates, there is still uncertainty regarding the allocation of the cost of services to temporary housing estates. The Ministry of Health has said that undertakings will continue to be governed by existing statutory obligations and that financial arrangements will have to be agreed in each individual case with the housing authority. This appears to mean that electricity suppliers are bound to provide services and then recover what they can of the cost. The Ministry thinks that in many cases the mains laid to temporary housing sites will still be wanted when the temporary houses give way to permanent ones but it seems much more likely that these will have to be built elsewhere.

Unique Works Distribution

In the Electrical Review *of May 30th we described methods of production of opencast coal at Wentworth, Yorkshire. This article deals with the electrical distribution scheme, and we are indebted for their collaboration to Electricity House, Ltd., who carried out the work of the electrification scheme, the initial electrical lay-out of which was prepared by Hoare, Lea & Partners.*

A FULLER appreciation of the scheme will be made possible by further details of the situation and lay-out of the site, which lies roughly to the south of Wentworth village and extends from the main Sheffield–Leeds road along Hague Lane to Wentworth Woodhouse. The northern boundary is a private road giving access to the village church; two farms are situated at about the centre of the area being excavated, and roadways serving these farms also link up the village and subsidiary main road across the site. The area of the whole site is about 170 acres. The dragline and bucket excavators work across the site approximately west to east, gradually progressing northward towards the village of Wentworth.

Work had begun on a section of the site before the electrical machines were allocated, and the siting of the substation presented certain difficulties, as the position had to be such that future working of the site would not necessitate its removal, and that it would still be as near as practicable to the point at which the supply would be required.

The final position chosen for the substation is towards the north of the site on previously excavated ground, as shown in the heading block, and it was decided to provide a raft of concrete to carry both the outdoor transformer and the substation buildings proper.

Consumers' equipment in the substation comprises (left) a five-unit, 3·3-kV totally-enclosed industrial-type switchboard and (right) a four-unit 400-V switchboard ; 11 kV equipment at rear right

A supply was afforded by the Yorkshire Electric Power Co., from its 11-kV system, through a 2,000-kVA 11/3-kV transformer. Considerable thought was given to the

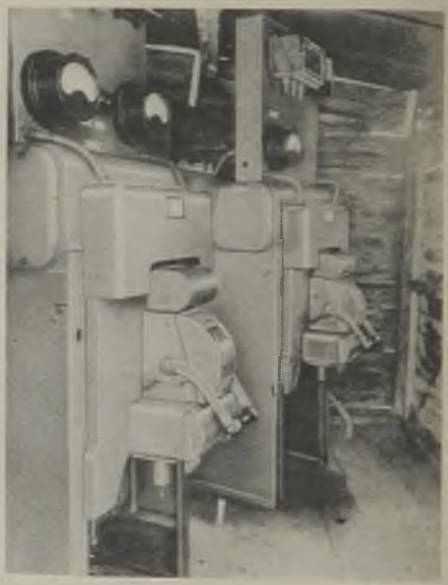
question of distribution to the various points where supplies would be required to operate the electrical excavators, bearing in mind that machines would be moving continually about the site and that scrapers would also be operating in the area.

It was decided to lay three 3-kV p.i. wire-armoured cables along the northern boundary of the site, and extend southwards at right-angles to the cable run by means of overhead lines, in each case to a point adjacent to the working cut. This arrangement permits any line to be shortened back by one or more spans as the excavation of the site is proceeded with.

The arrangement also provides the maximum flexibility in allowing the excavators to be transferred from section to section with the minimum of delay. In view of the onerous conditions of the site the overhead lines have been erected generally in accordance with standard 11-kV construction, although they are operated at 3 kV.

A supply was also required for the offices and workshops at the south end of the site, so a four-core 0·15-sq. in. 400-V cable was laid with the 3-kV cables. This cable was also extended southward to the office site along what was then intended to be the main cut through the site. It was found later, however, that this cut was unnecessary, and in order to permit the excavators to work the full length of the site section under review the l.v. line was diverted to follow the boundary of the section.

The consumers' equipment in the substation comprises on the h.v. side a five-unit Crompton Parkinson "Klad" 3-kV totally enclosed industrial-type switchboard, each switch having a carrying capacity of 300 A. Four of these switches serve excavator feeders, and the fifth one a 500-kVA 3-kV/440-V three-phase four-wire transformer. Each of the switches serving the excavator feeders is fitted with overload releases, shunted by time-limit fuses giving short-circuit protection only, to ensure that these breakers do not open on overload consequent on the severe duties involved. The rupturing capacity of all the h.v. switchgear is 25 MVA. The l.v. switchgear comprises a four-unit Crompton Parkinson switchboard consisting of one 800-A "Klad" switch controlling the l.v. side of the transformer, two 200-A outgoing switches serving the feeders to the offices, etc., and a sheet-steel cubicle switch accommodating two 30-A triple-pole-and-neutral English Electric h.r.c. fuses



Field units are housed in the simplest of wooden huts which are transported, complete with their units, on a sledge

The 3-kV transmission is extended southwards from the cables by means of an overhead line

for local lighting and power purposes in the vicinity of the substation. The 800-A switch has a rupturing capacity of 25 MVA, while the 200-A outgoing feeder units each have a rupturing capacity of 10 MVA. At the working end of each excavator feeder is installed a similar switch unit to that at its other end, but it is fitted with a special starting relay comprising two overload coils and one shunt coil fitted to dash-pot time lags. On starting the shunt coil is immediately energised, and the contacts short-circuit the two overload poles until such time as the period of lag has expired, when the armature rises and opens the short-circuited contacts, thus putting the overload release into service.

To accommodate the outgoing trailing cable, each field unit is fitted with a back-entry plug with suitable flange modification

Owing to the severe conditions under which the motors operate, and to the fact that each switch unit serves either a 200-HP or a 100-HP motor, the current transformers on these switch units, which have come to be termed "field units" because of their location, have a ratio of 100/5A, with a tapping on the secondary to give the equivalent to 50 A of primary current to cater for the dual control. The tappings can be changed by means of external links in a few seconds. Back-up overload releases shunted by time-limit fuses wired with No. 19 SWG fuse wire to give short-circuit protection during starting, *i.e.*, during the period when the normal overload is out of commission, are also incorporated. The time-limit fuses will pass a current transformer secondary current of 15A for 10 seconds, which is equivalent to a peak of approximately six times the normal full-load current of the motor. A single-pole earth-leakage relay with a minimum of 10 per cent. of the current transformer primary rating, *i.e.*, 5A, is also fitted to each of these field units.

For the necessary flexible connections to the excavators four-core rubber-insulated t.r.s. sheathed, pliable armoured, and t.r.s. sheathed 3-kV grade trailing cable is used, the minimum size of which is 0·0225 sq. in. To further render the system more flexible in coping with the movements about the site of the dragline excavators the trailing cables are generally arranged in 100-yd. lengths, and Ellison heavy-duty cable-coupling boxes are used for extending the cable lengths, thus permitting cable sections to be taken out of or added to the system with a minimum delay. To accommodate the t.r.s. trailing cable a

For flexible connections 4-core 3·3-kV trailing cable is used; heavy-duty sectionalising cable coupling boxes add to flexibility

Reyrolle "flit" type plug is fitted to each field unit for back entry, the necessary flange modification having been specially made for this purpose.

Owing to the presence of large spoil heaps and soil dumps and to the positions of the working cuts it has not always been possible to take the most direct route, or the best one, for the overhead line for supplying a particular service, and considerable deviations have had to be carried out on several occasions. It was anticipated that difficulty would be experienced with the earthing system but this fear has proved to be unfounded.

Earthing is carried out with cast-iron plates buried to a depth of 5 to 6 ft. In the earlier days these plates were surrounded by coke, but as the machines progressed fairly rapidly it became necessary to move the field units at frequent intervals, and the plates have been buried directly in the earth with satisfactory results.

The field units are housed in the simplest of wooden huts, and a unit is transferred from one point on the site to another by mounting the hut, complete with its unit, on a sledge which is drawn by a tractor to the new position at which the supply is required to operate.

Electrically-operated excavators, shovels, etc., normally work for 22 out of each 24 hours, so that maintenance has to be carried out during a two-hour shut-down period which is not continuous, but is made up of half-hour breaks for meals.

In view of the site conditions maintenance troubles can be considered reasonably small

Nearly all the drivers had to be specially trained, and in view of this fact and of the site conditions already described the maintenance troubles can be considered to have been very small. Difficulty has been experienced as the result of the scrapers and tractors running over the trailing cables, and on one occasion one of the excavators fouled an overhead 3·3-kV line with its boom. Each time the fault was cleared satisfactorily.

In addition to the supplies for the excavation machinery and the offices and workshops, a supply is given direct from the Yorkshire Electric Power distribution system at 400-V to a labour camp and to a plant repair depot situated at the south-east corner of the site. Further, there is another connection from a Y.E.P. 11-kV line to a substation serving the screening plant, through a 500-kVA 11-kV/400-V transformer. From this substation a separate l.v. underground feeder serves each of the screening plants.

Our thanks are due to Sir Lindsay Parkinson & Co., Ltd., for permission to visit the site and take the accompanying photographs.

Power Station Efficiency

A Means of Rapid Calculation

By G. Oldroyd,
Graduate I.E.E.

THE nomogram described below, which can be easily constructed on the basis of two formulæ, *viz.*, boiler efficiency and station overall efficiency, enables the engineer-in-charge of a power plant to gain a swift and sufficiently accurate view of the conditions obtaining without the necessity for working out calculations.

Boiler efficiency, $N_B, = \frac{E\ (H-h)}{C}$, where E = actual evaporation in lb. of water per lb. of fuel $= \frac{S}{F}$, S = total steam generated, F = total fuel consumed, C = calorific value of fuel in BThU per lb., H = total heat of steam in BThU per lb. and h = liquid heat of feed water in BThU per lb.

Station overall efficiency, $N_T, = \frac{3412}{C \times L}$ . . (1), where 3412 = BThU in a kWh, and L = lb. of coal per kWh generated (U) $= \frac{F}{U}$.

The present nomogram was constructed for steam conditions of 400 lb. per sq. in. gauge and 850 deg. F. and feed water temperature of 270 deg. F. (Steam Tables, Keenan and Keyes, 1936.) Under these conditions the total heat in one pound of steam = 1442·6 BThU and the liquid heat of the feed water = 238·84 BThU. It follows that H − h = 1442·6 − 238·84 = 1203·76 BThU, so that boiler thermal efficiency, $N_B, = \frac{1203{\cdot}76 \times E}{C}$ . . . . . (2) and $C = \frac{1203{\cdot}76 \times E}{N_B}$.

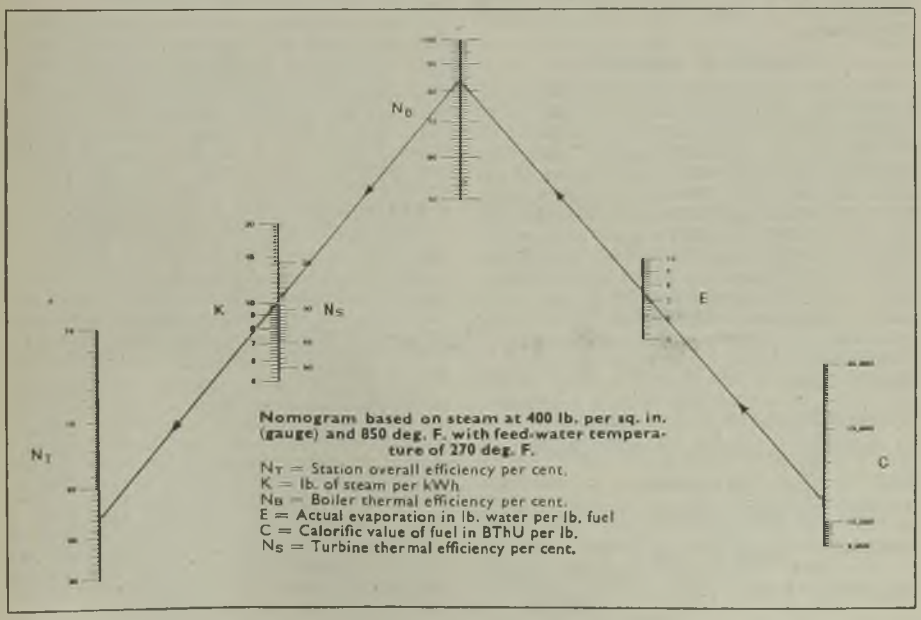
Similarly, from the station overall efficiency formula, $C = \frac{3412}{L \times N_T}$; therefore $\frac{1203{\cdot}76 \times E}{N_B} = \frac{3412}{L \times N_T}$ and $N_T = \frac{3412}{1203{\cdot}76 \times E \times L}$.

But $E \times L = \frac{S}{F} \times \frac{F}{U} = \frac{S}{U}$ = lb. of steam/kWh, ∴ $N_T = \frac{3412}{1203{\cdot}76} \times \frac{N_B}{\text{lb. of steam per kWh}}$

$= 2{\cdot}84\ \frac{N_B}{K}$ . . . . . (3),

where K = lb. of steam per kWh, *i.e.*, the turbine steam consumption. From equations (2) and (3) the nomogram can now be constructed as follows.

The C scale is a 10-in. log scale calibrated from 9,000 to 20,000 BThU, and the E scale is a 5-in. log scale on the same base calibrated 5 to 10 and placed midway between the C



scale and the N_B scale, which is another 10-in. log scale calibrated 50 to 100 per cent. and set down on the C scale by H − h, or, in this case, 1203·76.

Placing a rule across the values of C and E gives the division $\frac{E}{C}$, this result being multiplied by 1203·76 due to the setting down of the N_B scale, thus giving the value $1203{\cdot}76 \times \frac{E}{C}$, which is the boiler thermal efficiency.

If the rule is now placed across this known value of N_B, and the lb. of steam per kWh on the K scale, which is a 5-in. log scale on the same base as N_B, the result will be read as the reciprocal of $\frac{K}{N_B}$, *i.e.*, $\frac{N_B}{K}$ on the inverted 10-in. log scale for N_T, which is set down on N_B by the reciprocal of 2·84, *i.e.*, 0·352. The result is thus $2{\cdot}84 \times \frac{N_B}{K}$, which is N_T, the K scale being placed midway between the N_B and N_T scales.

The nomogram could have been extended to give the results $E = \frac{S}{F}$ and $K = \frac{S}{U}$, but this was not considered worth the trouble as a slide rule will give these results just as quickly.

The best method of construction is to trace all the scales on tracing paper, the 10-in. scales from semi-logarithmic graph paper and the 5-in. scales from the stock or slide of any ordinary slide rule, taking care that the graph paper for the 10-in. log scale is the same as that on the slide rule used; alternatively a slide rule could be used throughout.

Example of Application

As an example of the use of the nomogram, assume the calorific value of the fuel to be 10,900 BThU per lb. actual evaporation = 7·5 lb. per lb. Reading across these two values on their respective scales, gives 83 per cent. on the boiler thermal efficiency scale. From this value read across the value 10·2 on the lb. of steam per kWh scale and on the scale for station overall efficiency read 23 per cent. These figures are based on the following:—Total fuel consumed, 2910 tons; total steam generated, 48,800,000 lb.; kWh generated, 4,760,000; actual evaporation = $\frac{48{,}800{,}000}{2910 \times 2240} = 7{\cdot}5$ lb. per lb.; boiler thermal efficiency $= \frac{1203{\cdot}76 \times 7{\cdot}5 \times 100}{10900} =$ 83 per cent.; station overall efficiency = $2{\cdot}839 \times \frac{83}{10{\cdot}2} = 23$ per cent.

Using the basic formula:—Station overall efficiency $= \frac{3412}{10900 \times 1{\cdot}36} \times 100 = 23$ per cent., where $1{\cdot}36 = \frac{\text{fuel}}{\text{kWh}} = \frac{2910 \times 2240}{4{,}760{,}000}$.

The results obtained from the nomogram are therefore seen to check with the calculated results. The best method of reading the nomogram is by means of a piece of thin fuse wire held taut across the values required, the nomogram being pasted on a piece of stiff cardboard.

By placing another exactly similar inverted scale on one side of the scale representing lb. of steam per kWh, turbine thermal efficiency also can be read from the nomogram. For the steam conditions named, turbine thermal efficiency $= \frac{3412 \times 100}{1203{\cdot}76 \times K} - \frac{2{\cdot}84 \times 100}{K}$. If, therefore, 28·4 is marked on that scale opposite to 10 lb. per kWh and other values inversely *pro rata*, the thermal efficiency of the turbine at any given steam consumption per kWh for the pressure and temperature conditions covered by the nomogram can be read directly.

Two-million Volt X-rays

Penetrating Very Thick Steel

A LARGE 2,000,000-V X-ray outfit has been completed by the General Electric Co. of America to keep pace with the welding of increasingly heavier walled pressure vessels. It is described by Dr. Ernest E. Charlton, who worked on its development, as 78 times as fast as the 1,000,000-V outfit for examining 8-in. thickness of steel and it has made a satisfactory exposure through a foot of steel in about 2 hr. with the film at a distance of 3 ft. from the end of the tube.

Like its predecessor, the new tube has multiple electrodes, and the electrons, starting from a heated filament at the top, are speeded in stages until they have the total rated energy. After they attain full speed, which is about 179,000 miles per sec. or 96 per cent. of the velocity of light, they strike a copper-backed tungsten target at the end of the tube, whence X-rays may either be "squirted" from the end or sprayed from the side. The new tube has 24 steps averaging 83,500 V at each stage. Construction of the tube was made possible by use of rings of "Fernico" between sections of glass; the alloy and glass can be fused directly together. High voltage is supplied by a resonance transformer which has no iron core and the X-ray tube is placed at its axis. Both tube and transformer are in a closed metal tank, 5 ft. in diameter and 8 ft. long, which contains freon gas for insulation.

Though the rays are capable of penetrating very thick specimens, they will still not overexpose sections which are considerably thinner, says Dr. Charlton, who also points out that placing the X-ray tube at a distance from the part being radiographed increases the accuracy of the pictures by reducing distortion. Rays spread out from the target like light from a candle. A defect in a casting that is close to the film will appear in its actual size, while one that is considerably nearer to the tube will be enlarged; but when the X-ray generator is well back both will be recorded correctly.

Municipal Electricity

I.M.E.A. Council's Fiftieth Report

THIS year the Incorporated Municipal Electrical Association reaches its jubilee and the Council's fiftieth annual report covering the year ended in May mentions that the most appropriate way of celebrating this event is under consideration. The report (which was presented at yesterday's annual meeting) also states that Alderman Sir William Walker, M.I.E.E. (Manchester), is to succeed Mr. W. P. Lilwall as president, thus becoming the first local authority representative to occupy the position; Mr. J. S. Pickles, B.Sc., M.I.E.E., county electrical engineer, Dumfries, has been elected vice-president. Mr. H. C. Lamb, formerly city electrical engineer, Manchester, and a past-president, has been elected an honorary member.

During the year East Grinstead U.D.C. joined the Association, bringing the total membership up to 349, equivalent to 95 per cent. of the municipal undertakings in Great Britain. Messrs. G. J. Evans, P. E. Rycroft, J. M. Bowman and C. W. Salt have been elected associated members. Mr. B. Handley (past-president) is to retire from the Council upon his relinquishing his position as city electrical engineer of Portsmouth and a tribute to his services to the Association is paid in the report.

Voltage Standardisation

In response to a memorandum from the Electricity Commissioners in which it was stated that the Minister of Fuel and Power had suggested that the time had arrived for a review of the subject of voltage standardisation, the matter was referred to the Joint Committee of Electricity Supply Organisations. This Committee later submitted a memorandum to the Commissioners in which it proposed that the declared standard should be a band of 230/240 V with a tolerance of 4 per cent. below 230 and above 240 V. In order to avoid unnecessary expenditure, especially in the case of industrial consumers at present supplied at between 10 and 15 V above or below the recommended standard, the Committee considered that for an interim period of five years a 6 per cent. tolerance should be allowed, and thereafter subject to review. It was thought that this relaxation would permit the continued use of existing plant throughout the remaining period of its effective life and would materially reduce the cost of standardisation.

As the Incorporated Association of Electric Power Companies has dissociated itself from these views and has submitted independent observations, the I.M.E.A. Council has withdrawn its support to the relaxation proposed.

The Association has for some years endeavoured to secure a Standard Specification for flat pin plugs and during the year discussed the subject further with the British Standards Institution. The matter has also been considered by the Electrical Installations Study Committee of the Ministry of Works which has recommended a 3-kW standard plug. The recommendation has been accepted by the B.S.I. Industry Committee and the matter has been referred back to the I.E.E. for discussion of details with B.E.A.M.A.

The Electrical Research Association has agreed to act as a clearing house for fault and breakdown records provided that the full support of electricity supply undertakings is secured. The Council expresses the hope that engineers will co-operate in this matter.

Grid Tariff Proposals

In view of the fact that the existing grid tariff arrangement expires at the end of this year, meetings have been held to discuss revisions of the tariff. The Bulk Supply and Generation Committees, combined for the purpose, have made proposals as a result of which the Council has suggested to the Central Electricity Board that provision should be made for:—The alleviation of the payment for maximum demand resulting from a cold snap; payment in part only for maximum demands occurring outside the present m.d. assessment periods; exception of the period from noon Saturday to midnight Sunday, and Christmas Day, for the purposes of m.d. assessment; the retention of the present form of stepped m.d. charge, including the promotional element arising from the "basic demand" principle; the basing of the coal adjustment clause on an up-to-date figure for thermal efficiency and the estimated actual price of fuel in each district; and the application of the new tariff for a period not exceeding five years, in view of the instability of costs. Proposals giving effect to these considerations have been submitted to the Board.

Reference is made to several bulk supply negotiations in which the Council has participated. The joint committee of supply authorities and manufacturers has continued its deliberations on the standardisation of meters. The Generation Committee, after receiving representations from selected station owners, has asked the Electrical Research Association to investigate the loading and design of cooling towers with a view to ascertaining whether further steps can be taken to improve their efficiency, more par-

ticularly the continued efficiency during their useful life. The E.R.A. has consented to do this.

The Council has recommended members to charge 30s. per 25-W lamp (with *pro rata* charges for lamps of higher wattages) for the lighting of telephone kiosks. Members have been advised not to enter into new obligations with radio rediffusion companies as there is a possibility of legislation permitting distribution authorities to use their mains for the purpose.

Supply to Temporary Houses

In view of the ambiguity of certain paragraphs in the memorandum on temporary housing produced for the guidance of local authorities, representations were made to the Ministry of Health regarding the financial responsibility for the provision of services to temporary housing estates. The Council was informed that the laying of mains and services by undertakings would continue to be governed by existing statutory obligations and financial arrangements would have to be agreed in each case with the housing authority. In many instances the same sites would be used for permanent houses and therefore the capital expenditure would not be wasted. The Conjoint Conference of Public Utility Associations has been asked to consider the matter in order that a common policy for all utilities can be formulated.

One of the Association's Centres has suggested that the Association should have a greater representation on the Electrical Research Association and that the Association should support an appeal for increased contributions to the E.R.A. The Council sympathises with the proposals but considers that in view of certain anomalies which exist the matter should be decided by individual undertakings until a return to more normal conditions.

Support was given by the Council to proposals by the Conference of Local Authorities Owning Electricity Undertakings in Greater London that there should be an extension of loan repayment periods in respect of cookers, installations, DC/AC change-over and AC meters. The Electricity Commissioners intimated that a review of loan repayment periods could be made more appropriately in relation to any proposals for general reorganisation. The whole question of system standardisation was under review and the Commissioners intended to give sympathetic consideration to the question of repayment periods for loans for meeting any expenditure involved.

Following upon a further increase in coal prices the Council is again to approach the Commissioners, and, if necessary, other Government Departments, upon the question of increased electricity charges.

The report refers to meetings during the year of the I.M.E.A./B.E.A.M.A. and I.M.E.A./E.L.M.A. Joint Committees and the Electricity Taxation Advisory Committee. It is reported that the National Gas and Electricity Committee established in 1939 has been dissolved "owing to changed conditions."

The accounts show a total revenue for the year of £13,699 (against £13,185 for 1943–44) and expenditure of £12,495 (against £11,990), leaving a credit balance of £1,204 (£1,195).

Appended to the report are brief accounts of the work of bodies upon which the Association is represented. Among these is the Joint Committee of Electricity Supply Organisations, whose work has already been referred to. Apart from voltage standardisation, the Committee has dealt with income tax allowances in respect of supply agreements; the classification of the fuel industries in order to produce figures on a common basis for supplies to industrial consumers; wayleave payments for interference with agriculture; and Parliamentary Bills.

In the summary of the work of the Conjoint Conference of Public Utility Associations reference is made to the efforts of the Conference to obtain definite information regarding the promised War Damage Bill. The Conference was informed by the Financial Secretary to the Treasury in December last that there was still a possibility that a Bill would be introduced during the current session. He saw no reason to suppose, however, that any future Government would fail to adhere to the principles laid down in the White Paper on the subject, which constituted an assurance that at least half of the damage suffered would be met by the Treasury.

Radio Section Luncheon

ABOUT 160 members and guests attended the first informal luncheon to be held by the Radio Section of the Institution of Electrical Engineers, which took place at the Waldorf Hotel last week. Mr. H. L. Kirke, chairman of the Section, presided and expressed the hope that it might become the forerunner of an annual event and that later on more social functions might take place. Mr. P. Good, vice-president, who deputised for the president (Sir Harry Railing, who was unable to be present), spoke of his early connection with wireless, which dated back to his school days while studying under Prof. Ayrton.

Mr. G. O. Watson, chairman of the Installations Section, speaking on behalf of the guests and chairmen of the technical sections, said that there were now four of the latter, each depending upon the work of the others; but they all still belonged to one and the same Institution, so it behoved members to avoid over-specialisation. Sir Edward Appleton remarked upon the wisdom of the I.E.E. Council in encouraging sectionalisation under separate chairmen to satisfy the particular needs of specialist groups, all of which were catered for by the mother body.

Dew Point of Flue Gases

Recording Apparatus Using Electrical Conductivity Method

By W. R. Wootton

INVESTIGATIONS into the causes of severe fouling and corrosion of the air heaters of two large stoker-fired boilers indicated a definite association between the dew point of the gases and the severity of the trouble. The amount of sulphuric acid produced in this plant generally exceeded 100 lb. per million of gas and consequently only a small amount of gases needed to be aspirated through a transparent tube to demonstrate the rapidity of condensation and resulting fouling.

Photomicrographs, taken through very thin-walled Pyrex tubing, enabled the process of fouling to be recorded graphically. Within a minute of commencing aspiration, a cloudiness on the inside of the tube became visible to the naked eye which a magnification of 100 showed to be composed of minute droplets of liquid each centred on a dust particle. Within three minutes the droplets had increased in size many times and were running into one another, forming pools of irregular shape which were already trapping dust particles of considerable size. In about ten minutes all the droplets had fused into one another and a continuous film of liquid resulted, to which dust of all kinds adhered.

To the naked eye, the tube appeared quite dry up to the point where it came outside the boiler casing and then to become suddenly wet where it was cooled by contact with the atmosphere. By fusing a fine wire thermocouple into the glass tube and altering the immersion until the line of wetness coincided with the couple, the temperature of condensation was readily established. It was invariably about 300 deg. F.

Principle of Operation

This simple, though reliable, dew-point instrument led to the construction of a recorder similar to that described by Johnstone.[1] Using the electrical conductivity method of dew detection and operating in alternate cycles of heating and cooling of the analyser surface, this apparatus confirmed that high dew-point temperatures were present continuously.

The fluctuating temperature indication, however, precluded accurate observation of small changes in dew-point temperature and since these small changes corresponded to considerable variations in amount of acid produced, the instrument was modified to eliminate them.

The sampling apparatus and analyser surface are arranged in the manner described by Johnstone and also by Harlow,[2] but modified with a view to removing some of the possible faults of these earlier instruments. For instance, no metal parts are in contact with the gases prior to analysis; neither do the latter pass over any surface at a lower temperature than the analyser surface that would cause precondensation. AC is applied to the electrode path so that polarisation effects are eliminated and the temperature of the analyser surface is regulated smoothly by the employment of a Thyratron.

The electrode path of the analyser surface is arranged as the resistance leg of the resistance-reactance bridge controlling the grid of the Thyratron. The effect of formation of dew on the analyser surface is to shift the phase of the grid relative to the anode thereby increasing the output current flowing in the heater which controls the temperature of the analyser surface. The tendency towards an increase of dew point is thus almost anticipated and the temperature of the analyser surface immediately responds and remains steady at the new figure.

Description of Apparatus

In Fig. 1 the Pyrex sampling tube A is integral with the cup B which surrounds the analyser bulb C. The cup B is wound externally with asbestos-insulated resistance wire D, so that the temperature of the cup, together with a part of the sampling tube itself, can be raised to any desired temperature to prevent precondensation. The inlet end of the sampling tube is also fashioned into a cup E, which is stuffed with glass wool.

The analyser bulb carries two platinum wires fused on the surface at F a short distance apart. Fused into the glass, between these two electrodes, is a fine-wire platinum and platinum-rhodium thermocouple. All leads from couple and electrodes are carried *inside* the bulb and are brought out at the end G. This construction ensures strength and one instrument after more than 10,000 hours of use shows no signs of deterioration. The jet-tube H is also part of the analyser bulb structure but the fine-wire heater J is carried in a separate vessel K.

Around the spherical head of the analyser bulb two insulating fibre discs L are tightly cleated by means of four brass rods M. These rods extend to the full length of the sampling cup B and also carry the brass

(1) "An Electrical Method for the Determination of the Dew-point of Flue-Gases." Univ. Illinois Circular No. 20, 1929.

(2) "Heat Liberation and Transmission in Large Steam-Generating Plants." Journal Inst. Mech. Engrs. 1933.

disc N, which holds the analyser bulb assembly tightly to the sampling part and yet allows easy separation for cleaning.

The aspirating connection P is joined by stout rubber tubing to the drain-bottle Q and thence to the orifice bottle R and finally to the steam ejector S. Normally, about 20 cu. ft. per hr. of gas is sampled. The other connection T is joined directly to the ejector and in this way induces the jet of cold (or heated) air to play on the back of the analyser surface.

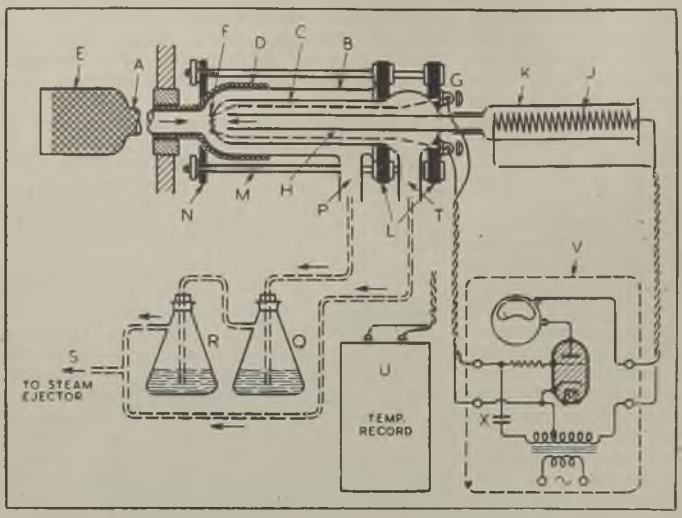


Fig. 1.—Diagrammatic arrangement of apparatus

The thermocouple is connected to a potentiometric type of temperature recorder U and the platinum electrodes are led to the valve amplifier V, in which the Thyratron is arranged as a phase-shift rectifier in the orthodox manner. The capacity of the condenser X controls the sensitivity of the amplifier and the smallest value consistent with stable operation is chosen. The average conductivity of the dew-film is then a minimum and the smallest changes in condensation characteristics are made evident.

The maximum output of the Thyratron, corresponding to a heavy dew deposition across the electrodes, is about 1 A, 1,000 V being applied to the anode under no-load conditions. The fine-wire heater J reaches red heat with the current of air flowing over it at maximum anode current.

The apparatus is fitted to a part of the plant where the temperature of the gases is between 700 and 1,000 deg. F. and the steam ejector draws cold air through the jet-tube so that the analyser bulb surface is at the ambient temperature.

Immediately the gas flow begins, the condensation of water-dew (the dew point of which is invariably higher than the ambient temperature) causes a sudden production of current in the heater J, the temperature of which increases rapidly, the effect being generally an instantaneous rush of maximum current, indicating a short-circuit of the dew path, Fig. 2.

The heater thus raises the temperature of the air being drawn through the jet-tube and the analyser surface temperature rapidly increases. The dew-point temperature is soon reached, and exceeded, and most of the water-dew which had condensed is evaporated. As this happens, the conductivity of the dew path decreases and the current in the heater also decreases smoothly in sympathy.

The temperature rise of the analyser surface is thus arrested and the bulb starts to cool. As the dew-point temperature is passed once more, dew again condenses and the cycle is repeated but at greatly reduced amplitude. After about one minute the instrument has ceased "fumbling" for the dew point and thereafter steadily records the water dew point, unless there are any reasons (as there invariably are) for an elevation of dew point above that corresponding to the water-vapour

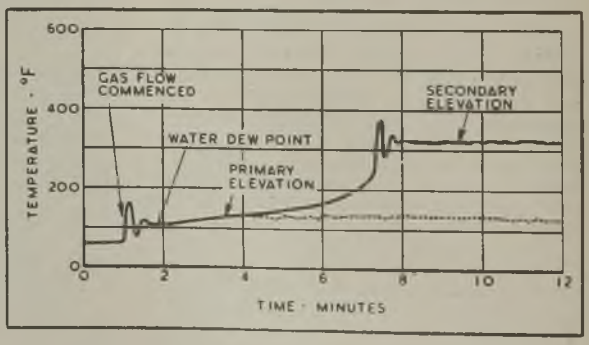


Fig. 2.—Response of instrument to high- and low-dew-point gases

partial pressure. It will be found that the true water dew point is indicated for only a few minutes, that is, while the analyser bulb remains clean and free from contamination by solids in the gases which have found their way through the glass wool filter. The water-soluble fraction of these minute solids, dissolving in the dew film, depresses the vapour pressure of the condensate and raises the dew point by possibly from 10 to 30 deg. F., the dew point recorded after the first five minutes or so being higher than the calculated figure by this amount.

A further elevation of dew point, owing to the presence of sulphuric acid in the gases, may now manifest itself. Thus, as the true water dew point would be indicated for only a few minutes, the elevation due to water-soluble solids is likewise of short duration and the temperature rises further, at first slowly and finally with great rapidity until, with some "fumbling," the acid dew point is reached. Thereafter the instrument continues to record this dew point and its variations.

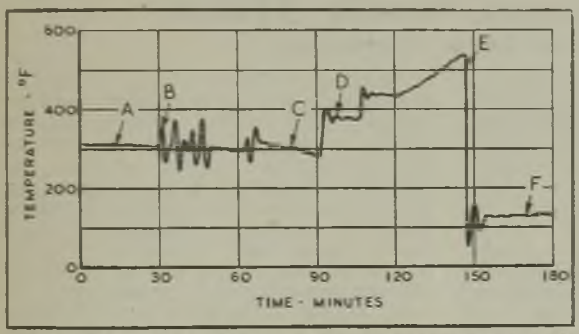


Fig. 3.—Effect of soot blowing and experimental injection of ammonia into flues

In Fig. 2 a comparison is made between the condensation characteristics of flue gases from two large boilers in the same power station. The stoker-fired plant shows a temperature record which, from the commencement of testing with a clean instrument, passes from the water dew point, through the primary elevation, to the acid dew point. The pulverised-fuel-fired plant shows only the water dew point and the primary elevation.

The response of the instrument to changes in the nature of the gases is strikingly demonstrated under soot-blowing conditions and during an experimental period of ammonia injection, Fig. 3. At A, the dew point recorded is practically steady until, at B, one of the combustion-chamber soot-blowers was operated. It then instantaneously rises to a temperature considerably higher than can be explained by the higher vapour partial pressure. Since the dust removed by soot-blowing in this plant has invariably shown high sulphur-trioxide content, some of it can reasonably be assumed to be liberated when

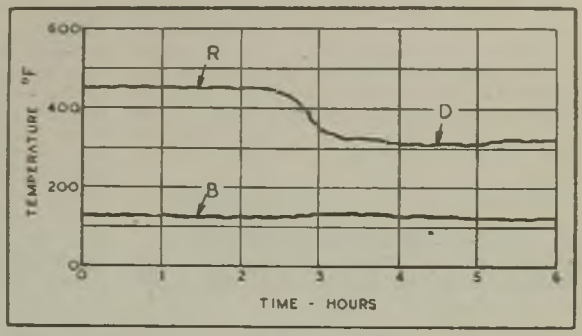


Fig. 4.—Effect of different coals on the dew point of flue gases from the same plant

its temperature is no longer depressed by proximity to cold tubes.

Each of the other maxima following B can be traced to the operation of a specific soot-blower, although some of the latter produce no effect, due probably to stratification and possibly to the "inert" character of the dust. After completion of soot-blowing, the instrument reverts to a practically steady recording of the dew-point temperature, C.

At D, the injection of a small and quite inadequate amount of ammonia gas into the flues is seen to result in an apparent elevation of dew point which persists as long as the ammonia injection is maintained. Gradual increase in the amount of ammonia used results in further steady elevation of dew point until about 530 deg. F. at E. The addition of more ammonia then results in a complete collapse of dew point down to the region of the water dew point, F.

It is thought that the elevation produced during insufficient injection is due to the formation of molten ammonium bisulphate on the analyser bulb surface and this theory finds support in the decreasing conductivity of the dew path with forced decrease in temperature—an inversion of the normal tendency. Certain coals which cause fouling of economisers and air-heaters behave as though partial neutralisation were taking place. The instrument readily detects these and they can be diverted, as a rule, to other

plant where their effect on availability is less.

Fig. 4 shows a comparative record of three different fuels burnt in the same boiler plant under similar conditions. Fuel B produces a negligible elevation of dew point and gives maximum availability as regards fouling of the low-temperature heat-reception equipment. Fuel D produces a considerable elevation of dew point and severe fouling and corrosion of any parts of the plant which are below this temperature. Fuel R results in the most rapid fouling of the three but apparently less actual corrosion than D. The response of the instrument to the change in dew point, concomitant with change in fuel during operation, is shown by the upper curve.

The instrument has been found of considerable value in plants which are suffering loss of availability due to fouling of economisers and air-heaters. Apart from enabling the fuels in use to be classified and distributed accordingly, it provides readily much valuable data concerning the effects of operational changes, together with such academic considerations as effect of mass-velocity on precipitability.

Although reference has been made throughout to the temperature recorded as being the "dew point" of the gases, the apparatus basically records the highest temperature at which a given surface can be maintained so that electrical conductivity across it is present. The passage of current would be permitted by the formation of liquid or by the wetting of solids on the surface or by the presence of fused crystals. Whatever the cause, it is certain that the higher the temperature indicated the greater is the trouble from fouling of the low-temperature end of the plant.

The author wishes to express his thanks to Mr. W. N. C. Clinch, general manager of the Northmet Power Co., for permission to publish the data contained in this article.

Notes from South Africa

From Our Capetown Correspondent

THE South African Director-General of Supplies recently released the news that the Heavy Electrical Plant Committee (Great Britain) had authorised the provision of plant with a total capacity of 186,500 kW which is needed in South Africa by 1947.

The Electricity Supply Commission, the Victoria Falls Company and the various municipalities expect the South African demand for electric power to expand considerably after the war. The Pretoria city electrical engineer has said his Council will have to plan for an expenditure of £6,000,000 to meet the normal expansion in the supply of electric power after the war. The demand for electricity in Pretoria is now so great that a high-voltage transmission line has had to be built from the Reef to supplement the Pretoria output. Quite apart from abnormal increases resulting from industrial expansion, extensions to the city's power station and distribution system are essential. It is now realised that without an expansion of the South African power supply organisation there can be no increase in mining and industrial production.

The municipalities are planning extensions to their electricity undertakings to cope with the post-war demand for power, and the Electricity Supply Commission expansion programme is designed to meet the maximum needs of its present and potential consumers in the future. These extensions cannot be made if heavy electrical equipment cannot be supplied by British manufacturers, and a long delay in the arrival of such plant may have serious effects.

During the current year work is expected to begin on the first section of the new Bulawayo power station which will cost £500,000. The whole undertaking will involve an expenditure of about £3,000,000, and will take some years to complete. This station is to operate under modern conditions of steam pressure and temperature, one of four power stations in Southern Africa to have adopted such conditions. The first section will have a capacity of 15,000 kW and the entire station 120,000 kW. The work is now three years behind schedule. It is thought that by the time the new power station has run its course it will be economically possible to transmit electric power from the Victoria Falls.

Progress at Durban

In the year ended July 31st, 1944, the consumption of electricity at Durban increased from 242,471,880 to 266,784,632 kWh, or by 10 per cent., and the number of consumers from 40,287 to 40,913 (1·6 per cent.). Energy purchased in bulk by the municipality from the Electricity Supply Commission totalled 290,196,926 kWh, at an average cost of 0·309d. per kWh. This total included 886,160 kWh generated at the municipal power station at Alice Street at the expense of the Commission, under the terms of the agreement. Energy generated at the jointly owned waste-heat power plant at Huletts' Refineries, Rossburgh, by the municipality totalled 15,888,500 kWh, of which 7,004,300 kWh was used in the refineries and 8,884,200 kWh delivered to the municipal supply mains. The peak load was 79,120 kW. The previous year's peak was 74,800 kW.

CORRESPONDENCE

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

Compression Cable

I WOULD like to clarify the last sentence in the third paragraph of the article on "Compression Cable" published in your May 25th issue, describing the completed 132-kV commercial installation at Osbaldwick.

The changes in volume of the impregnating compound in the cable dielectric, due to expansion and contraction following temperature variations caused by load changes, are accommodated solely by the movement of the diaphragm lead sheath which is maintained in intimate contact with the dielectric by the pressure gas external to the sheath. The purpose of the compensator connected to each termination and consisting of a metallic bellows holding insulating oil surrounded by the pressure gas, is twofold :—

(*a*) To maintain a pressure on the oil in the sealing bell at the same figure as the pressure gas imparts to the dielectric in the cable through the diaphragm lead sheath. This prevents any tendency of compound to migrate from the dielectric into the sealing bell.

(*b*) To cater for movement of compound from the bell due to expansion of the oil during the summer months, a movement which is reversed during the winter months.

Brimsdown. F. W. MAIN,
Technical Director,
Enfield Cables, Ltd.

Portable Tools

MAJOR advantages of electricity are flexibility of operation and portability of appliances, and it seems to me that the importance of voltage in relation to portable tools is not recognised as it should be.

In a recent article in the *Electrical Review*, Mr. R. S. Bennett advocated transformation to 25 V as a means of avoiding shock risks. This proposal seems to me to swing too far in the direction of low voltage, as a large number of factors have to be taken into consideration, such as increase in size and weight of the tool and also of the connecting cable and switch, so that the disadvantages may easily outweigh the advantages.

The first question is what is the highest safe voltage that would give the greatest power/weight ratio? I have over 300 of one type of portable tool operating under very adverse conditions and have found that with 100 V no shock of any consequence has been received during the last ten years. Much depends upon the type of tool, but for efficiency and durability combined with the greatest HP for a given weight, I have found the 200-cycle three-phase 100-V system, which eliminates commutation troubles, the most satisfactory. There is need for an association of plant engineers who are, I believe, the largest customers of the electrical industry. Though at present they have the smallest "say," they are the greatest sufferers from any defects under existing conditions, and no section of the industry could provide more useful practical experience.

Willenhall, Staffs. B. HINKS.

Too Many Catalogue Sizes

ONE correspondent on this subject appears somewhat gleefully to accept the present inefficiency with sundry playful references. This is not very helpful and is a sad reflection on that irresponsible frame of mind which one suspects may be a contributory cause of the present muddle. The fact that the corresponding need has been officially approached, as described by the Director of the British Standards Institution, for the building trades is surely sufficient indication that similar action could be taken with all-round advantage by the associations and professional institutions connected with the engineering industry. EFFICACE.

Huddersfield Kitchen Exhibition

OPENING a kitchen planning exhibition at the Huddersfield Electricity Department Showrooms, Market Street, the Mayoress, Mrs. Sidney Kaye, said that the model kitchen on show was within the reach of the majority of housewives. It was not large but there was plenty of cupboard room and she welcomed especially the inclusion of a drying cupboard. Mr. F. A. Ellis, the borough electrical engineer, described the operation of the kitchen and invited housewives to fill in a questionnaire relating to the design and arrangement of the room. The kitchen, which has been built by the Hull Corporation Electricity Department, is suitable for a house with a rateable value of £12 to £15. The area of the kitchen is 102 sq. ft. with a dining recess of 144 sq. ft. Room is provided under the sink draining board for a refrigerator, cooker and wash boiler or washing machine. There is also a number of post-war appliances on view, including washing machines, wash boilers, vacuum cleaners, kettles and irons; film displays are given each day. The exhibition closes to-morrow (Saturday).

Opencast Coal Winning

In the article under the above heading in the *Electrical Review* of May 25th, page 741, the electricity consumption for the workings in question was given as 120,000 kWh per week instead of per month.

A.S.E.E. Annual Report

SALARIES and conditions of employment of members were given considerable attention during the past year by the Association of Supervising Electrical Engineers. The report for 1944-45 states that the movement initiated by the Association in connection with cost-of-living bonus has resulted in the "ceiling" being raised in some cases to £1,500 and in other cases being abolished. Effects of war strain were manifested by a lengthening of the periods of sickness, distress and death benefits; the amount of benefit paid was about 19 per cent. greater than in the preceding year.

New branches have been formed at Coventry, Wolverhampton and St. Albans, and development generally has been so great as to justify the appointment of an organising secretary, Mr. T. E. A. Verity, B.Sc.(Tech.), who is to take up his duties shortly.

There has been increased activity on the educational and technical side. The Branch Papers Competition is to be suspended at the end of the 1945-46 period when the W. E. Highfield Shield Competition will be re-instituted. Many members have served as Association representatives on various bodies, such as committees of the I.E.E. and B.S.I. and on Ministry of Works Codes of Practice Committees.

At the recent annual conference the following were elected to fill vacancies on the Executive Council:—Messrs. J. F. Bridge, J. Flood, G. H. Parker, W. T. Partington and J. J. Smith.

The E.I.B.A.

THE annual general meeting of the Electrical Industries Benevolent Association will be held at 2 Savoy Hill, Strand, W.C.2, on June 29th. The annual report shows that, in spite of the difficulties of the times and the many wartime tasks which E.I.B.A. has had to shoulder, it has not only completed its work but is adequately prepared for the changing problems of the years to come.

All those who, during the present war, have held office as president of the Electrical Industries Benevolent Association have combined to suggest to the electrical industry that it would be fitting for all individuals and all electrical concerns to make a thank-offering gift in commemoration of victory in Europe, and that this gift should be made to the Electrical Industries Benevolent Association which gives so comprehensive and humanitarian a service. The signatories are Messrs. P. V. Hunter, E. E. Hoadley and J. N. Stephens. The appeal has been issued to all with whom E.I.B.A. is in contact but it is hoped that many more when they know of it, will spontaneously contribute in recognition of the fact that even if they have never helped the Association before it is most fitting that they should start now. Contributions should be sent to the Secretary, 32, Old Burlington Street, London, W.1, from whom copies of the appeal can be obtained.

Reference was made at a recent meeting of the General Purposes Committee of the Electrical Power Engineers' Association to the assistance afforded to E.P.E.A. members in certain cases by the Electrical Industries Benevolent Association. In recognition of this it was decided to make an annual grant of £100 to the E.I.B.A. from the E.P.E.A. Benevolent Fund; the decision was so worded that in future years the matter could be considered in the light of circumstances then obtaining.

Forthcoming Events

Saturday, June 16th.—*London.*—Comedy Restaurant, Panton Street, S.W.1. Association of Supervising Electrical Engineers (N.W. London Branch). Annual luncheon.

Stratford-on-Avon.—I.E.E. South Midland Students' Section. Summer outing to see "Twelfth Night."

Tuesday, June 19th.—*London.*—Connaught Rooms, 5.30 for 6 p.m. I.E.E. Transmission Section. Informal dinner (tickets, 12s. 6d.).

Stockport.—Mersey Hotel, Mersey Square, 7.30 p.m. Association of Supervising Electrical Engineers (Manchester Branch). Branch business.

Wednesday, June 20th.—*London.*—Waldorf Hotel, 1 p.m. Fan and Allied Manufacturers' Association. Luncheon, followed (at 2.15 p.m.) by annual general meeting.

London.—At Institution of Mechanical Engineers, 6 p.m. Institution of Heating and Ventilating Engineers. Summer special meeting. Paper on "Fuel Saving by Thermostatic Control," by A. L. Longworth.

Thursday, June 21st.—*Plymouth.*—Grand Hotel, The Hoe, 3 p.m. I.E.E. Devon and Cornwall Sub-Centre. "Survey of the Problems of Post-War Television," by B. J. Edwards.

Saturday, June 23rd.—*Bath.*—I.E.E. Western Centre. Summer outing to the engine factory of the Bristol Aeroplane Co., Ltd., where the annual general meeting of the Centre will be held at 12.35 p.m. Lunch will be served at 1 p.m. and conducted tours will commence at 2.30 p.m.

Friday, June 29th.—*London.*—Room 19, Livingstone House, Broadway, Westminster, 6.30 p.m. E.P.E.A. Southern Divisional Meter Engineers' Group. Paper on "Some Experiences in Servicing AC Meters."

National Safety Congress

THE first National Safety Congress to be held for six years has been arranged by the Royal Society for the Prevention of Accidents, Terminal House, 52, Grosvenor Gardens, S.W.1; it is to be held in London from June 18th to 24th. The first four days will be occupied by road safety sessions and on the 21st the annual general meeting will take place, with a dinner at the Savoy Hotel in the evening. On the following day there will be addresses and discussions on "Post-war Trends in Industrial Accident Prevention," "Group Activities," "The Guarding of Horizontal Milling Machines," and "Purposeful Physical Training in Industry." On the afternoon of June 23rd there will be a discussion on "The Influence of Training on Accident Prevention." The Industrial Safety Officers' Section will hold its first annual general meeting in the morning and a re-union dinner in the evening. On Sunday, the 25th, there will be a "Brains Trust" session.

PERSONAL and SOCIAL

News of Men and Women of the Industry

LAST week we reported the appointment of **Mr. H. Warren** as managing director of the British Thomson-Houston Co., Ltd. Mr. Warren, who is fifty-three, has been with the company since 1911, having joined its testing department upon leaving Bristol University of which he holds the M.Sc. degree. He was appointed to the engineering staff in 1913 and in 1921 became "engineer of insulations." In 1923 he collaborated with the late Mr. R. C. Clinker in the establishment of the B.T.H. Research Laboratory; in 1938 he was elected to the board of the company with the title of director of research and recently he became director of research and engineering.

Mr. H. Warren

Coupled with his research and engineering responsibilities, Mr. Warren has been in charge of the company's technical education and training scheme. He contributed a detailed description of this scheme to our series "Engineers of the Future" (*Electrical Review*, March 31st, 1944). He is a member of the E.R.A. Council and of several B.E.A.M.A. and B.S.I. committees. He was president of the Rugby Engineering Society in 1936-37 and is a vice-president of the Coventry Engineering Society, the Institute of the Plastics Industry and the Midland Centre of the Institute of Physics. He has travelled widely on the Continent and in America and has written many technical books and papers.

During the war Mr. Warren has directed a great deal of special research, development and engineering work, especially in radio, radio-location and aircraft, carried out by the company for the Government. He is a member of the Radio Research Board.

Engineer Rear-Admiral D. J. Hoare, at present Superintendent of the Admiralty Engineering Laboratory, has with the consent of the Admiralty, been appointed Director of Research of the British Internal Combustion Engine Research Association whose headquarters are at 111-112, Buckingham Avenue, Slough. Admiral Hoare is expected to take up his duties with the Association on July 23rd.

Mr. H. J. Smith who received the British Empire Medal at an investiture in May for his work at Woolwich Arsenal, is the father of Mr. Leslie Smith, M.I.E.E., chief designer to the British Electric Transformer Co., Ltd.

Mr. G. W. Godfrey, who has just taken up duties with E. K. Cole, Ltd., as radio sales manager, has been in the radio trade since 1923, when he joined the Sterling Telephone Co. He was later associated with Marconiphone, the Gramophone Co., and E.M.I., devoting much energy to the development of television. An appointment with Baird Television was terminated by the cessation of transmissions from Alexandra Palace. During the war Mr. Godfrey has been with Ultra Electric, Ltd., engaged on administrative duties.

Mr. I. R. Cox has been appointed managing director of the Metropolitan-Vickers Electrical Co., Ltd.

Sir Peirson Frank, chief engineer of the London County Council, has been elected president of the Institution of Civil Engineers for 1945-46. Before going to London, Sir Peirson Frank was city engineer of Liverpool.

Sir Frank Smith has been elected president of the Institute of Physics for 1945-46, with **Prof. A. M. Tyndall** as vice-president.

Mr. G. W. Parker, borough electrical engineer of Grimsby, who is due to retire next month, has agreed to stay on until his successor has been appointed.

Mr. R. C. Golding, M.Sc.(Eng.), A.M.I.E.E., A.M.I.Mech.E., deputy borough electrical engineer and manager, Great Yarmouth, has been appointed to succeed **Mr. B. T. Hawkins** who is retiring on July 31st next from the position of borough electrical engineer and manager of Wallasey, which he has held for the past twenty-four years.

Mr. Golding received his technical training at the Rugby College of Technology and Arts and was apprenticed to the British Thomson-Houston Co., Ltd. Thereafter he held appointments with the Leicestershire and Warwickshire Electric Power Co. (senior mains assistant at the Kibworth office), North Wales Power Co. (technical assistant in charge of mains at the Caernarvon office) and Central Electricity Board (in the operation department). In 1939 he joined the West Bromwich Electricity Department as mains engineer and in 1941 he was appointed to his present position at Great Yarmouth. Mr. Golding has visited the United States and the Continent on several occasions to study electrical progress. He has contributed a number of articles to the *Electrical Review*, the most recent (January 19th, 1945) dealing with the application of scientific management to electricity undertakings.

Mr. R. C. Golding

There was criticism at the Oldham Town Council last week of a minute of the Electricity Committee which recorded the decision to pay **Mr. E. Binns,** chief electrical engineer and manager, a salary of £1,500, rising by annual increments of £100 to the maximum in accordance with the scale based on the kWh assessment of the undertaking. It was objected that the salary ought not to be based on the output of the Department. The chairman of the

Electricity Committee said on the present output the salary would be £1,840. For twenty-five years the wages of employees, apart from chief officials, had been based on the kWh sold. If the sales of electricity decreased wages were reduced.

On the completion of forty-five years' service in the telegraph industry, **Lord Pender** has retired from active participation in the Cable and Wireless group of companies. The **Hon. Jocelyn Denison-Pender,** his son, has been appointed to a seat on the boards of all the companies within the group and joint managing director of the operating company, Cable & Wireless, Ltd.

Lord Inverforth, president of Cable & Wireless (Holding), Ltd., since 1929, has been appointed president of all the associated companies. **Sir Edward Wilshaw,** chairman of Cable & Wireless, Ltd., has been appointed governor and managing director of Cable & Wireless (Holding), Ltd., and chairman and managing director of its associated companies. **Lieut.-Col. I. Fraser,** press consultant to Cable & Wireless has been elected a director of the company and its associated concerns.

Mr. T. J. Stewart, late of the British Thomson-Houston Co., Ltd., has been appointed technical representative for "Stanelco" products in the Birmingham area. His address is Temple Courts, Temple Row, Birmingham, 3.

Mr. A. E. Jepson, whose retirement from the General Electric Co., Ltd., was reported in our last issue, joined the company in 1900 as tester of electric heating apparatus at the Peel Works, Salford, having previously served an apprenticeship with S. H. Heywood, electrical engineers, Manchester. Later he became an assistant substation attendant with the Manchester Electricity Department and after a period as an assistant demonstrator in the electrical department of the Manchester College of Technology rejoined the Corporation as chief assistant in the testing department.


Mr. A. E. Jepson

Mr. Jepson returned to the G.E.C. in 1910 to develop meter sales and in 1919 was appointed manager of the Sheffield branch, a position which he held until 1929 when he became assistant district manager, Lancashire and Yorkshire. In 1936 he went to the head office as manager of the switchgear and instrument department, a post which he held upon his retirement. He is a member of the I.E.E. and has taken an active part in the Institution's affairs.

Alderman Fred R. Unwin, manager of the Irish district of the General Electric Co., Ltd., has been appointed to succeed Mr. A. E. Jepson as manager in London of the switchgear and instrument department. **Mr. George H. Moir** becomes manager of the G.E.C. in Northern Ireland.

Mr. Richard Bond, A.M.I.E.E., consumers' engineer, Stafford Corporation, has been appointed borough electrical engineer and manager of Congleton.

Mr. Bond, who is forty-three, is a native of Morecambe. He was educated at the Friends' School, Lancaster, and received his technical training at the Storey Institute Technical College, Lancaster; with Mr. W. H. Inman, electrical engineer; and with the Caton Engineering Co., Ltd. From 1923-26 he acted as assistant engineer to Mr. W. H. Inman and from then until 1929 he served as junior engineer to the Lancaster Corporation. He then went to Newport (Mon.) Corporation as junior assistant engineer until becoming chief assistant engineer, consumers' department, Swintbn and Pendlebury Electricity Department, three years later. Mr. Bond went to Stafford as consumers' engineer in 1937.


Mr. R. Bond

Mr. Christopher Rathbone, A.M.I.E.E., A.M.I.Mech.E., has been appointed deputy electrical engineer, to the Stalybridge, Hyde, Mossley and Dukinfield Electricity Board.

Mr. R. Shepherd, M.I.Mech.E., who has for the past thirteen years been associated with Joseph Lucas, Ltd., as research and development engineer, has now established himself as a consulting engineer to the plastics and allied industries at 21, Broad Oaks Road, Solihull, near Birmingham.

Mr. G. R. Schou, A.M.I.E.E., has relinquished his appointment with the Central (Technical and Scientific) Register, Ministry of Labour and National Service, to return to the Willesden Technical College.

Mr. Alex. Milne, senior, informs us that his son, **Mr. Alex. Milne, junior,** who is now in the Forces, has become a partner in the firm of Alexander Milne & Co., the style of which has been altered to Alexander Milne & Son.

Miss Caroline Haslett is shortly leaving for the Middle East at the request of the Central Council for Education in H.M. Forces. She will give talks on housing, electricity, careers and resettlement.

Sir Archibald McKinstry, former managing director of Babcock & Wilcox, Ltd., was presented with the freedom of the burgh of Renfrew last Friday.

Appointments Vacant.—In this issue Battersea Borough Council is advertising for a general manager and engineer for its electricity undertaking (£1,675); Bacup Corporation for a borough electrical engineer (£600 and bonus); and Malvern U.D.C. for a chief electrical engineer (£765). The Senate of the University of London is inviting applications for the Chair of Electrical Engineering tenable at King's College (£1,150).

Obituary

Mr. L. R. A. Le Bouvier, a director of the Jerusalem Electric & Public Service Cpn., Ltd., has died suddenly in Jerusalem.

AC Vectors

Sinusoidally Varying Quantities

By G. W. Stubbings, B.Sc., A.M.I.E.E.

THE simplest kind of vector in applied mathematics is a directed step, and, in general, a vector quantity can be defined as one which has a directive property in addition to magnitude. Vectors of the same kind are combined by the classic parellelogram of forces rule. In contradistinction to vectors having the directive property whereby 2 + 2 is not generally equal to 4, scalar quantities are devoid of any kind of direction and are added arithmetically. Alternating quantities —currents and voltages of the same frequency—can, by a most useful mathematical fiction, be treated as vector quantities, subject to the condition that their variation in time is sinusoidal. This treatment is the foundation of the technique for the solution of elementary circuit problems.

Active and Reactive Components

The fact that alternating quantities can be treated as vectors leads to the idea of the resolution of an alternating current into two components in phase quadrature, the one, active, in phase with the voltage producing it and the other, reactive, in quadrature with this voltage. The active component carries the whole of the power arising from the association of the whole current with the voltage. The question is sometimes asked : Do these active and reactive components flow simultaneously in the circuit or are they merely mathematical fictions ? In two parallel circuits, the one purely resistive and the other purely reactive, the two component currents appear separately in the two branches so that the resultant current entering the combination is the effect of their superposition.

In a series circuit containing resistance and reactance, the objective reality of the two component currents is not so easily assented to. It seems certain, however, that whatever may be the nature of the circuit in which it flows, an alternating current of 2 A lagging 60 deg. on the voltage is equivalent to the superposition of an active current of 1 A and a reactive current of $\sqrt{3}$ A in just as real a sense as a direct current of 2 A is the equivalent to the superposition of two component currents each of 1 A.

The vector method of solving AC problems is so familiar to practical engineers that there is a tendency to overlook the fact that this method is legitimate only if all the alternating quantities concerned vary sinusoidally. It is easy to deduce, for instance, that two equal alternating currents of triangular wave form a quarter cycle out of phase will, if superposed, produce a resultant of quite a different wave shape, and that, moreover, the RMS value of this resultant will not be $\sqrt{2}$ times the RMS value of the components, as it should be according to the vector method of adding currents. Again, if the active and reactive components, I_A and I_R, of the no-load current of a transformer are measured objectively, the sum of the squares of these components is less than the value of the actual current, because the wave form of this current is not sinusoidal.

An algebraic equation $I^2 = I_A^2 + I_R^2 + I_H^2$ can be written which looks as if the total current represented by I is a vector quantity which is the resultant of three components mutually perpendicular in space, the third component I_H depending upon the harmonics. But, whereas the sinusoidal active and reactive components of the no-load currents of two transformers in parallel would add arithmetically to give the active and reactive components in the whole current entering the parallel combination, this would not necessarily apply to the harmonic components, for two harmonic components can be combined arithmetically only if their harmonics of similar frequency are all in phase. This equation is therefore merely a barren piece of algebraic symbolism and has no vector significance.

Resistance, Reactance and Impedance

The quantities resistance, reactance and impedance often appear in circuit calculations as if they were vector quantities. The resistance of a circuit depends upon its geometrical and material properties and is inherently devoid of any directional characteristic. So is reactance, which is a magnitude compounded of a circuit property and the essentially scalar quantity, frequency. What is commonly represented as the vector of an impedance is really the vector of the voltage drop in it with a sinusoidally varying current of 1 A flowing through it, and the directional characteristic of the impedance vector is simply that of the voltage drop relative to the current.

Thus, in series-circuit calculations voltage drops are added as vectors to obtain a resultant drop which characterises a combined impedance. Similarly, current vectors are combined to obtain the resultant admittance in a parallel circuit calculation. As the voltage drop in a pure reactance leads the current by 90 deg., an inductive impedance is a leading vector, and, hence, the algebraic expression for a pure reactance of x ohms is jx, where j is the unit leading vector. An

impedance has this vector significance only when it is carrying sinusoidally varying currents. Otherwise, with non-sinusoidal currents, the voltage drops will be non-sinusoidal and non-sinusoidal voltages cannot be combined as vectors.

The resolution of a sinusoidally varying alternating current into active and reactive components leads to the idea that the total VA in a single-phase supply is a vector quantity resolvable into power and powerless or VAr components. These vectors are simply component current vectors measured to a different scale which is fixed by the voltage of the supply. There is, however, a sense in which the power P, the reactive voltamperes Q and the total voltamperes U in a single-phase load have an inherent vector significance. The power in such a load is an average value; if the load is purely resistive its instantaneous value is $P\ (1 - \cos 2\ pt)$ and this value is alternating at double the circuit frequency. The average power in a purely reactive load of Q voltamperes is zero, and the instantaneous value of this power is $Q \sin 2\ pt$. If the two loads are supplied in parallel the total instantaneous power entering the combination will be $P + Q \sin 2\ pt - P \cos 2\ pt$. The alternating components of this total power are sinusoidally varying quantities, and they are 90 deg. out of phase. They can therefore be combined as vectors, and they give a resultant alternating power value of $\sqrt{(P^2 + Q^2)} \times \sin (2\ pt - \phi)$, where $\cos \phi = P/\sqrt{(P^2 + Q^2)}$. The total power entering the combination of two parallel loads is therefore $U \cos \phi + U \sin (2\ pt - \phi)$, where $U^2 = P^2 + Q^2$, and, as shown in the textbooks, this agrees with the product of the instantaneous values of the resultant current and voltage.

The notion that the total VA in a single-phase supply can be regarded as the resultant of two component supplies, the one carrying the whole of the power and the other wattless producing an alternating field or an alternating capacitance charge, has, therefore, some objective reality. The alternating components of a pure power supply and a pure reactive supply are vector quantities and they are combined as vectors to give the alternating component of the instantaneous power in the resultant supply. Thus single-phase power and VAr are in a sense vector quantities inherently, and not merely quantities derived from current components.

This view of AC power and VA does not, however, apply to balanced three-phase supplies. In such supplies the power is constant in magnitude and contains no alternating component, while the reactive VA are literally wattless, and the instantaneous watts in this component of the supply are always zero. It seems, therefore, that power and VA in a balanced three-phase supply have no vector significance other than that derived from the active and reactive components of the line currents.

Release of Key Workers

Commissioners' Letter to Supply Undertakings

IN a circular addressed to authorised electricity undertakings the Electricity Commissioners set out the qualifications required of men as conditions of their release from the Services under "Class B." They must be required to fill a "key" post vital to the national interest; possess the necessary qualifications to fill the post without training; and be willing to be released. Moreover it is necessary to establish that the post cannot be filled from civilian sources and that no alternative arrangements can reasonably be made for the performance of the work.

The Commissioners point out that the number of individual releases is being strictly limited and spread over the whole of industry; consequently the allocation to the electricity supply industry is very small indeed. While the Commissioners are prepared to sponsor applications from undertakings for the release of individual specialists under the "Class B" arrangements, they say that they must definitely rule out from consideration, unless very exceptional reasons can be given, applications in respect of clerical workers, manual workers (except charge hands for maintenance work in power stations) and men whose release under "Class A" can reasonably be expected within the next six months (i.e., at present, men in Groups 1 to 20.)

It will still be possible to obtain short periods of temporary releases for men who are not in the early "Class A" groups if their return is essential to enable some immediately vital work to be carried out, and the Commissioners will be willing to consider sponsoring such applications submitted by undertakings. It is now no longer necessary for undertakings to apply for the further deferment of men born in 1914 or earlier.

The Institute of Physics

THE annual report of the Institute of Physics shows a record increase in membership—about 15 per cent. Despite wartime difficulties the groups and the branches both at home and overseas held meetings and conferences covering a wide range of technical and professional subjects. A new and very successful venture was the publication of a series of lectures given before the Industrial Radiology Group as a "Handbook of Industrial Radiology." Arrangements with the Ministry of Education for the establishment of National Certificates in applied physics were completed by the setting up of a joint committee to administer the scheme agreed. Other matters considered during the year included patent law reform, higher technical education, the limitation of radio interference, and professional matters.

COMMERCE and INDUSTRY

Converted Wartime Factories. A.E.U. Wages Proposal.

Rural Development

IN the House of Commons on June 5th Sir Thomas Cook asked the Minister of Fuel and Power if he would authorise the Commissioners to increase the supply of electricity at present available to the agricultural districts of Norfolk. Major Lloyd George said it had been necessary during the war to restrict the development of electricity supply to war needs and cases of exceptional hardship. The relaxation of these restrictions was at present under consideration, but, even if some relaxation were found possible, shortages of materials and manpower would continue for some time to limit the rate of development.

Major Trevor Cox asked the Minister how many farms were now without a supply of electricity at cheap rates; and when it was expected that a supply would be provided to these farms in the County of Chester, Stalybridge and Hyde division. Major Lloyd George said he regretted that the information asked for in the first part of the question was not available. As regarded the second part, it had been necessary during the war to restrict electrical development because of shortage of manpower and materials, and no decision had yet been taken as to when and how far these restrictions could be relaxed.

Resettlement Advice Service

By invitation of the Minister of Labour and National Service, Mr. Ernest Bevin, M.P., last week inaugurated the Resettlement Advice Service in London by declaring open a new office in Oxford Street, where advice and information will be given to all men and women released from the Forces or from other forms of war service, and assistance given to them in dealing with their resettlement problems. It is proposed to open similar offices in all towns in which there are employment exchanges, most if not all of them by the end of this month.

New Zealand Plant Contracts

The British Thomson-Houston Co., Ltd., has recently received two important orders from the Government of New Zealand Public Works Department. One is for five 30,000-kVA 750-RPM synchronous condensers for operating on a 3-phase, 50-cycle, 11-kV supply. The equipments will be installed in North Island at the Public Works Department's Otahuhu and Bunnythorpe substations and will be used to control the voltage regulation of 220-kV incoming transmission lines. The synchronous condensers are rated for continuous loading over a range of 30,000 kVA at zero power factor leading to 15,000 kVA at zero power factor lagging, and they are also designed to take the full 30,000 kVA at zero p.f. leading up to 11,750 V and 15,000 kVA at zero p.f. lagging down to 10,500 V. Each condenser set includes main and service exciters and a slipring induction type starting motor operating from the 11-kV supply in series with the synchronous condenser windings. A fire extinguishing equipment is to be supplied for each substation, and the order also includes the 11-kV solenoid operated switchgear and neutral earthing cubicles, control panels, relay panels, temperature indicating equipment and voltage-regulating equipments. The switchgear and control gear are arranged so that the whole sequence of starting operations can be carried out either manually or entirely under automatic control. The other order is for thirteen 600-A 110-kV 2,500-MVA oil circuit-breakers, each with six bushing type current transformers and solenoid operating mechanism.

Purchase Tax Decision

Owing to the pressure on Parliamentary time, it has been decided not to proceed further with the withdrawal of the £500 exemption limit before the dissolution of Parliament. The Purchase Tax (Suspension of Registration Limit) Order, 1945, which required traders affected to apply for registration by July 1st next, will therefore be allowed to lapse and no action will be taken on applications that have been received under that Order.

More Factories Allocated

A further thirty-four Government factories have been leased to commercial concerns by the Board of Trade. Among them are the following:—South Shields, Wright & Weaire, Ltd. (radio components and domestic electrical appliances); Lutterworth, Alfred Herbert, Ltd. (machine tools); Blackwood (Wales), South Wales Switchgear, Ltd. (electrical equipment); Castle Bromwich (Birmingham), General Post Office (telephone equipment); Radcliffe, Mather & Platt, Ltd. (textile and food machinery); Cambuslang (Scotland), Hoover, Ltd. (domestic electrical equipment); and Castlereagh (N. Ireland), P. R. Mallory & Co., Ltd. (batteries).

Hotric, Ltd., a subsidiary company of H. Webb & Co. (Engineers), Ltd. informs us that it has been allocated one of the national factories at Broxburn, near Edinburgh. This factory is now being equipped for the large-scale manufacture of electric water heaters and other domestic appliances for housing schemes and export. The head office and sales department of Hotric, Ltd., remains at 198, Fore Street, Edmonton, N.18.

Engineering Workers' Wages

Proposals for a radical change in the wage structure of the engineering industry were presented at a meeting last week of the National Committee of the Amalgamated Engineering Union by the president, Mr. J. Tanner. The scheme provides for three classes, namely, Grade A, skilled workers (craftsmen) who have served an apprenticeship; Grade B, "skilled operators," production workers who are capable of setting as well as operating their machines (now generally classed as "semi-skilled"); and Grade C, labourers. Between the last two classes are different groups who do not fall in either and it was suggested that as many as ten intermediate grades would be necessary to cater for these. The minimum

wages rates proposed are as follows:—Grade A, £5 18s. a week (minimum piecework rate, £7 17s. 4d.); Grade B, £5 6s. a week (piecework minimum, £7 1s. 4d.); and Grade C, £4 11s. a week (piecework minimum, £6 1s. 4d.). Setters-up, markers out, inspectors, maintenance staff and toolmakers would be given an extra 10s. per week. The executive was instructed to make immediate application for an increase to bring wages into line with the proposals.

Electrical Workers' Award Protest

Ten thousand male workers at the Metropolitan-Vickers works at Trafford Park last week reaffirmed their decision to stay on day-work, in protest against the management's interpretation of the recent engineering award of 4s. 6d. a week granted by the National Arbitration Tribunal. The men are now in their sixth week of day work and it is estimated that the average loss per man through working on this rate of pay is about 18s. a week.

E.A.W. Scholarships

To celebrate its 21st "birthday" and to honour its founder and director Miss Caroline Haslett, the Electrical Association for Women has established an educational fund for the provision of scholarships and other educational projects in electrical housecraft. Many organisations of the electrical industry are contributing to the fund. The scholarships will be awarded to Service women, members of the Women's Land Army, women in war industry and in other war services, and selected students from schools.

B.E.A.M.A. is to provide a sum not exceeding £500 a year for four years towards the fund.

North Shields Electrical Exhibition

An all-electric kitchen with a utility room attached is the principal feature of the Tynemouth Electricity Department's exhibit at an industrial and electrical exhibition held recently at North Shields. Moffats, Ltd., planned the kitchen, which is made entirely of steel finished in cream, black and pastel green, with stainless steel draining boards. The equipment includes a cooker and refrigerator, the utility room accommodating a washing machine, wash boiler and clothes dryer. Mr. J. B. Glen, the borough electrical engineer, tells us that many inquiries were received for complete kitchen units as well as for individual pieces of apparatus.

Part of the all-electric kitchen at the North Shields exhibition

E.D.A. Bulletin

In the May number of the "E.D.A. Bulletin" a great deal of prominence is given to electric kitchens, references being made to essays produced by schoolgirls after a visit to the E.D.A. exhibition kitchens in London and to the display of these kitchens at Cardiff. "News from the Areas" shows that the Association's Area Committees are very active nowadays in stimulating interest in industrial, domestic and rural electrification.

Earth Conductor Colour

The Technical Committee of the Electrical Contractors' Association has been informed that in the forthcoming reprint of the 11th Edition of the I.E.E. Wiring Regulations, attention will be specially directed to the provisions of Regulation 309 (a) which prescribes that earth continuity conductors are to be coloured green and that brown will no longer be permissible for any purpose. Mr. L. C. Penwill, director of the E.C.A. suggests to members in advance of the 11th Edition of the I.E.E. Regulations, that in their inquiries and instructions to manufacturers they should specify the colour green.

Power Press Safety

Two reports on safety in the use of power presses, submitted by the Chief Inspector of Factories to the Minister of Labour and National Service, have just been published by the Stationery Office. They are the report of the Committee on Safety in the Use of Power Presses (1s.); and the Report of the Joint Standing Committee on the Safety of Heavy Power Presses: Bending Brakes (6d.).

The first-named report examines various methods of preventing the many accidents due to power presses. Fixed guards, automatic guards and other devices of different types are considered, and detailed recommendations are made with regard to the use of safeguards both for new presses constructed in future and for existing presses. Other recommendations are that a periodical inspection of presses should be required under statutory regulations, and that special attention should be given to the training of operatives, tool setters and maintenance personnel.

The second report deals with the safety of the type of presses known as "bending brakes"

It contains a specification and illustrations of an interlocked fixed guard for use with such presses, and recommends that certain other devices should be provided for ensuring the safety of the workers. It also recommends that a system of examination and upkeep of bending brakes should be devised in each factory.

B.E.A.M.A. and the B.I.F.

Support for the view that the next British Industries Fair should be held in 1947 comes from B.E.A.M.A. It is thought that there would be great difficulty in arranging adequate accommodation, entertainment and travelling facilities for the buyers who may be expected from overseas. The Association favours a new venue for the "ex-London" portion of the Fair—much nearer London than Birmingham—and at least the domestic appliances exhibition should be held in London.

It was announced in the House of Commons last week that plans were proceeding for the holding of a Fair in 1947.

Fuel and Power

In last week's leading article on this subject it was stated that "some idea of the comparatively higher degree of co-ordination in the electricity supply industry may be gained from the fact that while there are 345 authorised electricity undertakings, the number of gasworks is treble this (1,049)." The figure 345 is the number of generating stations owned by authorised electricity undertakings of which there were 573 in 1944.

Annual Holidays

The Telegraph Construction & Maintenance Co., Ltd., and Submarine Cables, Ltd., are closing their Greenwich and Farnborough works for annual holidays from July 21st to July 30th. A skeleton staff will deal with urgent requirements.

Stamford Electrical, Ltd., will be closing their Park Works from August 4th to 11th.

All employees of United Ebonite & Lorival, Ltd., are to get an extra week's holiday with pay in addition to their 1945 summer holiday. In making this announcement the directors and management of the company have conveyed to the workpeople their appreciation of the contribution which all have made to the war effort.

Retail Staff Wages

The National Joint Industrial Council for the Retail Furnishing and Allied Trades (including electrical and radio goods) has decided to increase the minimum weekly rates of remuneration as follows :—Branch managers and manageresses ; Up to £100 weekly trade, 3s. per week; over £100 weekly trade, 4s. per week. All other male and female employees of sixteen years of age and over, 3s. per week. A minimum rate has also been fixed for male and female employees of fifteen years of age. The new minimum weekly rates of remuneration operate from the first pay day after June 11th. Wages must not be paid at less than the rates specified except in special circumstances prescribed in the joint agreement. Copies of the full agreement may be obtained from either of the joint secretaries to the Council, Mr. T. Bowyer Jackson, 32/34, Ruskin Chambers, Corporation Street, Birmingham, 4, and Mr. G. Beardsworth, 122, Wilmslow Road, Fallowfield, Manchester, 4.

Increase for Wallasey Contractors

Wallasey Corporation Electricity Committee has agreed to a 25 per cent. increase in payments to local registered electrical contractors for wiring cookers, wash boilers and water heaters.

Electrical Factory for Berwick

Plans are under consideration for the establishment of a factory at Berwick for the making of electrical appliances. The factory, to be erected by a new company under the style of the Berwick Engineering Co., Ltd., will employ about a hundred workmen most of whom will be recruited locally.

Workmen's Compensation

Although it will not be possible to pass the Industrial Injuries Insurance Bill before Parliament is dissolved to-day the Government decided to publish the text this week. The Bill was intended to raise the rates of compensation and for total disablement these were fixed at 60s. per week (against 40s. at present) for a single person; 76s. for a single person with an adult dependant or a married man (against 40s. and 50s. respectively); and 83s. 6d. for a married man with one child (against 55s.).

Dearer Non-ferrous Metals

The Control of Non-Ferrous Metals (No. 17) (Copper, Lead, and Zinc) Order, 1945 (S.R. & O. 1945, No. 642) increases the maximum prices for lead by £5 a ton, for zinc, zinc sheets and rolled zinc (boiler plates) by £5 10s. a ton, and for zinc oxides by £4 15s. a ton. This is the first increase in the prices of unwrought lead and zinc since December, 1939. The Order also abolishes the maximum prices for hard spelter, zinc dress, flux skimmings and certain descriptions of copper scrap, brass scrap and swarf, and gunmetal scrap and swarf. The Minister of Supply has also issued a list of prices of non-ferrous scrap metals at which he is prepared to effect a sale to a buyer subject to having sufficient material of that particular quality available at a convenient depot at any particular time.

Trade Announcement

Wall & Attwood, Ltd., are returning to Portsmouth on June 25th to offices at 157-159 New Road (telephone: Portsmouth 2031). Since the early part of the war when their premises were totally destroyed by enemy action they have had offices at Havant.

Changes of Name

Recent changes of name include the following:—Newport Electrical Co., Ltd. to Winter (Newport), Ltd.; Meissner Coils (R.A.P.), Ltd., to Meissner Coils (G.B.), Ltd.; Miller Sign Co., Ltd., to Miller Electric Co., Ltd.; Frank Curtis (Electrical Engineers), Ltd., to Electrical Engineering Construction Co., Ltd.: and Accumulator Contracting Co., Ltd., to Accumulator & Contracting Co., Ltd.

Views on the News

Reflections on Current Topics

ALL over the country the battle between electricity and gas for the possession of temporary houses continues. The latest dispatch comes from Mr. A. W. Barham, borough electrical engineer of Watford, who tells me that his chairman (Alderman H. Coates) has prevailed upon the Borough Council to reverse a previous decision that of 100 temporary houses 63 should have gas cookers, washboilers and refrigerators and 37 electrical appliances. Now there will be 63 all-electric houses, but it is a pity that Alderman Coates was not persuasive enough to score 100 per cent.

* * *

At Preston the chairman of the Electricity Committee (Alderman H. E. Rhodes) was not so successful. The Housing Committee had recommended that half of the town's temporary houses should be electrically equipped while the other half had gas. Alderman Rhodes moved an amendment that all should be served by electricity where it could be installed, but the Council accepted the original proposal.

Llandudno proved very gas-minded when the equipment of temporary houses came up for discussion. Only two members could be found to support a motion by Councillor F. F. Dicken that the fifty bungalows should be all-electric, and gas prevailed. The sad feature of the debate was an admission by Councillor Dicken that he had gas cooking in his own house and a statement by one of the gas enthusiasts that he knew an electrical engineer of a large borough who had installed a gas refrigerator. Precept and practice should go hand in hand.

* * *

It is generally company electricity supply undertakings who are said to stand in the way of rural electrification by quoting iniquitous prices for extension of their services. Maybe that is because, speaking generally, the companies happen to be responsible for supply in the greater proportion of the rural areas. In most cases, of course, their high quotations are fully justified; the alternative is to supply at a severe loss or pass the burden on to their other consumers. But local authorities are apt to adopt a similar attitude when faced with requests for unremunerative extensions. I see that a case of this kind has cropped up in Devon. Indignation was expressed at a meeting of the Newton Abbot R.D.C. at the failure of the Torquay Electricity Committee to give a supply to Langstone, as an extension would cost £1,500. One member pointed out that Torquay would give a supply if someone paid the cost, whereupon another member said that a shopkeeper did not ask others to pay for his shop. Ignoring the inaptness of the comparison, I seem to have bought (or paid for) several shops during the past few years.

* * *

When told that, even after designs have been decided on, it takes at least a year to put a new electric cooker on the market, one is rather inclined to think it is an unnecessarily long time. The wisdom of manufacturers not rushing too quickly into the production of their post-war apparatus was brought home to me forcibly a few days ago when I visited a small canteen where for the past few months the prototype of a new cooker made by a well-known manufacturer has been tried out under actual working conditions. Exhaustive tests by a competent cook have revealed a number of defects. The lowest loading of the hot-plate is found to be too high for simmering and the oven lagging is faulty. The cook also considers that, although the thermostat operates satisfactorily, indication of the actual temperature inside the oven should be provided by means of a thermometer. It does seem that a little extra time and genuine effort spent in studying the reactions of users is well worth while rather than running the risk of encountering complaints and difficulties later on. Re-tooling is an expensive business.

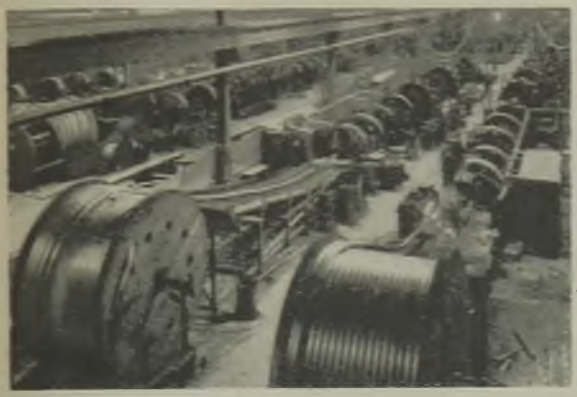
* * *

In an article on "Practical Electronic Controls" in the American journal *Electronics*, Paul G. Weiller says:—"No doubt the employment of an electronic link adds to the sales appeal of a product. This is due to the blaze of publicity which electronics has received and because of the great assistance it has been to the war effort. Unfortunately electronics has been over-publicised. Any appreciable number of electronic fakes, involuntary or deliberate, would discredit industrial electronics for a long time. To market an electronic device which is no better and does no more than its mechanical or electrical competitor of olden days would also result in discredit to industry even if the use of vacuum tubes in the device gives it enhanced sales appeal." A note on the author says that Dr. Weiller is a widely known consultant specialising in electronic equipment design who has had many years of experience both in the laboratory and in the field.—**REFLECTOR.**

Callender's Activities

Wartime Achievements : Merger with B.I. Cables

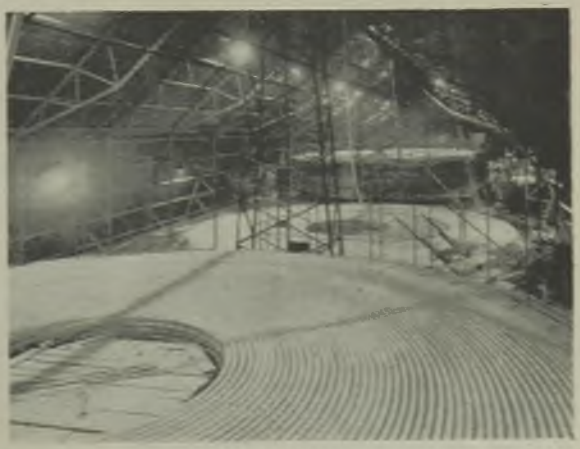
AN account of the company's contribution to the winning of the war forms the first half of the statement by the chairman of Callender's Cable and Construction Co., Ltd. (Sir Malcolm Fraser, Bt.) circulated to stockholders in advance of to-day's annual meeting. The statement mentions that the profit for the past year was £503,185, against £465,115 for 1943. The ordinary dividend is maintained at 20 per cent. by a final dividend of 10 per cent. and a cash bonus of 5 per cent., and £175,000 is transferred to dividend equalisation reserve. Proceeding to deal with wartime developments, the chairman says that soon after the appearance of the magnetic mine, the company offered a cable invented by the chief engineer (Mr. P. V. Hunter) for exploding the mine. This was able to carry currents up to 3,000 A. and to float in sea water while being strong enough to be towed at speeds up to 20 knots. Three weeks later on January 18th, 1940, the first complete cable, with all electrodes and accessories, was delivered to the Admiralty and within a year equipment for 366 vessels was supplied by Callender's alone, in addition to some hundreds more by other cable makers.



Four armouring machines engaged in reinforcing "Hais" cable with steel tapes and wire armour

They claimed that their technicians were the first to succeed in developing and producing satisfactory field cables for the Army containing no natural rubber. The demands of radar and other high-frequency communication equipment called for cables capable of withstanding frequencies of thousands of millions of cycles per second. These frequencies would have reduced the ordinary rubber cable to a mass of liquid in a few seconds. The I.C.I. developed polythene, a material of remarkable electrical properties, but its successful processing and application required an effort of no mean order in which the company was able to take the lead.

Another development had been the production for the Central Electricity Board of a three-core gas pressure cable operating at 132-kV and capable of transmitting the entire output of a large generating station. Callender's also participated in the production of the armoured lead pipes laid across the Channel for the supply of oil to the Allied armies on the Continent.



Three 30-nautical mile lengths of "Hais" cable being coiled down in a special building with openings in the roof. From these positions the cables were pulled by winches along an overhead gantry for loading into the cable layer

Turning to the amalgamation of Callender's and British Insulated Cables, Ltd., Sir Malcolm Fraser outlines the steps leading

up to this which arose out of the co-operation of the two companies in a number of directions. He says that the amalgamation should strengthen the security of the preference stockholders. The tangible assets of the new company (British Insulated Callender's Cables, Ltd.), whose issued capital will be £11,219,175, amount to over seven times the nominal value of its two classes of preference stock.

In a normal pre-war year the sales of the two companies were divided into 82·7 per cent. home sales and 17·3 per cent. overseas sales. In the post-war period the home sales are likely to exceed pre-war demands and there will be greater difficulties in fulfilling orders than obtaining them. What the margin of profit will be cannot at present be forecast.

Their expert advisers express the opinion that the combination of the companies' export departments and the wider distribution of their overseas sales and technical forces should increase substantially the volume of post-war export sales. They should be able to obtain large electrification and power transmission contracts throughout British and foreign countries by means of their combined financial and technical resources.

The statement concludes with a review of the position of Callender's Trust (which holds the Callender investment assets) under the amalgamation scheme and the chairman says that the income of the ordinary Callender stockholder should in the future be at least equal to what he would have received if Callender's had remained a separate entity. The interests of shareholders, staff, workpeople, customers and the public alike have been jealously watched and maintained throughout and the board has no hesitation in recommending the scheme to the stockholders' favourable consideration.

Export Licensing Relaxed

Many Electrical Items Freed

THE Board of Trade has made the Export of Goods (Control) (No. 4) Order, 1945 (S.R. & O. 1945 No. 576, Stationery Office, price 6d.). This Order, which came into effect on June 11th, cancels all previous Export Control Orders and sets out the export licensing position as at June 11th. It reduces substantially the list of goods requiring export licences and removes all the remaining countries from the list of territories to which the export of *all* goods is controlled by export licensing, so that in future only goods appearing in the First Schedule to the Order will require export licences. Among the classes affected are the following which appear in the First Schedule to the Export of Goods (Control) (No. 10) Order, 1943, as amended. In some cases parts of items only have been deleted from the list of controlled goods and exporters are advised to consult the Order itself to ascertain the exact position as regards goods with which they are concerned.

The items which have been completely deleted from the Schedule include the following:—Group 6 (4): Vacuum cleaners (non-domestic), domestic washing machines, mangles and wringers, welding electrodes, wire and cable insulating and covering machinery, wire-drawing machinery and wire-rope and cable-making machinery.

Deletions from Group 12 (2) include:—Voltaic cells and zinc electrodes, apparatus and appliances of a kind used for domestic purposes, and parts thereof, wholly or mainly of metal, bells, buzzers and indicators, and parts, mainly of metal, electrically-heated blankets, compresses and pads, busbars and busbar chambers, ceramic components made wholly or mainly of soapstone, steatite or titanium di-oxide, control, regulating and starting gear for electric motors, generators, rotary convertors, rotary transformers, frequency changers, motor convertors, electromagnets and electric furnaces, cores consisting wholly or mainly of iron powder, echo sounders, flat irons, electric furnaces, fuses, gramophones, radio-gramophones, record players and parts, hair curling, waving and drying appliances, and parts, wholly or mainly of metal, lightning conductors, loudspeakers, microphones, motors, motor convertors, frequency changers, generators, generating sets, rotary convertors and rotary transformers, overhead line accessories, permanent magnets and electromagnets, resistances, including heating elements, searchlights and parts, switchboards and pillars, and fuseboards and pillars (including distribution boards and pillars), switches and circuit-breakers, static transformers and transformer tanks, wireless receiving sets and chassis, wiring accessories and fittings, wholly or mainly of metal, of a kind commonly used for domestic purposes, X-ray apparatus and parts.

As regards domestic cooking and heating appliances the following are still subject to export licence:—Boiling and heating plates, combined cooker-heaters, cookers and parts, and grill-boilers and parts. Domestic wash-boilers and accumulators, and plates and grids for lead acid accumulators remain subject to control.

This notice refers to *export licensing* requirements under the Export of Goods (Control) (No. 4) Order, 1945, only and does not affect any other regulations which may be in force governing the manufacture, acquisition, disposal, etc., of goods, including those for export.

Consolidation Order

In this connection attention is called to the Machinery, Plant and Appliances (Consolidation) Order, 1945 (S.R. & O. 1945 No. 631, Stationery Office, 2d.), which also came into force on June 11th.

Hitherto many classes of machinery and plant have been licensable under the Machinery, Plant and Appliances Orders, when supplied to

the home market and under the Export Control Orders when supplied for export. The main effect of the new Order, together with certain changes made by the Export of Goods (Control) (No. 4) Order is to bring the bulk of the controlled classes of machinery and plant under a single licensing procedure. While most of the controlled classes will thus be subject to machinery licensing only, a few classes will remain subject to export licence. When an export licence is granted in these cases no further machinery licence will be required. Nor will machinery licences be needed in those cases in which export licences have already been granted prior to June 11th.

The classes in the Machinery Licensing Schedule which are still covered wholly or in part by the Export Control List include:—Apparatus for cinematograph projection, etc., electrical machinery, etc., accumulators, etc., conveyors, etc., industrial trucks, etc., and automatic private telephone exchange systems, etc. In addition the Export Control List still includes such ancillary equipment as pumps and compressors, i.c. engines, and steam engines and turbines.

ELECTRICITY SUPPLY

Supplies for New Houses. Price Increase Proposals.

Accrington.—TENANTS TO CHOOSE.—The Town Council has decided to provide gas and electricity services in all the new houses for cooking and washing purposes. appliances to be supplied according to the wishes of tenants.

Bangor (North Wales).—ELECTRICITY FOR NEW HOUSES.—After an animated discussion the Council last week decided to install electricity instead of gas in the 50 new houses which it is erecting. The women members of the Council declared that it was for women to decide which was the better method of cooking and they pointed out that women in the Services had favoured electricity.

Barrow-in-Furness.—LOANS.—The Electricity Committee has obtained sanction to borrow £5,000 for mains and services in connection with the change-over and £3,500 for meters.

Birkenhead.—SUPPLY TO TEMPORARY HOUSES.—The Corporation Electricity Committee has obtained sanction to borrow £3,500 for mains to temporary houses and is seeking sanction to borrow £1,500 for substation equipment and £2,000 for consumers' apparatus.

Blackburn.—ELECTRICITY FOR FARMS.—The electrical engineer (Mr. R. H. Harral) has prepared a scheme to provide electricity for farms, etc., on Woodfold Park estate, costing £4,322.

Bournemouth.—ELECTRIC HEATING OF HOSPITAL.—Estimates for electric heating to replace coal grates at the isolation hospital are being called for by the Corporation Health Committee.

Burnley.—SUBSTATION EQUIPMENT.—The Electricity Department proposes to spend £3,310 surplus from revenue to meet outlay on substation equipment during the autumn.

Cardiff.—SWITCHES FOR RADIO SETS.—The Works Committee has asked the city engineer to confer with the electrical engineer regarding a suggestion that separate switches for use in connection with radio sets should be included in the specification for electrical installations in new houses.

Coventry.—POWER STATION ALTERATIONS.—Sanction is being sought by the Corporation Electricity Committee to borrow £3,256 for modifications to the circulating water discharge pipework at Longford power station.

Derby.—WITHDRAWAL OF DISCOUNT.—Application is being made to the Electricity Commissioners for permission to withdraw the 5 per cent. discount which has been allowed to consumers since 1942. The recent increase in the price of coal will involve the Electricity Department in an additional outlay of £38,000 per annum, and discontinuance of the discount will mean an extra income of £30,000.

East Barnet.—HOUSING SERVICES.—At the monthly meeting of the Urban District Council, the surveyor reported upon discussions that had taken place with the Northmet Power Co. and the Barnet District Gas & Water Co. with regard to cables and mains to be laid in connection with the new housing scheme. In the case of the electricity cables the Northmet Co. had agreed to provide all necessary cables free of charge, and, in the case of the gas mains, the Gas & Water Co. offered to provide mains free of charge if at least fifty per cent. of the houses or flats were fitted with gas cookers and gas wash-boilers. The report was approved.

Glasgow.—TRACTION SUPPLY PLANT.—To meet the electricity requirements of the Transport Department during the next five years, the Corporation will probably require one new 25,000-kW turbo-alternator and one 75,000 lb. water-tube boiler at the Pinkston generating station.

Holmfirth.—HIGHER CHARGES.—At its May meeting the Council decided to apply to the Electricity Commissioners for permission to make all-round increases in the charges for electricity.

The proposals include raising the present war increase of 5 per cent. on all-in tariffs for domestic and non-domestic consumers to 17½ per cent. and the 2½ per cent. increase for power and special users to 5 per cent. Councillor R. L. Robinson, chairman of the Electricity Committee, said that the proposed increases would give the undertaking an estimated profit of £278. If the all-in tariff increase was fixed at, say, 10 per cent., there would be a loss of £400. The increases were the result of the higher cost of coal. An amendment that the tariffs for domestic users should be referred back for further consideration was defeated.

Hull.—LOAN SANCTIONED.—The Corporation Electricity Committee has obtained sanction to borrow £1,923 in connection with an additional supply for John M. Harrison & Co., Ltd.

ELECTRICITY CHARGES.—The Minister of Fuel and Power has informed the Electricity Com-

mission that he knows of no reason to intervene in the Council's proposal to adjust the actual kWh charge on all tariffs where coal clauses are not in operation, to a minimum of 0·5d.

Keighley.—PROPOSED PRICE INCREASE.—In view of increased coal prices and other expenses the Electricity Committee recommends that the existing basic charges to power consumers shall be increased by 5 per cent., and all other charges by 10 per cent.

London.—CABLE-LAYING BY PLOUGH.—The County of London Electric Supply Co., Ltd., is providing electricity services to some 80 temporary houses at Clarence Avenue, Streatham, to the order of the Ministry of Works. To ensure that the supply is available as early as possible, the cables are being laid by a cable-laying plough provided by the Lower Thames Land Development & Construction Co., Ltd. Work was commenced at Clarence Avenue on June 7th and is expected to be finished by the end of the week. By hand digging methods this work, which involves some 800 yards of cable laying, would take approximately a fortnight to complete. The method of laying cables by plough has been extensively used by the County of London Co. During the war this method was employed to lay many miles of cable to aerodromes and Army sites and in connection with the "Pluto" operation.

Nelson.—ELECTRICITY IN THE COTTON INDUSTRY.—Cotton manufacturers have discussed with Alderman Winterbottom, chairman of the Corporation Electricity Committee, and Mr. T. D. Martin, the borough electrical engineer, the extended use of electricity in the industry as an additional inducement to young people to enter mill employment.

North Wales.—TRANSMISSION COSTS.—Last week the Welsh Parliamentary Party received a deputation from North Wales and South Cheshire electricity undertakings who submitted a memorandum showing how, under existing arrangements, these areas were severely handicapped in the development of industries. This was attributed to higher electricity charges owing to transmission costs. Over a period of years, it was set out, these authorities had sought to remove their present disabilities by representations to the Central Electricity Board and the Electricity Commissioners, but reliefs obtained, while welcome, were inadequate to meet their needs. The Party decided that a deputation should seek an early opportunity of discussing the matter with the Minister of Fuel and Power, and urge upon him the necessity of a review of the existing conditions.

Oldham.—COOLING SCHEME.—The Electricity Committee has received sanction from the Electricity Commissioners to proceed with the erection of a small experimental plant for using effluent from the sewage works for cooling purposes at Chadderton generating station. The scheme involves the erection of a pumping station and plant.

Perthshire. — ELECTRICITY CHARGES. — The Western District Committee of the County Council is communicating with the Grampian Electricity Company to ascertain whether, if the kWh charge were reduced to a general one of ½d., the districts of West Perthshire which had entered into an agreement on a rate of ¾d. would enjoy the reduction. Failing this the suggestion is made that the company might consider the inclusion of a "rise and fall" clause in the agreement.

Rotherham.—PROPOSED INCREASED CHARGES.—To meet an increase of £55,000 in the annual fuel costs of the electricity undertaking, the borough electrical engineer, Mr. W. H. Duffett, is seeking permission to adjust the price of electricity to power users not subject to coal clauses.

Sedgley.—SUPPLY TO HOUSING ESTATE.—The Midland Electric Corporation is to extend mains and provide a substation in connection with the supply to the U.D.C. housing estate.

Swindon.—SUPPLY TO ESTATES.—The Electricity Committee is to provide a supply to the Pinehurst and Beech estates at a cost of £8,500.

Overseas

Australia.—NEW POWER STATION.—The New South Wales Government has passed a Bill which authorises the erection of a hydro-electric power station at the Wyangala dam on the Lachlan River. According to *Tenders* (Melbourne) the plant will consist of an English Electric 10,100-HP vertical shaft reaction turbine working under a gross head of 154 ft., the unit acting as a generator when water is available for discharge or as a synchronous condenser when no water is available. A 66-kV line will link the station with Cowra where connection will be made with the southern electricity supply system. It is expected that the station, which is estimated to cost £390,000, will be in operation some time next year. It will be constructed to withstand a flood of 50 ft. above tail water level, and the design provides for remote operation from a building 400 yd. away.

TRANSPORT

Bolton.—BUSES TO REPLACE TRAMS.—The Ministry of War Transport has sanctioned the acquisition by the Transport Department of sixty-seven buses to enable it to replace four remaining tram routes by bus services. The Transport Committee's decision to purchase the buses was referred to at a meeting of the Town Council on June 6th. Councillor Hesmondhalgh asked that trolley-buses should not be overlooked. The Mayor said that the Committee had considered trolley-buses for years and would favour the system best suited at the time. At present experts advised against trolley-buses until there was an improvement in them.

Leeds.—TRAMWAY EXTENSION.—Application is being made for permission to extend the light railway from Belle Isle Road to Middleton Park Road.

West Hartlepool.—TROLLEY-BUS OPERATION.—During the year ended March 31st the Corporation's trolley-buses carried 8,782,491 passengers, an increase of 271,520 on the previous year. Receipts amounted to £47,764, an increase of £1,182.

Wallsend.—OPPOSITION TO TROLLEY-BUSES.—The Town Council is to oppose a Bill promoted by Newcastle-on-Tyne City Council, which among other things, seeks powers to run trolley-buses over additional routes into Wallsend. At present only one route in Wallsend is covered by trolley vehicles.

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Mining Plug and Socket

BESIDES being easily assembled, the new "Huwood" W 100 PA 1 100-A mining plug and socket equipment introduced by HUGH WOOD & CO., LTD., Gateshead-upon-Tyne, greatly reduces maintenance difficulties. Conforming to B.S. 279, the plug is suitable for all types of cable used in mining work, a range of clamping arrangements fitting accurately any type or size of screen or pliable armoured cable between $1\frac{1}{16}$ and $2\frac{1}{8}$ in. outside diameter and any unscreened cable between $1\frac{3}{8}$ and $1\frac{3}{4}$ in. outside diameter, without having to resort to boring out nuts and clamping pieces, or of fitting making-up pieces, etc. The gripping arrangement and the connections are seen in the illustration.

To overcome difficulties frequently encountered in removing damaged withdrawal screws in 100-A sockets, the screw is fitted into a sleeve which is located by two strong Allen head screws, which can be easily removed and new ones fitted without interfering with any flameproof enclosure. The possibility of damage to the socket during the removal of a damaged screw is thus completely eliminated and the whole operation takes only two minutes and is carried out *in situ*.

The "I.P.C." adaptor which is available for converting the socket for remote control, is particularly easy to wire. Moreover the pilot cable enters the adaptor parallel to the trailing cable, thereby avoiding a sharp bend at the point of entry to the cable gland. All the equipment described is covered by flameproof enclosure certificates Nos. 1602 and 1692, Group I.

Coil Tester

An instrument that is intended for testing air-cored coils of insulated wire to detect short-circuited turns in the windings is available from the BANNER ELECTRIC CO., LTD., Burford House, Hoddesdon, Herts. The set is energised from AC mains and its dimensions are only 7 inches square. The coil to be tested is placed over an iron core, which projects through the top of the instrument, faults causing the pointer of an indicating meter inset on the sloping front of the set to change its normal deflection. Continuity tests may also be carried out by first connecting the leads together and then placing the coil parts on to the iron core when a big deflection will prove continuity of the windings, joints and leads. The sensitivity of the tester may be judged from the fact that noticeable movement of the meter needle is produced by one short-circuited turn of No. 40 gauge copper wire.

Fuse Box for Street Lighting

A weatherproof fuse box for street lighting, which has a rating of 15 A at 250 V, is announced by SIEMENS ELECTRIC LAMPS & SUPPLIES, LTD., 38, Upper Thames Street, London, E.C.4. The cast-iron case has fixing lugs for wall mounting, or pole straps can be fitted; alternatively the oval box can be placed inside a lamp standard. It will accommodate double-pole fuses of either the h.r.c. or rewirable types and a detachable plate or plumbing cable gland can be screened to the top or bottom.

Metalclad service switch-fuse boxes, double-pole as well as triple-pole and neutral models, are available with capacities of 5 to 80 A at 250 to 440 V with the usual interlocked door. They accommodate R-type cartridge fuses made by the English Electric Co. and have porcelain handles and bases with looping-in contacts. The sealing chamber for cables up to 0·06 sq. in. is detachable. Connection and extension chambers are also supplied to form, in association with watt-hour meters, house-service distribution assemblies for domestic premises.

Quality Control

THE symposium of papers on "Statistical Quality Control" (74 pages with diagrams and graphs) published by the Ministry of Production (district office: Waterloo House, Waterloo Street, Birmingham) is a reprint of six out of eight lectures delivered to engineers and industrialists last summer under the auspices of the Ministry's Birmingham District Production Committee with the co-operation of the Board of Education and the Birmingham Central Technical College. The lectures included a simple introduction to the theory of acceptance sampling and information about the practical aspects of initiating "SQ" control in a factory, together with an introduction to more advanced methods of analysing industrial information now available.

Treating High-speed Steel

Useful hints on the hardening and tempering of high-speed steel are given on a card available for all operators concerned with heat-treatment from the Controller of Jigs, Tools and Gauges, 35, Old Queen Street, London, S.W.1.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Siemens Bros. & Co., Ltd., record a net profit, after taxation, for 1944 amounting to £340,041, as compared with £314,452 in 1943. After paying a dividend of 7½ per cent. (same) £590,003 (£488,712) is carried forward. A statement by the chairman, Lord Queenborough, contains an account of the company's work in connection with the development of the "Hais" cable oil pipe line, of which Siemens Bros. produced 202 miles. In addition to this work the company has, on the telecommunication side, also delivered during the war telephone and telegraph carrier equipment and cable vastly in excess of what was needed during the campaign in North Africa, when a line 3,000 miles long was established by the Army between Tunis and Basra. In fact carrier equipment supplied is sufficient to provide speech channels representing approximately 850,000 circuit miles. For Army acoustic purposes over two million balanced armature insets and over two million transmitter insets have been delivered, as well as three million telephone relays and adaptations, including special units operating at a speed of 1/2,000th second. Predictors, radar equipment and dry cells (over 200 million units) were also produced in large quanties. In total length of core the cables supplied by the company for the Services would go round the equator some eighty times. Another order was for fourteen miles of submarine cable capable of carrying 5,100 A at 1,660 V.

After reviewing the balance sheet Lord Queenborough referred to the war record of the staff and mentioned that the Blackheath factory had been damaged in air raids on twenty-seven occasions.

Edmundsons Electricity Corporation, Ltd., held its annual meeting on June 8th. In the course of his speech Lord Royden (chairman) reviewed the accounts (see *Electrical Review*, June 1st, p. 808) and stressed the fact that the company's policy had been to avoid increasing prices if possible and in spite of a general increase in costs they had been able to follow that policy and even to reduce prices in some cases. While the amount paid out in taxation and rates had amounted to £1,863,334 in 1934, interest and dividends had totalled only £616,297.

Their organisation had been devoted to the co-ordination of financial and technical development of the operating companies. It was unfortunate that Lord Sankey's Committee dealing with the place and value of holding companies had had to suspend its inquiries, for they would welcome any opportunity of meeting any criticism that might be made.

Lord Royden said that progress during the war period had not been due to the prevailing conditions; indeed their growth had been retarded rather than improved by additional Government control and purely wartime consumption of electricity. The statement which he had presented refuted the contention of Mr. Herbert Morrison that the electricity supply industry was in a state of "chaos and muddle." The company had always been ready with a supply to meet every demand and had increased its generating capacity from 269,000 kW in 1938 to 586,000 kW in 1944. In this connection they claimed that the construction of their Llynfi station had created a record; only nineteen months elapsed between the cutting of the first sod and the commencement of commercial operation.

Describing the functions of the Central Electricity Board, Lord Royden said it was wrong to cite the Board as an example of what nationalisation or rationalisation could do. He claimed that the facts and figures which he had placed before the shareholders proved that profit-motive and free enterprise were not all evil and could be of greater value to consumers than any State-created so-called non-profit-bearing organisation.

After mentioning the group's plans for the expenditure of £17,000,000 in the first five years after labour and material became available, Lord Royden said that although they urged a certain measure of evolutionary change they did not think that the consumers were interested in having political theories tried out on them.

The London Electric Wire Co. & Smiths, Ltd.—Speaking at the annual general meeting on Friday Mr. W. J. Terry, chairman and managing director, said that rearrangement of plant, which would be undertaken as soon as circumstances permitted, was the only change-over necessary to provide for peacetime activities. During the war many millions of miles of wires had been produced for use in aircraft, anti-aircraft defence, communications, etc. Large quantities of degaussing strips, shell bands, cadmium-copper line wires, earth rods, flexible tubing, special wires for the heating of airmen's clothing and many other products were supplied to the Services. The company also took a leading part in encouraging in this country the manufacture of diamond dies indispensable for making the fine wires required for instruments, valves, radiolocation, etc.

The Plessey Co., Ltd., records a trading profit for the year ended June 30th last amounting to £299,336 (£276,816), plus dividends from subsidiaries £9,616 (nil) and interest on securities, making a total of £321,028 (£286,148). Two interim dividends of 10 per cent. have again been paid during the year but no final distribution is proposed. The carry-forward is £32,297. It is proposed to increase the company's borrowing powers from £250,000 to £500,000.

Antrim Electric Supply Co., Ltd.—At the annual meeting on June 6th the chairman (Mr. R. P. Beddow) said that the company's gross revenue had increased from £77,000 in 1939 to over £236,000 in 1944 and the sales of electricity from 8,600,000 to 31,700,000 kWh, in spite of the restrictions upon domestic consumption. The company was now taking its bulk supply from the Ballylumford station, but there had been no reduction in the price which was much higher than the Electricity Board for Northern Ireland was paying for its

bulk supplies. At present the earliest date for the purchase of the Antrim companies' undertakings was 1974 but under a recent development scheme the Electricity Board would be empowered to acquire the undertakings. It was their view that the Electricity Act of 1931, under which the scheme was made, was not intended to apply to statutory undertakings such as theirs and strong representations had been made against the confirmation of the scheme.

The Lothians Electric Power Co. records net revenue for 1944 totalling £110,957, plus interest £1,672. Taxation takes £69,500 and apparatus on hire written off £615. With £19,076 brought in there is £61,590 available. Reserve account receives £26,075 and a dividend of 6 per cent. is again paid. A sum of £20,215 is carried forward. Since 1939 the number of consumers has increased by 1,631 to 15,653 and the load connected by 8,809 kW to 42,981 kW.

The B.E.T. Electricity Supply Co., Ltd. (controlled by the British Electric Traction, Co. Ltd.) reports that dividends, interest, etc., for the year ended March 31st last amounted to £79,456 (£79,339). The net profit was £32,425 (£31,379). A sum of £12,000 (£12,457) goes to reserve and the dividend is maintained at 5 per cent., £31,889 (£30,189) being carried forward.

Weston-super-Mare & District Electric Supply Co., Ltd., a subsidiary of B.E.T. Electricity Supply Co., Ltd., reports a net revenue for 1944 of £64,704 (£57,168). A final dividend of 5 per cent. is to be paid, making 8 per cent., tax free, and £9,000 is again placed to reserve, leaving £3,951 (£4,064) to be carried forward.

The Merthyr Electric Traction & Light Co., Ltd., which is controlled by B.E.T. Electricity Supply Co., Ltd., reports a revenue for 1944 of £42,329 (£39,089). The net profit was £9,716 (£10,256). After allocating £7,000 (same) to general reserve and paying an ordinary dividend of 6 per cent. (same) £5,142 (£5,126) is carried forward.

The Ascot District Gas & Electricity Co. records a revenue for 1944 of £64,931. A final ordinary dividend of 3½ per cent. is to be paid, making 6 per cent., and £22,997 is carried forward.

The Bridgwater & District Electric Supply & Traction Co., Ltd., is maintaining its dividend at 6 per cent. The trading balance for 1944 was £28,256, as against £30,138 for 1943.

The East African Power & Lighting Co., Ltd.—The 357,083 new £1 ordinary shares to be issued will be offered at 29s. each in the proportion of one for every preference or ordinary share held.

The Electric & General Investment Co., Ltd., reports a net profit for the year ended May 31st amounting to £3,684, as compared with £3,299 in the previous year. A final dividend of 7 per cent. is to be paid, making 10 per cent. (same).

Franco Signs, Ltd., are maintaining their dividend at 10 per cent. The net trading profit of operating subsidiary companies for the year ended September 30th, after taxation, was £30,970 (£28,577).

The Great Northern Telegraph Co., Ltd. (of Denmark) held its ordinary general meeting in Copenhagen on May 31st. The chairman stated that as the accounts closed before the liberation of Denmark they were of necessity incomplete. It had therefore been decided to convene an extraordinary general meeting to which more comprehensive accounts and the question of payment of dividend would be submitted.

Cable & Wireless (Holding), Ltd., are to pay a dividend of 4 per cent., less tax at 9s. 2d. (same). The net profit for 1944 was £1,199,079 £1,220,976).

Cable & Wireless, Ltd. (the operating company) are paying a final dividend of 2½ per cent. less tax at 8s. 11d., making a total distribution of 4 per cent. (same). The net profit was £1,237,757 (£1,228,892).

Marconi's Wireless Telegraph Co., Ltd., which is controlled by Cable & Wireless, Ltd., proposes to pay a final dividend of 3½ per cent., less tax at 9s. 9d., again making 7 per cent. for the year. After provision for taxation the net profit is £210,381 (£244,829).

The National Electric Construction Co., Ltd., reports a net profit for 1944 amounting to £25,500 (£24,246), after providing £27,500 (£26,500) for taxation. The dividend is maintained at 10 per cent.

Keith Blackman, Ltd., are to pay a dividend of 20 per cent. (same). The profit for the year ended March 31st last amounted to £135,684, as compared with £192,451 in the previous year. The carry-forward is £45,181 (£43,497).

The Skefko Ball Bearing Co., Ltd., reports a net profit of £180,594 (£178,082). A final dividend of 10 5/6 per cent. tax free, again brings the total distribution for the year to 17½ per cent., tax free.

Johnson Matthey & Co., Ltd., are to pay a final dividend of 3 per cent. (same) plus a cash bonus of 6 per cent. (4 per cent.), making 12 per cent. (10 per cent.) for the year.

Thomas De La Rue & Co., Ltd., are to pay a final dividend of 30 per cent., again making 40 per cent. for the year.

Dictograph Telephones, Ltd., are again paying an interim dividend of 4 per cent.

Enfield Rolling Mills, Ltd., are again paying a dividend of 5 per cent.

International Combustion Ltd., is paying an interim dividend of 5 per cent. (same).

New Companies

British Insulated Callender's Cables, Ltd.—Public company. Registered May 31st. Capital, £100. Objects: To acquire for the purposes of amalgamation all or part of the assets, liabilities and undertakings of British Insulated Cables, Ltd., Callender's Cable & Construction Co., Ltd., and Callender's Trust, Ltd.; to adopt agreements with the three above-named companies and the liquidators thereof; and to carry on the business of manufacturers of, and dealers in, insulated cables and wires, including paper, rubber and silk insulated cables, oil and gas pressure cables, telecommunication cables, accessories and fittings, wireless equipment, etc. Directors: Sir Alexander Roger (director, Telephone & General Trust, Ltd.); T. H. Martin-Harvey (director, St. Helens Cable & Rubber Co., Ltd.); C. Pipkin (director, Anchor

Cable Co., Ltd.); D. W. Aldridge; W. G. Hendry; P. V. Hunter; W. H. McFadzean; Sir Eugene Ramsden, M.P. (director, A. & S. Henry, Ltd.); and F. Waine (director, Radio-Gramophone Development Co., Ltd.). Remuneration of directors, £2,000 each per annum. The chairman and deputy chairman are to be entitled to such additional remuneration as may be voted to them by the directors, not exceeding in the aggregate £12,000 per annum. Registered office: 103, Mount Street, W.1.

G. M. Engineering (Acton), Ltd.—Private company. Registered June 2nd. Capital, £50,000. Objects: To carry on the business of manufacturers of, and dealers in, switchboards, switchgear, dynamos, motors, batteries, tram-cars, electric vehicles, etc. Directors: P. V. W. Gell, Neachley Hall, near Shifnal; R. H. M. Drake, West Riddens, Ansty, Cuckfield; P. A. Smith, Morolin, Lower Hampton Road, Sunbury-on-Thames; and W. W. Parker, Riddens Cottage, Ansty, Cuckfield. Secretary: W. W. Parker. Registered office: Standard Road, Park Royal Road, N.W.10.

Farrant (Electrical Fittings), Ltd.—Private company. Registered May 26th. Capital, £500. Objects: To carry on the business of manufacturers of, and dealers in, electric lamps, apparatus and fittings, radio apparatus, etc. First directors: E. R. Farrant and Effie W. Farrant, both of 142, High Street, Bushey. Registered office: 142, High Street, Bushey.

Davidsons A.C.D.C. Co., Ltd.—Private company. Registered May 30th. Capital, £1,000. Objects: To carry on the business of manufacturers of, and dealers in, electrical and other domestic appliances, etc. Directors: E. Davidson, 89, Gladstone Street, Mansfield, and A. Davidson, 5, Grove Street, Mansfield. Registered office: Waverley House, 37, West Gate, Mansfield, Notts.

Cabath Electrical, Ltd.—Private company. Registered May 26th. Capital, £500. Objects: To carry on the business of manufacturers of and dealers in electrical, gas, oil and quartz lamps, reflectors, bells, fires, cookers, refrigerators, and electrical and gas plant and accessories, neon and other signs, gramophones, wireless apparatus, etc. Directors: R. J. Gathercole, 23, Gladeside, Shirley, Croydon, and Valerie E. Scott, 126, Long Lane, Croydon. Registered office: Scarbrook Chambers, 56, High Street, Croydon, Surrey.

Company to be Struck off Register

The following company is to be struck off the Register within three months from May 25th, unless cause is shown to the contrary: Cheshire Cables, Ltd.

Companies' Returns

Statements of Capital

Thornbury & District Electricity Co., Ltd.—Capital, £15,000 in £1 shares. Return dated December 28th. 12,404 shares taken up. £8,004 paid. £4,400 considered as paid. Mortgages and charges: Nil.

Northampton Electric Light & Power Co., Ltd.—Capital, £1,000,000 in 925,000 ordinary stock and shares of £1 each and 75,000 preference stock and shares of £1 each. Return dated April 3rd. 870,000 ordinary and 52,500 preference shares taken up. £922,500 paid. (All issued shares are fully paid and have been converted into stock.) Mortgages and charges: £600,000.

Elexcel, Ltd.—Capital, £250,000 in 125,000 cumulative preference and 125,000 ordinary shares of £1 each. Return dated April 18th. 125,000 shares taken up. £2 paid. £124,998 considered as paid. Mortgages and charges: Nil.

Mortgages and Charges

Page & Miles, Ltd.—Mortgage on 60, Western Road, and 43, Castle Street, Brighton, dated May 17th, to secure all moneys due or to become due from the company to Barclays Bank, Ltd.

L. J. Ive, Ltd.—Mortgage on 179, 179a and 179b, Queen's Road, Watford, dated May 7th, to secure £2,250 and further advances. Holders: Halifax Building Society.

Winding-up Petition

B. & B. Batteries, Ltd.—A petition for the winding-up of the company will be heard at the Royal Courts of Justice, Strand, London, on June 18th.

Liquidations

Reliance Lift & Engineering Co., Ltd.—Meetings July 2nd, at the office of J. R. Phillips & Co., Lloyds Bank Chambers, Hustlergate, Bradford, to receive an account of the winding-up by the liquidators, Messrs. W. Raynor and S. W. Grayston.

Bankruptcies

P. S. Kennedy, electrical engineer (trading as Martin & Company), 102, High Street, Stoke Newington, London.—This debtor, who filed his own petition in 1923, applied for his discharge at the London Bankruptcy Court on June 7th. The discharge was granted, subject to a suspension of fourteen days.

S. W. Bridges, radio and electrical dealer, 37, Melgund Road, Highbury, N.5, lately carrying on business as British & American Radio Service Co., 10 & 11, Field Place, St. John Street, Clerkenwell, E.C.1, and 219, Pentonville Road, N.1.—Application for discharge was made at the London Bankruptcy Court on June 7th and was granted, subject to six months' suspension.

W. Sumner and **E. Sumner**, electrical and mechanical engineers, trading as "W. & E. Sumner," 65, Victoria Street, and 108, St. Mary's Road, Garston, Liverpool, and 9, Grange Road, West Kirby.—Proofs for dividends by June 22nd to the trustee, Mr. A. Barrett, Hunter Street (Friends' Meeting House), Liverpool, 3.

W. Sumner and **E. Sumner** (separate estate of W. Sumner).—First and final dividend of 20s. in the £ payable June 14th at the Official Receiver's office, Hunter Street, Liverpool, 3.

W. B. Ralphs, electrical contractor, lately carrying on business at 2, Mulgrave Road, Middlesbrough.—Day appointed for proceeding with the public examination adjourned *sine die*.

STOCKS AND SHARES

TUESDAY EVENING.

STOCK EXCHANGE prices were sharply depressed by the speech made by Mr. Attlee, leader of the Opposition, in the series of political broadcasts last week. The speech dealt with a wide range of subjects. From the Stock Exchange point of view, that which referred to proposed nationalisation of industries was the most interesting in relation to the probable effect it would have upon security values. Falls occurred throughout the industrial section, but prices of gilt-edged securities, more especially in the British Government group, were upheld by the announcement of a new issue of 2½ per cent. National War Bonds on terms which made the currently-quoted issues look cheap by comparison. After the fall, a fairly general rally occurred, though this failed to wipe out entirely the previous loss. Something of a feature has been a violent recovery in the prices of Brazilian Tractions and other dollar stocks.

Home Electricity Supply

The speech has had no effect upon prices of shares in the electricity supply market. On balance, the week's movements are rather against holders, but the actual fall occurred a fortnight ago, when the majority of prices in this department lost amounts ranging from 6d. to 3s. Accordingly, as no appreciable amount of selling followed upon the declaration of Mr. Attlee, quotations were left almost unchanged. Electrical Finance & Securities are better at 62s. 6d., and London Electrics at 31s. 6d. have gained the 6d. Lower prices are quoted for Metropolitans, 42s., Llanelly 29s., British Power & Light 31s., and a few others.

Cable & Wireless

Cable & Wireless ordinary stock, which fell 12 points last week, to 87, recovered a point or two and maintained a steady tone at 88½ when the dividend was announced at the expected rate of 4 per cent. for the year 1944. The profit is down £21,900, but there is plenty of margin for payment of the dividend. This being distributed once a year, the net payment is 2 per cent., and at 86½ ex the dividend, the yield comes to £4 12s. 6d., which may be considered a reasonable return under present conditions. Marconi's Wireless Telegraph Co. again pays 7 per cent. for the year and in this case the profit of £210,400 is about £34,000 lower than that of 1943. Marconi Marines are better at 35s. 6d.

Home Rails and Others

Home Railway stocks attract no great degree of public attention; prices remain steady, with little variation from day to day. British Electric Traction deferred is 40 points up, at 1205, after its fall of 50 a fortnight ago. Thomas Tilling ordinary at 58s. have regained 1s. of the previous fall of 4s. West Ridings gave way to 48s. Calcutta Trams hold their recovery to 72s. 6d., some 11s. above their recent lowest, and Cawnpore Electrics keep good at 51s. In the communication group, Canadian Marconi retain all their popularity with the buyers from overseas, whose demand has raised the shares to 19s., more than double the price ruling at the beginning of this year.

Price Fluctuations

British Insulated at 6¼ and Callender's Cable at 6 7/16 are respectively ⅛ and 3/16 better upon publication of the full terms of the proposed merger. Automatic Telephones, with a rise to 68s. 6d., have recovered most of the previous loss. Hopkinsons, the increased dividend tardily making its effect felt, are 3s. 9d. better at 83s. 9d. Metal Industries "B" have advanced 6d. to 48s. after their decline to 45s. The dividend has been deducted from Henley's and the price is better at 27s. 9d. General Electrics hardened 1s. to 95s. 6d., Aron Electrics to 63s., Vactrics to 23s. 6d. Other rises include Newman Industries 8s., Crabtree 43s., and Babcock & Wilcox 2s. 3d. higher at 55s. 3d. Murex are 1/16 up at 96s. 3d. J. & F. Stone improved to 11s. 6d. Not all the changes are upward. Electric Constructions are easier at £3. Enfield Cables at 63s. 9d., Ericssons at 54s., and British Thermostat at 19s. 3d. ex dividend, show small losses.

Siemens shares at 35s., ex 9d. net dividend, have recovered to a great extent from their recent dullness. The profits are augmented by £30,000 from taxation reserves that are not now required, and show an improvement of £78,500 as results of trading.

After their drop to 9s. 3d., Brush Electrical ordinary shares recovered to 10s., at which latter price a good many shares changed hands.

Radio Shares

Radio activity continues to be a mild feature of the miscellaneous market. Cossors are for the moment the liveliest in the group. From 33s. the price rose rapidly to 36s., to react a few pence. Philco are firm at 14s. 6d. E.M.I. kept close to 34s. 6d. The effect of the Treasury's partial relaxation of the war ban placed upon new issues is thought likely to become manifest before long in this section.

De la Rue

De la Rue shares rose 11s. 3d. to 10⅞ upon declaration of the 30 per cent. dividend, making 40 per cent. for the year, out of profits showing that the company could have paid twice as much by dividing up to the hilt. The results are better than those of a year ago, and after a fall to 10, the price is now within 12s. 6d. of the highest that it touched a couple of months ago. The yield at the current price is a modest £3 16s. per cent. The company, however, has interests in plastics, and these, with its own branches of industry, are considered sufficiently promising to justify the present quotation.

Advertising in Export Markets

The Manufacturer's Responsibility

By "Sala"

OPINIONS seem to differ whether it is advisable for the advertising programme for their export markets to be carried out by manufacturers, or if it is best left to agents. The securing and maintaining of export trade should be looked upon by the manufacturer as an expansion of his regular trade, and as such, the control of advertising should be in his own hands to adapt and regulate so as to ensure that his advertising appeals are reaching the right people in a favourable manner. By all means let him co-operate to the full in obtaining advice and suggestions from his agent—a man who is a native of the country in which he is representing the manufacturer and can suggest and recommend suitable advertising media which will give the manufacturer best returns for his expenditure.

The Agent's Position

The manufacturer can never hope for successful or lasting results if he simply leaves the question of advertising to the agent. More often than not the agent holds the agencies for other related products and he cannot be expected to have quite the maximum amount of enthusiasm for one particular line when he is handling a number of others too. Moreover, if some of the related lines are more expensive items bringing him in a better margin of profit, he will naturally concentrate most on them. This policy is admittedly shortsighted but, nevertheless, it does often arise.

Excellent advertising efforts have been made by many agents by spreading the cost of advertising over all the products for which they hold agencies, each advertisement combining a display or a mention of the principal products and the local depots through which they are obtainable. These efforts, however, cannot be expected to give the maximum advertising display to the product of any one manufacturer. If the agent takes on himself the responsibility of advertising and adds this cost to the selling price, then the manufacturer has no cause to complain that the advertising is inadequate or that such advertising costs when added to the selling price by the agent are putting the price out of reach of full development, or are making the price uncompetitive.

When a manufacturer markets a new product at home and wishes to establish it in the shortest possible time he finds it absolutely necessary to advertise it adequately, and this also applies to overseas business. He has to educate prospective buyers to the uses and advantages of his product and if his scheme of education is to be complete he must ensure that he reaches *all* prospective buyers. In addition, he must ensure that they are told where supplies of his product are available.

With some idea of what total volume of business he looks for from an overseas market he will decide on the total amount of advertising expenditure which he can afford to endeavour to secure that volume. Possibly, quite probably, it is a sum out of all proportion to his initial returns. Nevertheless, he has the sole control of it to adapt as he may, to reorganise it if necessary and to ensure that he gets adequate coverage and full value for money expended. In short, he takes over all responsibility for introducing and popularising his product, as he rightly should, and leaves the agent free to carry out his main function of distribution and meeting the demands which have been created for the product. Whatever other duties, such as personal contacts, the agent carries out he will do to assist the manufacturer's scheme of introduction in which he is just as much interested as is the manufacturer. With a reasonable percentage to cover handling, selling and distribution expenses and profit the agent should stand a fair chance of securing a proper share of the market for the manufacturer if his (the agent's) price is right.

Reasons for Failure

With full control over advertising the manufacturer will expect his product to secure a fair share of the market if it meets all the necessary requirements and fully justifies its price (unless a planned, destructive price competition is in being). The failure on the part of an agent with an adequate selling and distributive organisation to achieve this aim can be attributed to one of three things:—(1) The agent's selling price may be too high; which may be due to (2) the manufacturer's price being too high; or (3) the manufacturer may have mishandled his scheme of educating the prospective user to the quality advantages of his product to justify its present price. In practice, point (3) should never arise if the manufacturer has handled his advertising in the right way. It plainly proves, however, the absolute necessity for him to take on his own shoulders the responsibility of introducing and popularising his product with the assistance and guidance of the agent. If the manufacturer, with such a wide knowledge of his own product, its uses, its advantages, its technical points, cannot succeed in creating the market, the agent alone cannot be expected to do so.

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.

AIRCRAFT-MARINE PRODUCTS, INC.—"Electrical connectors." 17961/42. December 3rd, 1941. (569366.)

Akt. Ges. Brown, Boveri & Cie.—"Slag removing device for pressure fired furnaces." 16885/43. November 19th, 1942. (569449.)

Aktiebolaget Elektrolux.—"Suspensible refrigerator cabinets." 15115/43. September 29th, 1942. (569442.)

Automatic Telephone & Electric Co., Ltd., R. Taylor and G. T. Baker.—"Electrical signalling systems." 19426. November 20th, 1943. (569487.)

H. E. Blackiston.—"Terminal apparatus for domestic and other electric and gas supply." 9431. June 11th, 1943. (569396.)

British Thomson-Houston Co., Ltd., and J. H. Walker.—"Variable-speed dynamo-electric couplings." 8990. June 4th, 1943. (569391.)

Brush Development Co.—"Protective means for piezo-electric units and methods of producing same." 3009/42. March 8th, 1941. (569493.) "Piezo-electric transducers." 10376/43. June 27th, 1942. (569510.)

Crompton Parkinson, Ltd., and A. W. Angold.—"Prepayment mechanism for meters and the like." 5324. April 2nd, 1943. (569501.)

Electric Furnace Co., Ltd., and S. G. King.—"Electrical controlling apparatus employing a grid-controlled gas-filled electronic relay." 10409. June 28th, 1943. (569551.)

Ford Motor Co., Ltd.—"Electric welding apparatus." 14051/43. September 12th, 1942. (569437.)

H. Gallusser.—"Electrically heated drum furnaces." 9195/43. June 27th, 1942. (569393.)

J. C. A. Gray and S. Stansfield.—"Electrical joint boxes and glands for switchgear, service boxes and other electrical apparatus." Cognate applications. 9961/43 and 16881/43. June 21st, 1943. (569480.)

G. Haim and H. P. Zade.—"Terminal joints for electric cable with plastic sheath." 10006. June 21st, 1943. (569481.)

T. Hindle.—"Electric baling presses." 19715/43. January 25th, 1944. (569516.)

N. E. A. Kleen.—"Absorption or adsorption refrigeration." 8237/43. June 6th, 1942. (569418.)

Linde Air Products Co.—"Electric welding apparatus." 20804/43. December 18th, 1942. (569456.)

Marconi's Wireless Telegraph Co., Ltd.—"Television transmitting tubes." 13613/43. August 21st, 1942. (569436.)

Marconi's Wireless Telegraph Co., Ltd., and S. B. Smith.—"Equi-signal radio direction-finder systems." 17162. December 2nd, 1940. (569435.)

Metal & Thermit Corporation.—"Process of tin electroplating." 16649/43. March 19th, 1943. (569447.)

Okonite-Callender Cable Co., Inc.—"Pot-heads or terminals for electric cables." 7843/43. July 3rd, 1942. (569387.)

Philips Lamps, Ltd., and A. Nemet.—"X-ray control apparatus." 13553. August 19th, 1943. (569484.)

Philips Lamps, Ltd., and C. L. Richards.—"Tuning arrangements for wireless receivers and the like." 17124. October 18th, 1943. (569451.)

Standard Telephones & Cables, Ltd.—"Radio beacons for defining landing paths for aircraft." 2591/42. March 6th, 1941. (569406.) "Piezo-electric crystal mounting." 20506/43. October 7th, 1942. (569454.) "Selenium coated elements and method of making them." 16824/42. July 12th, 1941. (569473.) "Vacuum tube oscillators." 19765/43. November 30th, 1942. (569517.)

Standard Telephones & Cables, Ltd., M. M. Levy and T. W. Elliott.—"Arrangements for generating and observing electric pulses." 1536. January 29th, 1943. (569474.)

Standard Telephones & Cables, Ltd., A. A. New and E. L. Bodycombe.—"Formation of adherent silver films on non-metallic surfaces." 7941. May 19th, 1943. (569388.)

Sulzer Frères Soc. Anon.—"Gas turbine plants." 6036/43. April 18th, 1942. (569379.)

L. Tordai.—"Construction of dry-cell batteries." Cognate applications. 10050/43 and 14190/43. June 22nd, 1943. (569482.)

United Air Lines Transport Corporation.—"Radio receivers." 7123/43. June 22nd, 1942. (569417.)

Westinghouse Electric International Co.—"Electron-discharge devices." 11271/42. August 13th, 1941. (569494.)

TRADE MARKS

RECENT applications for trade marks include the following, objections against which may be entered within a month from June 6th:—

EASCO ELECTRICAL (design).—No. 630,417, Class 9. Signalling lamps; telephonic apparatus; rectifiers and transformers; appliances for charging batteries; and parts of the aforesaid goods included in Class 9, but not including electric batteries. Also No. 630,418, Class 11. Portable electric lamps, and parts thereof not included in other classes. EASCO.—No. 630,419, Class 9. Signalling lamps; telephonic apparatus; rectifiers and transformers; appliances for charging batteries; batteries; and parts of the aforesaid goods included in Class 9. Also No. 630,420, Class 11.—Portable electric lamps and parts thereof not included in other classes. RECTOSTAT.—No. 632,819, Class 9. Electric battery chargers and rectifiers therefor.—Eric Lewis Eastell and Margery May Eastell, trading as Easco Electrical, 6 & 8, Brighton Terrace, London, S.W.9.

OCTOPUS.—No. 633,114, Class 9. Wiring installations incorporating a central junction or terminal box for carrying electric current from the main supply.—A. W. M. Hartley, trading as Hartley & Co., 132, Frankwell, Shrewsbury.

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.

Burnley.—June 30th. Electricity Department. Supply and delivery of transformers and e.h.v. cables. (June 8th.)

Gellygaer.—June 30th. U.D.C. Electricity Department. House service units. (June 1st.)

Hazel Grove and Bramhall.—June 30th. Electricity Department. Three 250-kVA transformers. (See this issue.)

Hull.—July 13th. Electricity Department. Pumps. (See this issue.)

Littleborough.—June 19th. Electricity Department. 11-kV feeder cables. June 1st.)

Maesteg.—June 21st. Electricity Department. Two l.v. feeder cables. (See this issue.)

Whittingham (near Preston).—June 27th. Committee of Visitors, Mental Hospital. Wiring of farms and buildings. (See this issue.)

Orders Placed

Blackburn.—Town Council. Accepted. Five refrigerators for Queen's Park Hospital.—Geo. Greenwood.

Bolton.—Electricity Committee. Accepted for extensions at power station. Reinforced concrete cooling tower.—Bierrum & Partners. Builders' work for new switchgear premises, etc.—Wm. Gornall & Sons. Steelwork.—R. Watson & Co.

Cardiff.—Electricity Committee. Accepted. Two switchgear units (£1,276).—Allen West & Co. Infra-red lamp heating plant (£98).—General Electric Co. Repairing 1,000-Ah battery (£504).—Tudor Accumulator Co. Twelve and twenty cwt. lifts at boiler house (£4,500).—Express Lift Co.

Glasgow.—Corporation Cleansing Special Sub-committee. Accepted. 34 traction batteries (£422).—Tudor Accumulator Co.

Manchester.—Public Health Committee. Accepted. Platform type goods truck for Withington Hospital.—Electricars.

Morecambe. — Electricity Committee. Accepted. Cable for twelve months.—W. T. Glover & 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.

Aylesbury.—Houses (26) and bungalows (12), for R.D.C.; surveyor, Council Offices, Buckingham Street.

Birkenhead.—Houses (50), Council estates; borough engineer.

Children's hospital, Wexford Road, for T.C.; town clerk, Town Hall.

Birmingham.—Improvements, Canwell Hall Hospital (£13,140); and nurses' accommodation, Yardley sanatorium (£17,837) and at West Heath (£9,960); city engineer.

Buildings, central depot site (£50,000); Alfred Hughes & Sons, Ltd.

Blackburn.—Extensions, Technical College; borough engineer, Town Hall.

Bognor Regis.—Junior technical school for building (£5,780), for West Sussex C.C.; county architect, Chichester.

Bolton.—Works additions, School Hill; J. C. Birch, Ltd.

Works additions, Weston Street; Bolton Leathers, Ltd.

Houses (52), Cameron estate; housing director.

Bournemouth.—Memorial homes for disabled soldiers (£50,000); borough engineer.

Croydon.—Extensions (£8,600), New Addington School; town clerk.

Dudley.—Workshops, Ivanhoe Street; Willmot Trucks, Ltd.

Goole.—Extensions (£6,000), Borough Library; borough surveyor.

Haslemere.—Council offices and civic centre; U.D.C. surveyor, Museum Hill.

Hastings.—Renewal of electric lighting installation at municipal hospital (£1,300), for Corporation Health Committee.

Hyde.—Works additions, Randall Street; Bennett's (Hyde), Ltd., paper size makers, Boston Mills.

Leeds.—Houses (226); city engineer.

Lincoln.—Boys' secondary school; Boultham Park Road, and reconstruction of Friars' Lane School; R.C. authorities.

London.—ST. PANCRAS.—Flats (176), various sites; borough engineer.

Flats, Hampshire Street, etc. (41) and Oakley Street area (100); A. J. Thomas, architect.

KING'S CROSS. — Reconstruction, railway station; L.N.E.R.

Perth.—Houses (32); burgh surveyor, 16, Tay Street.

Sheffield. — Rebuilding houses, Shirecliffe (£13,104); Melling Bros., Ltd.

Smethwick.—Works additions, Ballot Street; Idoson Motor Cylinder Co., Ltd.

South Shields.—Permanent houses (50); acting borough engineer.

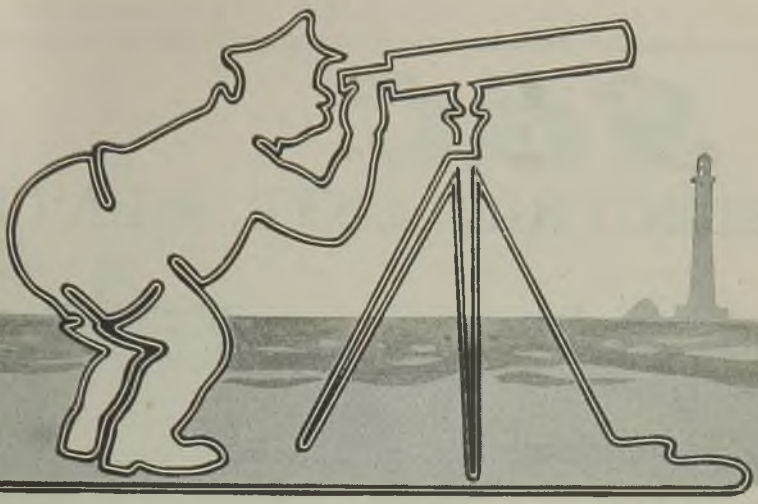
Office additions for the Northern Press, Ltd.; F. W. Newby, architect, King Street, South Shields.

Factory, Pilot Street for Shaffer Aircraft, Ltd.; P. L. Browne, Son & Harding, architects, Pearl Buildings, Newcastle-on-Tyne.

Sunderland.—Houses (800); borough engineer.

Wallsend.—Alterations at Town Hall and houses (20), Westmoreland Estate; borough engineer.

York.—Houses (100), Acomb estates; city engineer.



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.

OFFICIAL NOTICES, TENDERS, ETC.

HAZEL GROVE AND BRAMHALL URBAN DISTRICT COUNCIL

Electricity Department

Contract No. S.G. 11

TENDERS are invited for the supply and delivery of THREE 250-kVA TRANSFORMERS fitted with externally operated off-load tap changing gear.

Copies of the specification may be obtained from the Chief Electrical Engineer and Manager, Electricity Offices, Chapel Street, Hazel Grove, Cheshire, on payment of a deposit of £1 1s., which amount will be refunded on receipt of a bona-fide tender.

Duplicate copies of the specification may be obtained on payment of the sum of 10s. 6d., which sum is not returnable.

Tenders, enclosed in plain sealed envelopes endorsed "Contract No. S.G. 11," should be addressed to the undersigned and be received not later than 12 noon on Saturday, 30th June, 1945.

The Council do not bind themselves to accept the lowest or any tender.

F. E. CAPPER,
Clerk of the Council.

The Council House,
Hazel Grove, Cheshire.
6th June, 1945. 2137

MAESTEG URBAN DISTRICT COUNCIL

Electricity Department

TENDERS are invited for the supply, laying and jointing of Two L.T. Feeder Cables. Copies of the specification, form of tender and conditions of contract may be obtained upon application to the Electrical Engineer and Manager, Electricity Department, 35, Commercial Street, Maesteg, Glam.

Tenders, to be sealed and endorsed "Tender for L.T. Feeders," must be delivered to the undersigned not later than Thursday, 21st June, 1945. Envelopes must not bear any name or mark indicating the sender.

The lowest or any tender will not necessarily be accepted.

A. KING-DAVIES,
Clerk of the Council.

Lloyds Bank Chambers,
Talbot Street, Maesteg, Glam. 2117

WHITTINGHAM MENTAL HOSPITAL

THE Committee of Visitors of the Whittingham Mental Hospital, near Preston, Lancashire, invites tenders for the Electrical Wiring of certain Farms and Buildings situate in or near Haighton Green Lane, which premises may be visited by arrangement. Form of tender, specification and conditions of contract may be obtained on application to the undersigned. Tenders should be returned, addressed to "The Chairman of the Visiting Committee" at the Hospital, endorsed "Tender for Electrical Wiring," not later than Wednesday, the 27th instant.

The Committee does not bind itself to accept the lowest or any tender.

W. A. HIGGS, Clerk and Steward.

4th June, 1945. 2160

CITY AND COUNTY OF KINGSTON-UPON-HULL

TENDERS are invited by the Electricity Department for the supply and erection of two 1½ million gallons per hour vertical spindle Electric Motor-driven Pumps, with usual controls, to work against a head of approximately 55 ft. Tender forms may be obtained from General Manager, Ferensway, Kingston-upon-Hull, upon payment of £1 deposit (returnable on receipt of bona-fide tender). Copies 10s. each (not returnable). Tenders to be submitted by 13th July, 1945, in accordance with instructions on form of tender. 2159

SITUATIONS VACANT

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

BATTERSEA BOROUGH COUNCIL

General Manager and Engineer, Electricity Undertaking

THE Council invite applications for the appointment of General Manager and Engineer of their Electricity Undertaking from applicants who are Corporate Members of the Institution of Electrical Engineers and experienced in the management and administration of an Electricity Undertaking. The Council operate a "Selected Station" of a present capacity of 50,000 kW. The salary will be in accordance with the Agreement made by the National Joint Committee of Local Authorities and Chief Electrical Engineers, dated 9th July, 1941, at present approximately £1,675 per annum. Full salary will be paid from commencement of service.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937.

Applications must be made on a form which contains full particulars to be obtained from me, and which must reach me not later than 10 a.m. on Thursday, 28th June, 1945.

Canvassing directly or indirectly will be a disqualification.

R. G. BERRY,
Town Clerk.

Town Hall,
Lavender Hill, Battersea, S.W.11.
31st May, 1945. 2116

THE GALLOWAY WATER POWER COMPANY

Shift Charge Engineer

APPLICATIONS are invited for a permanent appointment as Shift Charge Engineer at Kendoon Power Station.

Salary and conditions in accordance with N.J.B. Agreement, Class C, Grade 8 (commencing salary £329 per annum). Hydro-electric experience not essential, but Shift Charge experience with Grid operation desirable.

No application considered unless definite prospects of early release. The Ministry of Labour and National Service have given permission under the Control of Engagement Order, 1945, for the advertising of this vacancy.

Applications, with full particulars, copies of testimonials, to The Manager, Tongland Power Station, Kirkcudbright. 2129

LEYTON BOROUGH COUNCIL

Chief Demonstrator

APPLICATIONS are invited for the position of Chief Demonstrator (female) in the Council's Electricity Undertaking.

Candidates must have a good general education, hold a Diploma in Cooking and/or Electrical Housecraft, and have a thorough knowledge of electrical domestic appliances. They must be competent to conduct lecture-demonstrations and advise consumers on the selection and use of electrical apparatus.

The salary is £250 per annum, rising by annual increments of £15 to a maximum of £300 per annum, plus war bonus, at present £48 5s. per annum.

The successful candidate will be required to pass a medical examination by the Council's Medical Officer of Health, and the appointment will be subject to the provisions of the Local Government Superannuation Act, 1937.

Applications, in the candidate's own handwriting, stating age, qualifications, experience, position with regard to National Service, and when able to take up duties, accompanied by copies of two recent testimonials, to be sent to the Borough Electrical Engineer and Manager, Electricity Offices, Cathall Road, Leytonstone, E.11, not later than first post Friday, 6th July, 1945.

Canvassing in any form will be a disqualification.

D. J. OSBORNE,
Town Clerk.

Town Hall,
Leyton, E.10. 2119

MALVERN URBAN DISTRICT COUNCIL

Appointment of Chief Electrical Engineer

APPLICATIONS are invited for the appointment of Chief Electrical Engineer, at a salary in accordance with the Agreement made by the National Joint Committee of Local Authorities and Chief Electrical Engineers, which on the present assessment of the Undertaking, is £765 per annum after two years' service. For the first year of service, the salary will be 85% of that figure and for the second year 92½%.

Applicants should have experience of Generation, E.H.T. and L.T. Distribution, design and execution of all development works, sales organisation, and of the general administration and control of an Electricity Supply Undertaking.

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

Applications, stating age, qualifications and experience, together with information as to position in relation to National Service Acts and Essential Work Orders, and earliest date applicant could commence duty if appointed, accompanied by copies of not more than three testimonials, must be delivered to the undersigned not later than Friday, the 29th June, 1945.

J. BULMAN,
Clerk of the Council.

The Council House,
Malvern.
8th June, 1945. 2154

BOROUGH OF BACUP

Appointment of Borough Electrical Engineer

APPLICATIONS are invited for the appointment of BOROUGH ELECTRICAL ENGINEER at a salary of £600 per annum rising by annual increments of £25 to a maximum of £650, plus cost of living bonus (at present £59 19s. 4d. per annum) and car allowance.

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

Applications, giving details of qualifications, experience, position with regard to military service and date of availability to take up duty, together with copies of two recent testimonials, should be sent to the undersigned not later than the 3rd July, 1945.

L. STOTT,
Town Clerk.

Municipal Offices,
Stubbylee Hall,
Bacup.
8th June, 1945. 2152

BOROUGH OF LUTON ELECTRICITY UNDERTAKING

Appointment of Technical Assistant

APPLICATIONS are invited for the above post. The majority of work will be in connection with the Corporation's Generation Station, and the candidate will be required to give technical assistance in other sections of the undertaking. Applicants must have sound experience in the design, layout and operation of modern power stations. Constructional and industrial experience will be an advantage.

Preference will be given to persons who are corporate members of the Institution of Electrical Engineers and/or the Institution of Mechanical Engineers.

The conditions of employment will be in accordance with the National Joint Board Agreement, and the salary Class J, Grade 8 (at present £469 rising to £491 per annum).

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

Applications, stating age, details of training and experience, and accompanied by copies of three testimonials, must be delivered not later than Monday, the 25th June, 1945, to:—

C. T. Melling, M.Sc.Tech., M.I.E.E., A.M.I.Mech.E.,
Borough Electrical Engineer,
Borough of Luton Electricity Undertaking,
St. Mary's Road, Luton, Beds.

Canvassing, either directly or indirectly, will disqualify.

The Ministry of Labour have given permission under the Control of Engagements Order, 1945, for the advertisement of this vacancy.

W. H. ROBINSON,
Town Clerk.

Town Hall, Luton, Beds.
June, 1945. 2145

ASSOCIATED MUNICIPAL ELECTRICAL ENGINEERS
(Great Britain and Ireland)
and the
ELECTRICAL POWER ENGINEERS' ASSOCIATION.

NOTICE

BACUP CORPORATION

Appointment of Engineer and Manager

THE Standing Joint Committee of the above Associations desire to point out that the above advertised post is not in accordance with Clause 10 of the Agreement made by the National Joint Committee of Local Authorities and Chief Electrical Engineers (Electricity Supply Industry) under which clause the latest available data of output indicates a commencing salary of £700 per annum rising to £824 per annum.

ALL ENGINEERS, WHETHER ENGAGED IN THE ELECTRICITY SUPPLY INDUSTRY OR NOT, ARE URGENTLY REQUESTED NOT TO APPLY FOR THE POST NOW BEING ADVERTISED, AND IF APPLICATION HAS ALREADY BEEN MADE, IT SHOULD BE WITHDRAWN.

W. ARTHUR JONES, A.M.I.E.E.,
Secretary,
Standing Joint Committee A.M.E.E.-E.P.E.A.
2153

APPLICATIONS are invited for the position of Junior Assistant Mains Engineer, who must be capable of superintending the installation and maintenance of high voltage and low voltage mains and of static substation plant. Applicants must have had a proper theoretical and technical training and practical experience, and possess initiative. A knowledge of drawing and the principles of estimating will be an advantage. Salary will be in accordance with Grade 10, Class H, of the N.J.B. salaries schedule. The successful candidate will be required to pass a medical examination and contribute to the Corporation's Superannuation Scheme. The Ministry of Labour and National Service have given permission, under the Control of Engagement Order, 1945, for the advertising of this vacancy.—P. Philip, M.I.Mech.E., M.I.E.E., City Electrical Engineer, Dudhope Crescent Road, Dundee. 2144

ASSISTANT Manager (service department) required for well-known radio manufacturer, London area. Sound technical knowledge of radio and television, experience in administration and record. Applications from Class "A" men invited only. Write, stating age and full particulars, to—Box 7260, A.K. Advg., 212a, Shaftesbury Avenue, W.C.2. 2113

BULL Motors (E. R. & F. Turner Ltd., Ipswich) invite applications for the post of Manager of their Birmingham Office. Applicants must be electrical engineers with outside selling experience, and preferably recent knowledge of the Midlands area. Applications, which will be treated in confidence, should be addressed to the Secretary. 2155

BUYER required for radio and electrical instrument manufacturer. Permanent post to suitable applicant. Previous experience essential. Write, giving age, salary and particulars.—Box 2122, c/o The Electrical Review.

CABLE Tester required to take charge of rubber cable test room in modern cable factory. Applicants must be conversant with the complete testing and examination of all types of power and small cables and flexibles. Apply, giving full particulars of qualifications, experience, salary required, etc., to—Box 2114, c/o The Electrical Review.

COUNTY Borough of Brighton Electricity Undertaking: Assistant Distribution Engineer. Applicants must be qualified electrical engineers with sound technical training and must have had experience on A.C. and D.C. systems in (1) laying, jointing and testing of high and low voltage cables; (2) location of faults, and (3) methods of change-over of supply. Salary is in accordance with N.J.B. Schedule, Class "J," Grade 9, at present £382 per annum. Appointment will be subject to provisions of the Local Government Superannuation Act, 1937, and selected candidate will be required to pass a medical examination. Age limit 40. Write, quoting D.1254XA, to Ministry of Labour and National Service, Central (T. & S.) Register, Room 5/17, Sardinia Street, Kingsway, London, W.C.2, for application form, which must be returned completed by 7th July, 1945. 2115

DRAUGHTSMEN required (after the present restrictions of employment are removed) by leading manufacturers in London area, for design department working on Radio and Television equipment. Previous experience essential. Good prospects. Write, stating age and full particulars to—Box 7247, A.K. Advg., 212a, Shaftesbury Avenue, W.C.2. 2081

EFFICIENT Lady Bookkeeper, with knowledge of typing.—Box 2104, c/o The Electrical Review.

ELECTRICAL wholesalers require Trade Counter Assistant (must be under 18 or over 51). Must be conversant with all types of electrical material for installation purposes.—London Electrical Co., 92, Blackfriars Road, S.E.1. 24

EXPERIENCED Armature Winder wanted for India. £40 per month plus 10% of concern's annual profit. Four years' term. Passages paid. Leave on half pay. Desirable features: Sound mechanical sense; possess snaps of own heavy mill or textile jobs rewound; good health; unmarried; age 25-35; had own wiring business; understand quoting. (1944 concern's profits were £7,500.) Write —Box 7108, c/o The Electrical Review.

FARNHAM Gas & Electricity Company: Mains Assistant. Applicants must be qualified electrical engineers and be experienced in the erection and maintenance of substations and in the laying, jointing and maintenance of E.H.T., H.T. and L.T. distribution systems, under ground and overhead. Salary £300 p.a., plus £62 10s. w.b. Pension scheme in operation. Age limit 40. Write, quoting D.1260XA, to Ministry of Labour and National Service, Central (T. & S.) Register, Room 5/17, Sardinia St., Kingsway, London, W.C.2, for application form, which must be returned completed by 25th June, 1945. 2128

HEAD Foreman required for electrical instrument assembly department. Capable trainer of female labour, experienced with modern production methods, not afraid of work. Good prospects to right man. Particulars of past experience, age and salary, and if disengaged.—Box 2085, c/o The Electrical Review.

LAMP Factory Manager. Required for the North, a Works Manager with technical experience and executive ability. The factory is small, with first quality production. Apply in confidence, with full particulars of qualifications, experience and salary required.—Box 2024, c/o The Electrical Review.

LONDON manufacturer of electrical accessories wishes to appoint Designer-Draughtsmen, over 51 years of age or outside present engagement restrictions only. Positions offered have good prospects and will carry good salaries. Please give age, experience and salary required. —Box 2120, c/o The Electrical Review.

LARGEST manufacturers of all types of kettle replacement elements, electrical spirals and electric iron elements are desirous of inviting applications from suitable gentlemen, over 51 years of age only, as Sole Representatives calling on public utility organisations and electrical trades generally. Attractive terms, excellent prospects for progressive representatives. Applications, detailing past experience, territory worked, to Box 2136, c/o The Electrical Review.

M.K. Electric Ltd. invite applications for vacancies for Designer-Draughtsmen, over 51 years of age or outside present engagement restrictions only. Applicants should have had previous experience in design and development of electrical accessories. Please write, giving age, experience and salary required, to—M.K. Electric Ltd., Wakefield Street, Edmonton, N.18. 2121

OLD-established Export Firm require the services of an experienced and reliable Buyer well versed in the electrical trade and shipping.—Box 2103, c/o The Electrical Review.

PLANNING and Progress Engineer required by Birmingham firm. Duties cover die production for drop forgings, extrusions, pressure castings, with some development and experimental work. First-class knowledge of recording, tabulating filing systems necessary. Salary £350-£450 p.a. according to ability. Applications, which must be in writing, stating date of birth, full details of qualifications and experience (including a list in chronological order of posts held), and quoting Ref. No. 1094, should be addressed to the Ministry of Labour and National Service, Appointments Office, 237, Broad St., Birmingham, 1. 2127

PRODUCTION Manager wanted for factory in Lanarkshire manufacturing domestic electrical appliances and employing 500/600. Applicant must have experience in up-to-date mass production methods. Full particulars, stating salary expected, etc., in confidence. Address—0661, Wm. Porteous & Co., Glasgow. 7177

QUALIFIED Illuminating Engineers required on outside staff by an established and well-known company covering commercial and industrial fields. Vacancies occur in districts throughout Great Britain. Applications from men over 51 years of age only, stating experience, technical qualifications and salary required. Good prospects for the right men. Write to—Box 41, c/o Pool's, Aldwych House, London, W.C.2. 2146

REQUIRED, Operation Foreman for shift duties in modern H.P. boiler house. Must be accustomed to large water-tube units of modern design, and must be good disciplinarian. The position is permanent and pensionable for suitable man. Wage 28.67d. per hour, rising to 29.67d. per hour when fully proficient. Applicants must state age and if married. The housing situation in the district is acute, and if the successful applicant is separated from his family he will be paid 24s. 6d. lodging allowance for a limited period whilst maintaining two homes. Applications should be addressed to—The City Electrical Engineer, Gloucester Corporation Electricity Dept., Commercial Road, Gloucester. 2017

SALESWOMAN required for electrical showroom (London, W.C.). Full particulars wages, etc., to—Box 2076, c/o The Electrical Review.

TECHNICAL Assistant required for sales and to supervise small department dealing with buying, material control and progress planning. Write, giving particulars of experience, salary, etc., to—The Manager, Cantie Switches Ltd., Northgate Works, Chester. 2141

TECHNICAL Sales Engineer required, must be fully conversant with transformers, and a sound connection. Apply—Managing Director, Yorkshire Electric Transformer Co. Ltd., Empire Works, Thornhill, Dewsbury. 2147

TEST Gear and Maintenance Engineer required (after the present restrictions of employment are removed) by manufacturers in S.E. London. Experienced in diagnosis and repair of electronic test and measuring equipment. Capable of designing simple jigs and fixtures. Write, giving full details age and experience to—Box 7251, A.K. Advg., 212a, Shaftesbury Avenue, W.C.2. 2082

WORKS Manager required for firm in the Midlands manufacturing all varieties of resistances and heating elements, employing 150/200. Write, giving full particulars of experience, age and salary required.—Box 2124, c/o The Electrical Review.

WORKS Manager required for manufacturers of electrical accessories, West London area. Must be a very fully experienced man on production, sound knowledge of machines and press tools, time and motion study, rate fixing, production control and all branches of general works management; 300 employees. Preference given to man experienced in precision press parts and mass production methods for high grade products. Reply, stating age, experience and salary.—Box 2069, 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.

CONGLETON Borough—Electrical Engr. and Manager.

SITUATIONS WANTED

ACCOUNTANT-Secretary (36), experienced administration and control all aspects accountancy and costing engineering industry, seeks progressive position, Southern or Eastern Counties preferred. Capable organiser, comprehensive knowledge office organisation and management, preparation monthly and periodical accounts. Exempt M.S. Free one month.—Box 7165, c/o The Electrical Review.

ADVERTISER, free July, seeks appointment Southern England, 20 years' experience as Chief Engineer or Foreman, covering selection, installation, maintenance, etc., of large works, hotels, etc., plant. Excellent refs. for ability and organising qualities, first-class technical qualifications. Last 5 years civilian electrical instructor to R.A.F.; 50 years of age.—C. Hawkes, 42, Herbert Road, Sompting, Worthing. 7171

ADVERTISER, 25 years' experience of mechanical design of electrical machinery and 3 years on technical publications, seeks change. Write—Box 7187, c/o The Electrical Review.

ALL-round Electrical and Radio Engineer, over 17 years' practical experience in all branches of trade, good technical education, well equipped, seeks service agencies in North-west England, full or part time.—Box 7151, c/o The Electrical Review.

AN Electrical and Mechanical Engineer (34), with 20 years' varied experience, including six years' apprenticeship, design, manufacture and repair of electrical machinery, plant running and maintenance, planning, tool design and production of light electro-mechanical products, seeks post offering opportunities for advancement. A.M.I.E.E.—Box 7191, c/o The Electrical Review.

BUYER, A.M.P.O.A., experienced in present-day conditions, desires change, preferably with company manufacturing scientific electrical instruments, electricity meters or electrical apparatus. At present in London area, but prepared to work anywhere in Southern England. —Box 7170, c/o The Electrical Review.

CHIEF Clerk (38), 10 years present post, electricity supply, seeks appointment, release obtainable.—Box 7134, c/o The Electrical Review.

DESIGNER-Draughtsman, with over 15 years' experience on the design and development of industrial and domestic cooking and heating appliances, seeks responsible position with prospects.—Box 7186, c/o The Electrical Review.

DOMESTIC Electric Heating and Cooking Appliances. Engineer, 25 years in all its branches, desires responsible post.—Box 7193, c/o The Electrical Review.

DRAUGHTSMAN, G.I.Mech.E., age 23, studying electrical engineering, 3rd year, requires experience, preferably practical.—Box 7185, c/o The Electrical Review.

ELECTRICAL and Mechanical Engineer, A.M.I.E.E., comprehensive experience power and lighting, design and installation, costing and complete administration, desires position with progressive industrialist or consultant.—Box 7173, c/o The Electrical Review.

ELECTRICAL Engineer, B.Sc. (1st Class Hons.), seeks progressive position. 4 years' apprenticeship and 5 years' experience in installation, design and development of electrical machines and control gear, including electronics.—Box 7194, c/o The Electrical Review.

ELECTRICAL Engineer, experienced on installation of electric melting furnaces, high frequency induction heating plant and works maintenance, seeks post with prospects.—Box 7192, c/o The Electrical Review.

ELECTRICAL Engineer, Grad.I.E.E., 14 years' experience in manufacture and design of control switchgear having complicated circuits, lifts, ventilation and small generating plant, anxious to hear of permanent executive post in London. Excellent education, initiative, ideas, writing ability, languages.—Box 7114, c/o The Electrical Review.

ELECTRICAL Maintenance Engineer, twenty years' experience radio transmitting equip., automatic machinery, all types of electrical equip.—Box 7153, c/o The Electrical Review.

ELECTRICAL Engineer (42), with wide experience in design and installation of works power plant, requires post in London. Extensive drawing office experience. Technical qualifications to A.M.I.E.E. standard. Free shortly.—Box 7188, c/o The Electrical Review.

ELECTRICAL Engineer (56), qualified, experienced all branches, 38 years, desires change. Consulting, planning or supervision. Salary about £500. Free after Aug. 20th.—Engineer, 1, Crescent Road, N.15. 7180

ELECTRICIAN-Plumber-Jointer (30), experience in all classes of cable jointing up to 11 kVA, willing to train for super tension work.—Box 7184, c/o The Electrical Review.

ENGINEER, B.Sc., A.M.I.E.E., age 38, holding senior administrative position in Indian sales organisation of British firm manufacturing motors, generators, transformers, switchgear, etc., desires change post-war to senior position in England, preferably one involving export management.—Box 7142, c/o The Electrical Review.

FOREMAN-Electrician desires change. All classes of contracting and maintenance. Box 7181, c/o The Electrical Review.

FLUORESCENT Lamp Auxiliaries. Design and Production Engineer requires change, take full charge. —Box 7149, c/o The Electrical Review.

GRAD.I.E.E., Triple Finalist of City and Guilds, P.M.G. Cert. (33), experienced installation, maintenance, lecturing, research, etc. Any offer (technical or commercial) given consideration.—Box 7139, c/o The Electrical Review.

HEAT Treatment. Keen man (39) seeks responsible position, exp. modern processing all types steel, micro-structures, testing, labour control, etc., used to overcoming technical problems.—Box 7174, c/o The Electrical Review.

HIGHLY-qualified Chartered Mechanical Engineer (42), seeks change. 25 years' elect. and mech. experience, ten years executive position on design, experiment and production of power-driven food-preparing and special purpose machines.—Box 7148, c/o The Electrical Review.

PLANT and Maintenance Engineer (44), A.M.I.E.E., comprehensive experience, desires responsible position. —Box 7189, c/o The Electrical Review.

POSITION as General Manager or Works Manager with first-class record in medium and light engineering production. Well versed in administration and organisation of labour. Capable of and experienced in re-organisation. Present salary £1,200. London district.—Box 7154, c/o The Electrical Review.

RESPONSIBLE executive position required, offering attractive prospects. Present Sales Manager (30), with good connections and wide experience of sales, production, staff control and administration. Midland area preferred. Please indicate salary and position in full.—Box 7166, c/o The Electrical Review.

RESPONSIBLE position required by Engineer with progressive company. 17 years' electrical industry, experienced works installations, production, sales, commercial, office administration, at present representing large Midland electrical engineers. London or south.—Box 7183, c/o The Electrical Review.

SALES Engineer (45) requires position, available in two months; 20 yrs.' experience, electrical and mechanical. Considerable pre-war turnover and connection, first-class testimonials.—Box 7138, c/o The Electrical Review.

SALES. Technical Sales Engineer (50) wishes to represent manufacturer of transformers, heating and cooking equipment or resistances, in London and South. Good connection for approved equipment. Min. rem. £500. Own car.—Box 7113, c/o The Electrical Review.

SUBMERSIBLE motor-driven borehole pumps. Chartered Electrical and Mechanical Engineer, skilled in design and manufacture, wishes contact pump manufacturers interested in developing sizes 500 to 120,000 g.p.h.—Box 7130, c/o The Electrical Review.

WELDING Foreman, position required, 16 years' experience sheet metal fabrication and light structural work, good disciplinarian, de-reserved, Home Counties or South preferred.—Box 7144, c/o The Electrical Review.

YOUNG Electrical Engineer, widely travelled, at present holding responsible position abroad, could be free for re-engagement, inducement offering, in the U.K. or on site early 1946. Good education and technical training, excellent references. Wide experience in executive situations home and abroad on installations, maintenance, repairs to electrical and mechanical equipment, steam and diesel engines, planning, layout. Any employer requiring really keen young engineer, preferably for service overseas, should write for further details to Box P.368, 19/21, Corporation Street, Birmingham, 2. 2040

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YOUNG, progressive Electrical Engineer, having a large connection throughout Northern Ireland, would like to get in touch with manufacturers of domestic and industrial electrical appliances and accessories, with view to representing them in this area.—Box 7190, c/o The Electrical Review.

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

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Plant for Disposal

TENDERS are invited for the purchase and removal from site of REDUNDANT PLANT, comprising:

1 W. & T. Avery 50-cwts. Platform Weighing Machine removed from narrow gauge railway; platform 4' 6" × 4', scale from 1 lb. to 50 cwts.

3 120-kVA British Electric Transformers, 6.6/2.1 kV, 1-phase, oil-immersed transformers. Indoor pattern, with terminals suitable for V.I.R. connections through porcelain bushes. Date of purchase 1920.

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2	50-kVA	..	air insulated.
1	25-kVA	..	oil immersed.
2	10-kVA	..	.. ..
3	6-kVA	..	.. ..
2	45-kVA	..	.. ..

All suitable for V.I.R. connections, 2,000/220/110 volts, 1-phase.

Secondhand Meters

509 (various manufacturers), 2½ amp., 230 v. A.C. ordinary.
450 .. .. 5 amp., 230 v. A.C. ordinary.
76 (Aron), 10 amp., 230 volts A.C. prepayment.

All in good condition and ready for further service. Particulars and forms of tender may be obtained on application to R. H. Harral, M.I.E.E., Electricity Offices, Jubilee Street, Blackburn.

CHAS. S. ROBINSON, Town Clerk.
2080

COUNTY BOROUGH OF PRESTON

Preston Institution, Fulwood

OFFERS are invited for the purchase and removal of the following redundant Steam-driven Generating Sets:—

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3. 55-kW Ashworth & Parker/Mather & Platt D.C. Generating Set, vertical compound Steam Engine, pressure 125/130 lbs./sq. in., speed 630 r.p.m., direct coupled on C.I. bedplate to Mather & Platt 55-kW D.C. Dynamo, 220 volts.

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The Corporation do not bind themselves to accept the highest or any tender. 2074

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One	12,000 lbs.	..	200 lbs. ..
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ALTERNATOR, 500 kVA, 3-p., 50 c., 400/440 v., 750 revs., direct coupled exciter, 2 brgs., on bedplate. —Stewart Thomson & Sons, Fort Road, Seaforth, Liverpool, 21. 58

AMMETER, D.C., A.C., D-10 portable; Timeswitch, 6 amp.; 1-kW Hotplate; Everay High Frequency Set, £15.—C. Behrens, 52 Elgin Cres., Ladbroke Gro. W.11. 7169

BELT Grinders or Sanders, 4" wide belt, £5 5s.; 6" wide belt, £10 10s.—John E. R. Steel, Clyde Mills, Bingley, Phone 1066. 52

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GENERATING Sets for sale, 18 kVA, 400/3/50, petrol; 300-amp. petrol-driven Portable Welding Set; 2½-kW, 220-v. D.C. Crude Oil Set.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 2157

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MOTORISED ½" Bench Drilling Machine, 13 speeds, £12 12s. 6d.—John E. R. Steel, Clyde Mills, Bingley, Phone 1066. 51

NAMEPLATES, Engraving, Diesinking, Stencils, Steel Punches.—Stilwell & Sons Ltd., 152, Far Gosford Street, Coventry. 14

ONE 3-h.p. Higgs Motor, 440 v. A.C., 955 r.p.m., complete with starter; also one 1-h.p. Motor, 440 v. D.C., 910 r.p.m., complete with starter. In perfect condition.—E. Brinkman Ltd., 15a, High St., Epsom. Epsom 2565. 7172

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SELF-Priming Electric Pumps, 300 g.p.h., £12.—John E. R. Steel, Clyde Mills, Bingley, Phone 1066. 53

SEVERAL duplicate 20-h.p. and 25-h.p., 440-volt D.C., 3-bearing Motors by Mather & Platt, on baseplates, 650 r.p.m., with Brookhirst panels.—Newman Industries Limited, Yate, Bristol. 2047

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6½-kW Turbo-Generating Set, 110 volt D.C., £40.—Stewart Thomson & Sons, Fort Road, Seaforth, Liverpool, 21. 55

7½-kW Steam-driven Generating Set, Ashworth Parker vertical engine coupled to L.D.M. compound wound 230-volt generator, £120.—Stewart Thomson & Sons, Fort Road, Seaforth, Liverpool, 21. 54

8 Desk Fan, 45s.; Towel Rail, 40s.; Bench Motors, 1/10 and 1/20 h.p., 40s. each; all for 200/220 volts direct current. Further particulars from—Box 7164, c/o The Electrical Review.

80-kW. 220-v., 350-revs., S.I., two ped. brgs., on bedplate.—Greenhalgh Bros., Burton's Field Mill, Atherton, nr. Manchester. 2044

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500 ¾-h.p. D.C. Motors, 1,440 r.p.m., 230 v., cont. rating, compound wound, ball bearings, condition as new, G.E.C. Offers to—Box 2020, c/o The Electrical Review.

1,000-kW Turbo-Alternator Set, made by Metropolitan-Vickers in 1920, 3-phase, 50 period, 400 volts. Steam pressure 200 lbs., jet condenser. Apply —Patons & Baldwins Ltd., Halifax, Yorkshire. 2000

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COMPANY MEETING

ANTRIM ELECTRICITY SUPPLY

No. 8 Development Scheme

THE 17th Ordinary General Meeting of the Antrim Electricity Supply Company was held on Wednesday, 6th June, 1945, at 88, Kingsway, London, W.C. Mr. R. P. Beddow (chairman and managing director) presided.

In the course of his speech, the Chairman said:

I feel it my duty to report to the shareholders circumstances which have arisen during recent months and which may vitally affect the companies. I refer to the No. 8 Development Scheme which is being promoted by the Electricity Board for Northern Ireland and has been submitted to the Ministry of Commerce for confirmation under the Electricity (Supply) Act, 1931. The scheme covers the whole of the areas of supply of the Antrim companies, as well as the urban and rural districts of Limavady. The Antrim companies are, therefore, the undertakers primarily affected by the scheme.

The main object of the scheme is stated to be the promotion, co-ordination and improvement of the supply, distribution and sale of electricity within the area to which the scheme relates, but, even if the scheme is confirmed, it would in itself confer on the Board no power to distribute electricity in any of the areas of supply of either of the Antrim companies unless and until the Board acquires the companies' undertakings. On the other hand, on the confirmation of the scheme, the Board would become empowered by the Act of 1931 to acquire any of those undertakings at any time compulsorily. As far as the companies' areas are concerned, that appears clearly to be the main, if not the only, purpose of the scheme.

The main powers of the Antrim Electricity Supply and Distribution Companies were conferred by a Special Act of Parliament in 1928, and by a Distribution Order granted in 1932. As is customary, the powers of the Supply Co. under the Act of 1928 are not at present purchaseable by any local or other similar authority; the undertaking authorised by the Distribution Order may not be purchased until 1974, when the local authorities will first become entitled to exercise the rights of purchase given them under the Electric Lighting Act, 1888. The Distribution Order was applied for before the Act of 1931 was passed, but was not granted until May, 1932, some twelve months after the passing of the Act. Before the grant of the Order the financial stability of the companies was carefully inquired into by the Ministry of Commerce, and the Order—deferring the earliest date of purchase until 1974—was then granted to the Distribution Co. It may be noted that had the Government desired the Electricity Board to be made responsible for the development of electricity supply in the area covered by the Distribution Order, the Order could have been granted to the Board which was in being at the time.

The Directors' View

It is our view that the Act of 1931 was not intended to apply to statutory undertakings such as ours which cover a wide and consolidated area, and are moreover now inter-connected with the undertakings of the Electricity Board and of the Belfast Corporation. Furthermore, we maintain that we were entitled to take at their face value the powers which were granted to us by Parliament or under statutory authority, and we have developed our areas on the faith of those powers.

We have borne the burden of the lean pioneering years, and if at this juncture the undertakings were to be compulsorily taken from us, the companies would, in my view, be receiving a very raw deal which would not only be most unfair to the companies but would moreover not be calculated to enhance the credit for fair dealing of Northern Ireland. If the scheme is confirmed, the companies will not know whether any, and if so which, of their undertakings may be compulsorily taken from them at any time by the Electricity Board, and with this sword of Damocles hanging over them it would become impracticable for the companies to proceed with the proper development of their areas.

The companies have, therefore, lodged the strongest representations against the confirmation of the scheme, and will be represented by counsel at the inquiry which is to be held by the Ministry of Commerce in July.

The report was unanimously adopted. 2130

COMPANY MEETINGS—*Continued*

EDMUNDSONS ELECTRICITY CORPORATION

Lord Royden's Review

THE Right Hon. Lord Royden, C.H., in the course of his address on Friday, 8th June, to the stockholders of Edmundsons Electricity Corporation Ltd., said: The following facts need no emphasis from me to indicate the immensity of the tasks which your companies performed successfully during the periods reviewed:

1. Total assets were increased from just under thirty-three million pounds to over forty-six million pounds;

2. Revenue from sale of current increased from under five million pounds to over eleven million pounds;

3. Units sold annually to consumers increased from eight hundred million units to two thousand three hundred million units;

4. Provision for taxation was increased from ninety-five thousand pounds to over one million and seventy-six thousand pounds;

5. The average cost of coal per ton increased from twenty shillings to thirty-seven shillings;

6. The average price of units sold for all purposes has decreased from 1.27d. to 1.08d.; for domestic and commercial purposes the decrease was from 2.77d. to 1.94d.;

7. Net profit to Edmundsons decreased from five hundred and eighty-two thousand pounds to five hundred and thirty-five thousand pounds;

8. Not one tariff has been increased; many have been reduced.

We learned a month ago from Mr. Herbert Morrison (then Home Secretary) that a state of chaos and muddle existed in the electricity supply industry. The indisputable facts and figures which I have placed before you disprove his outrageous statement.

If the last five years have done nothing else, they have demonstrated the elasticity, efficiency and virility of the industry. They are a denial of the accusation of a state of chaos and muddle and the claim that nothing less than nationalisation will enable us to solve peacetime problems.

I apologise to you for taking up your time in dealing with what to all who are unbiased is obviously untrue. Unfortunately, however, the propaganda technique of alleging distress and chaos and exaggerating out of all proportion minor and easily adjustable anomalies was proved by totalitarian countries to be so successful that there is a risk of these methods being copied here.

It is easy to make charges of inefficiency and to talk glibly of the necessity for drastic treatment for our industry, but in this country facts and figures (however hateful they may be to the doctrinaire) have always been considered of greater value than unsubstantiated invective.

During the last five years we have been prohibited from connecting new consumers except for purposes directly or indirectly connected with the war effort. We look forward to the time when we, as pioneers of rural electrification, can be free again to set about our task of completing the rural electrification of our areas.

All our plans are made, and we propose to spend, directly or indirectly, on rural electrification about £17,000,000 during the first five years after labour and materials are available. That is a heavy task, but it is one which will be faced with the same skill and zeal as has produced the figures it has been our privilege to place before you to-day.

It is a task, too, which in our view must be carried out so that your corporation may be in the position to show how the blessings of electricity service may be brought to rural industries and dwellers alike.

A limited number of copies of the Chairman's report in full are available on application. 2158

CALLENDER'S CABLE AND CONSTRUCTION

Proposed Amalgamation

IN the course of his statement issued to stockholders of Callender's Cable and Construction Co. Ltd., in connection with the Annual General Meeting to be held on June 15th, 1945, the chairman, Sir Malcolm Fraser, Bt., G.B.E., reports a profit of £503,185, as compared with £465,115 last year (an increase of £38,070), which, with the £315,884 brought forward from 1943, leaves a balance of £819,069 available for distribution. The directors recommend a final dividend of 10% and a cash bonus of 5%—both less tax—making a total of 20% for the year.

After dealing with the year's balance sheet and accounts, the Chairman's statement continues as follows:—

War-time Activities

It is now possible to give you some indication of the Callender Company's war-time activities. The problems produced by the magnetic mine; the disappearance of natural rubber; and the demand for cables suitable for transmitting alternating currents for Radar and similar purposes (having frequencies which could not be contemplated by the cables in use in pre-war times) have presented problems of the first magnitude. In the solution of all these problems your company has taken the lead, and in the national interest has placed its technique at the disposal of the Government to be used by the industry generally.

Among numberless war activities is one which your company, together with one or two other cablemakers with waterside factories, were able materially to assist the Government in the production of the celebrated "Pluto" oil-pipe lines which have transmitted a million gallons of petrol a day across the Channel.

What will interest stockholders at the moment are the details of the proposed amalgamation of Callender's Cable and Construction Company with the British Insulated Cables Company, under the combined name of "British Insulated Callender's Cables Ltd."

The complete amalgamation of Callender's and British Insulated Cables Ltd., excluding Callender's Trust, is the logical consummation of past policy of collaboration, which will have, as its main objects: The avoidance of future duplication of capital and revenue expenditure; the pooling and speeding-up of research; the achievement of the maximum efficiency in up-to-date production, sales, distribution and administration; the rationalisation of orders permitting longer and continuous runs of the same types, thus eliminating unnecessary duplication of process layouts, etc., with a reduction in production costs and delivery dates, and the consequent strengthening of the competitive capacity in the export markets overseas.

So far as our exports are concerned, it is the considered opinion of our expert advisers that if the two companies concerned combine their export departments here, and distribute more widely their overseas selling and technical forces, the volume of post-war export sales should be substantially increased.

Position of Callender's Trust

May I now turn to the position of Callender's Trust in the proposed scheme of amalgamation? As stockholders have been informed, the Trust Company's issued share capital of 525,000 shares of £1 each, fully paid, and all owned by Callender's Cable and Construction Co., will, subject to the consent of the Callender's Cable Co.'s stockholders, be divided among the latter company's Ordinary stockholders in addition to the shares which they will obtain from the proposed new company.

The terms of the amalgamation provide that a holder of £100 Callender's Ordinary stock will receive 270 Ordinary shares of the new company, and 46 shares of Callender's Trust Ltd., together with any small cash payment in respect of his fractional share of the proceeds from the sale of those shares of Callender's Trust which cannot be distributed among the Ordinary stockholders.

The Callender Ordinary stockholders who retain their Trust Company shares can reasonably hope that, all things being equal to the pre-war years of trading and profit, they should obtain not less than the 20% dividend which they received during the four out of the past 25 years when they were content with a dividend of 15%.

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Index to Advertisers

(*Continued from page* 81)

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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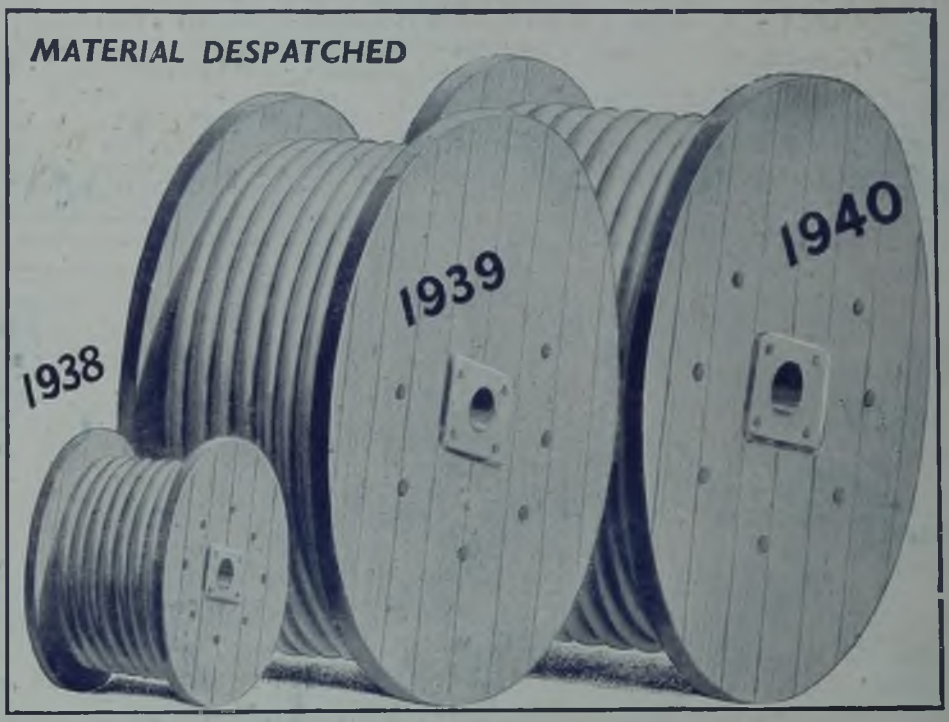

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